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SCHOOL OF PHYSIOTHERAPY RK.UNIVERSITY

Volume XII Issue I

PHYSIO FORUM

ANNUALLY PUBLISHED PHYSIOTHERAPY NEWSLETTER

Top Tier Reflection

Dr. Amit Lathigara
Vice Chancellor, RK University

Dear Esteemed Physioforum Participants and Readers,

It is with great pleasure and enthusiasm that I extend my warmest greetings to all of you as the Vice Chancellor of RK University. Physioforum serves as a remarkable platform for the exchange of knowledge, ideas, and advancements in the field of physiotherapy. Through engaging dialogues and insightful presentations, we can collectively refine our understanding of human movement, rehabilitation and Physical well-being.

I congratulate Dr. Amit Sharma for pioneering this journey of Physioforum and providing physio scholars a platform to learn, share, and inspire. May this issue ignite your passion, invigorate your pursuit of excellence, and deepen your commitment to advancing the frontiers of physiotherapy.
Wishing you a fruitful and enlightening experience at Physioforum 2024.

Dr. Priyanshu V Rathod PT, Ph.D
Director, Internal Quality Assurance Cell (IQAC)
Dean, Faculty of Medicine

Greetings to all readers of PhysioForum,

It is with immense pleasure that I extend my warmest regards and welcome you to the latest edition of our quarterly publication. PhysioForum continues to be a beacon of knowledge and insights, showcasing the dynamic world of physiotherapy and its far-reaching impact on healthcare.
In each issue, we strive to encapsulate the spirit of innovation and dedication that our esteemed School of Physiotherapy stands for. From the latest advancements in clinical practice to groundbreaking research and patient stories that touch our hearts, PhysioForum remains a platform where the essence of our field is beautifully woven together.

I encourage you to immerse yourselves in the enriching content curated by our passionate contributors. As we navigate the ever-evolving landscape of physiotherapy, let this publication serve as a source of inspiration, education, and connection. Thank you for your unwavering support, and I look forward to embarking on this journey of discovery and growth with you.

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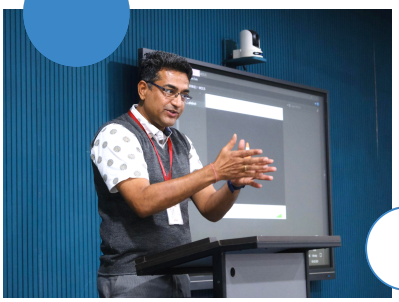
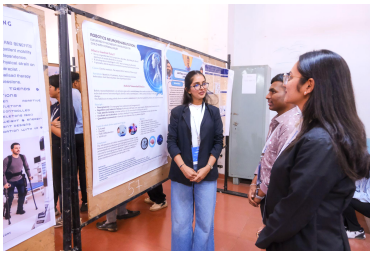







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INTERNATIONAL YOGA DAY

On June 21, 2023, the School of Physiotherapy at RK University celebrated International Yoga Day with a seminar on "Yoga for Back Pain," led by Chief Physiotherapist Dr. Urvi Pithwa. Approximately 90 BPT students participated, learning about yogic practices for managing back pain, including asanas, breathing techniques, and holistic treatment approaches. The seminar concluded with OM chanting, and was supported by Dr. Amit Sharma, Director of the School of Physiotherapy.

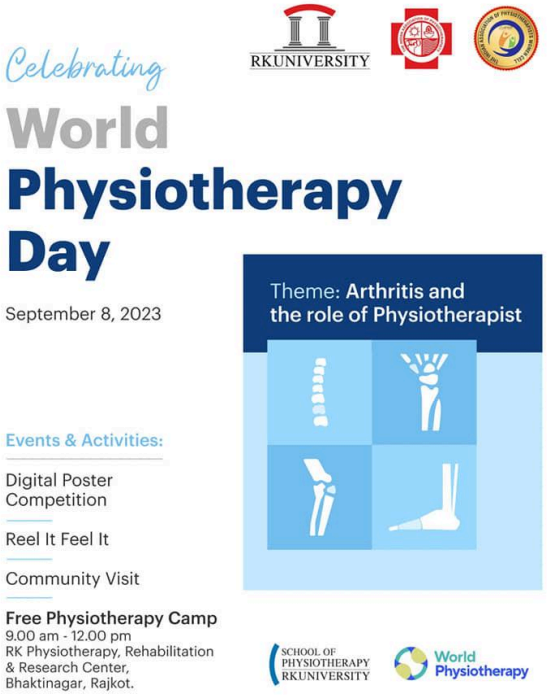
WORLD ASTHMA DAY

On World Asthma Day, School of Physiotherapy, RK University had Organized a free Awareness Camp for Prevention and Management of Asthma in Cotton Industrial Workers on 2nd May, 2023 in association with Radheshyam Spinning Mill PVT.LTD. at Shemala, Gondal, Rajkot. 10 students participated in the camp under the guidance of Dr. Kajal Pokar. Around 50 subjects took the advantage of health checkup camp. Give Basic Awareness about Asthma. Peak Expiratory Flow Measures and Asthma Control Test were measured and recorded & Physiotherapy treatment & advice was given to them.

WORLD HYPERTENSION DAY

On May 17, 2023, the School of Physiotherapy at RK University organized a World Hypertension Day event led by Dr. Parthkumar Devmurari, Dr. Khushboo Parmar, and Mr. Arunkumar Shreshtha. Participants received Group Relaxation Therapy training, blood pressure measurements before and after the session, and learned about carotid massage. The event demonstrated the positive impact of relaxation therapy on reducing blood pressure levels.

The World Physiotherapy Day event, held on 08/09/2023 at Shri Ramnik Kuvarba Vridhashram and RK Physiotherapy Rehabilitation and Research Centre, aimed to raise awareness about the vital role physiotherapy plays in promoting health, preventing disease, and rehabilitating individuals, particularly the elderly. Over 70 participants engaged in activities such as tailored physiotherapy sessions, educational workshops on fall prevention and joint health, health assessments, and interactive games. A physiotherapy camp, poster presentations by students, and workshops were organized to extend services to the community. Collaboration with IAP, IAP Women's Cell, and healthcare professionals ensured a multidisciplinary approach. Feedback from participants highlighted improvements in mobility, well-being, and nutritional understanding. The event fostered community engagement, enriched the lives of elderly residents, and promoted the importance of physiotherapy. Acknowledgments were extended to the Indian Association of Physiotherapists, IAP Women's Cell, and Ms. Bhavnaben Joshipura for their support in making the event a success.



HEMOGLOBIN CHECK-UP DRIVE AND CERVICAL CANCER AWARENESS CAMP

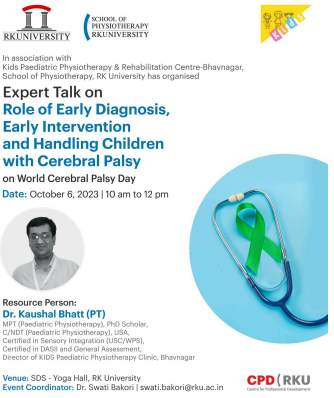
On September 13, 2023, B T Savani and the School of Physiotherapy, in collaboration with the Kundariya Cancer Prevention Foundation, organized a health camp at RK University. The camp provided hemoglobin level tests to around 300 students and staff, emphasizing the significance of iron and haemoglobin in overall health. Individuals with low haemoglobin received appropriate medications and consultations. Additionally, a cervical cancer awareness program was held for female students to increase awareness about cervical cancer prevention and health. This initiative highlighted the importance of regular health screenings and education on critical health issues.

World Alzheimer's Day

On 21st September 2023, the School of Physiotherapy organized an Alzheimer's Awareness Drive at Recourse Ground, Rajkot, to commemorate World Alzheimer's Day. The event, led by Dr. Hiral Mehta under the guidance of Dr. Amit Sharma, successfully educated 30 participants on the signs, symptoms, and causes of Alzheimer's disease. The drive aimed to raise awareness, dispel common misconceptions, and promote a deeper understanding of the disease among the elderly population in the region. The event was well-received, and the participants appreciated the valuable information shared. Special thanks were extended to the School of Physiotherapy and the PG students for their support in making the event a success

World Cerebral Palsy Day

On 6th October 2023, the School of Physiotherapy at RK University, in collaboration with Kids Physiotherapy & Rehabilitation Centre, Bhavnagar, organized an event to celebrate World Cerebral Palsy Day at SDS Yoga Hall. The event featured an expert talk by Dr. Kaushal Bhatt on the "Role of Early Diagnosis, Early Intervention, and Handling Children with Cerebral Palsy." A total of 76 participants attended the session, which included interactive discussions and hands-on training on managing and rehabilitating children with cerebral palsy. The event, organized by Dr. Swati Bakori under the guidance of Dr. Amit Sharma, was a valuable learning experience. Sincere gratitude was expressed to Dr. Bhatt and the intern students for their support in making the event a success



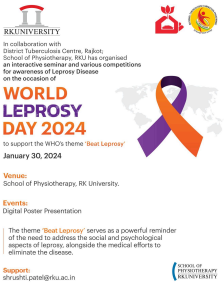
World Heart Day

On World Heart Day 2023, the School of Physiotherapy at RK University organized Basic Life Support (CPR) training for school teachers at two locations: P & B School, Rajkot, and Unique Group of Schools, Atkot, on 29th September 2023. The events were conducted under the theme "USE HEART, KNOW HEART" with the goal of spreading awareness and equipping participants with life-saving skills. Both events were coordinated by Dr. Nidhi Ved under the guidance of Dr. Amit Sharma, with certified trainers from the American Heart Association leading the sessions. Each event saw the participation of 60 teachers as whole and the efforts were supported by PG students. The organizers expressed gratitude to the respective schools' management for their collaboration and the students for their assistance.

WORLD ARTHRITIS DAY

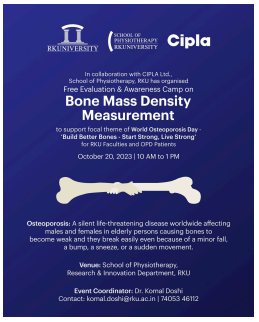
On World Arthritis Day, 12th October 2023, the School of Physiotherapy at RK University organized a seminar on evidence-based practice in arthritic conditions in collaboration with Aarogyam Hospital, Sunshine Physiotherapy Clinic, Arham Multispeciality Physiotherapy Clinic, and supported by the Society of Indian Physiotherapists (SSIP). The seminar, held at the SOM Seminar Hall, featured prominent speakers including Dr. Devang Mandalia (MS Orthopedics), Dr. Vaibhavi Ved (MPT), and Dr. Disha Ruparelliya Bhate (PhD), who discussed various aspects of evidence-based practice in treating arthritic conditions. The event was attended by 120 participants, comprising both bachelor's and master's students. Acknowledgements were extended to the guest speakers and participants, with special thanks to Dr. Swati Dhrangu for organizing the event and Dr. Amit Sharma for his support

WORLD LEPROSY DAY



WORLD OSTEOPOROSIS DAY

On October 20, 2023, the School of Physiotherapy at RK University, in collaboration with CIPLA Ltd., organized a free Bone Mass Density Measurement camp for RKU Faculties on World Osteoporosis Day. The camp aimed to raise awareness about bone health and osteoporosis prevention. A total of 216 participants attended, learned about their bone strength, and received advice on preventive measures to improve bone health

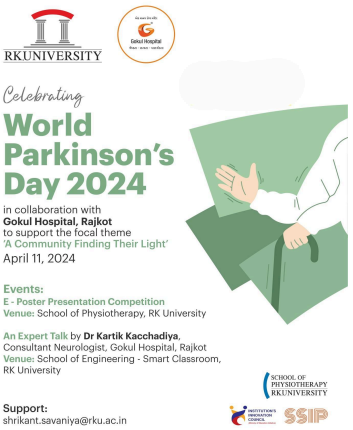


WORLD HEALTH DAY

Participants were divided into 17 groups and engaged in the competition, which began with instructions and material distribution at 9:00 AM. Over two hours, from 10:00 AM to 12:00 PM, participants created posters that reflected their ideas and creativity. Each group presented their poster to the judges, and Group 4 (Vatsal Shah, Meghal Kaneria, Prince Yadav, Maithili Jadhav) was declared the winner, with Group 9 (Pooja Koli, Dithya Rashamina, Nupur Kacha) as runners-up. The event concluded with positive feedback from participants, who appreciated the creativity and teamwork showcased. Special thanks were extended to juries Dr. Dipti Nair and Dr. Kajal Kalaria, as well as the Young Indian Team from the School of Management for their support.

WORLD PARKINSON'S DAY

On April 11, 2024, the School of Physiotherapy at RK University, in collaboration with Gokul Hospital, celebrated World Parkinson's Day with an expert talk and an E-Poster Presentation Competition. Held in the SOE Smart Room, the event aimed to raise awareness about Parkinson's disease, focusing on its symptoms, management strategies, and therapeutic interventions. Dr. Kartik Kacchadiya, a renowned neurology expert, delivered a keynote session that provided 60 participating BPT students with valuable insights into the disease's etiology, progression, and treatment approaches. The E-Poster Presentation that followed offered students a platform to showcase research and innovative ideas, fostering intellectual engagement and a deeper understanding of Parkinson's disease. The event, marked by enthusiastic participation and interactive learning, successfully highlighted the importance of awareness and education about this neurodegenerative condition.



WORD OBESITY DAY

The School of Physiotherapy at RK University marked World Obesity Day on March 4, 2024, with two impactful events. The first was an expert talk by gynecologist Dr. Mital Jadav on "Obesity and Women's Health," addressing the effects of obesity on reproductive health, hormones, and chronic disease risks. The second was a Free Obesity Evaluation and Awareness Camp for faculty and students, offering health assessments and consultations. With over 100 attendees and strong support from organizers and faculty, the initiative effectively promoted obesity awareness and healthy living.

20SPT BATCH CHP LIST 23-24

Camp 1: "Empower Your Breath: Free Physiotherapy Camp for Homemakers to Boost Lung function." & Camp 2: "Aerobic Adventure: Boosting Student's Health", Guided By Dr. Kajal Pokar With Students Mungra Shailee, Marakana Khushi, Sorathiya Urvi, Andani Mansi, Padariya Diya

Camp 1: Aerobic assessment and aquatic aerobic training for school going childrens & Camp 2: Awareness and role of physiotherapy in gynecological cancers, Guided By Dr. Harsh Badrakia With Students Gargi Bambhrolia, Khushi Pambhar, Kruti Jani, Maulik Vachhani, Vansh Trivedi, Sharad Raval

Camp 1: "EVALUATION OF FITNESS IN ATHLETES (TENNIS PLAYERS)." & Camp 2: "WEIGHT! IT'S NOT OVER YET (OBESITY ASSESMENT AND MANAGEMENT)", Guided ByDr. Namrata Sojitra With Students Shrutika Jadhav, Siddhi Mori, Margi Patel, Nidhi Sajeev, Shruti Sanandiya, Krushali Sanja

Camp 1: "Assessment and Physiotherapy management of knee pain in Geriatrics." & Camp 2: "Assessment and physiotherapy management of problems occurs before and during menstruation in girls ", Guided By Dr. Swati Dhrangu With Students Goswami Vrushika, Kachhela Kruti, Parmar Riddhi, Popaliya Diya

Camp 1:"Comprehensive Health Assessment Camp: Evaluating Pulmonary Function, Blood Pressure and Blood Sugar." & Camp 2: "An Evaluations Camp of Pes Planus (Flat Foot) for School going Children.", Guided ByDr. Amit Sharma With Students Nidhi Dethriya, Axit Dhaduk, Guaraj Domadiya, Rimanshi Ramani, Rinkal Gami, Vikram Modhvadiya

Camp 1: EVALUATION AND MANAGEMENT OF BODY COMPOSITION AND PHYSICAL FITNESS & Camp 2: EVALUATION OF HANDGRIP STRENGTH IN SCHOOL GOING STUDENTS', Guided By Dr. Krupa Tank With StudentsKhushbu Kanabar, Ekta Trivedi, Shikha Panara, Bansari Barad, Mutale Longolongo, Prabina Shrestha

Camp 1: "The core cure-unlocking swimmer's potential through Physiotherapy" & Camp 2:Effect of PCOD & Stress on Academic Perfomance in school going Girls, Guided By Dr. Hiral Mehta With Students Dimpal Chotaliya, Mitali Makwana, Pragati Nimavat, Chandrika Parmar, Aaradhana Shukla

Camp 1: "Pre-natal Awarness program for pregnancy " & Camp 2: Groove and Glide camp for school going children , Guided By Dr. Nikhita Dodiya With Students Agravat Bhakti, Agravat Krishna, Anadkat Diya, Lunagariya Manali, Ghodasara Dharti, Rafih Firdouz

Camp 1: Diagnosing Respiratory System–Related Issues for Cement Factory Workers & Camp 2:Effect of heavy bag on foot posture in school going children , Guided By Dr. Shrikant Savaniya With Students Dipal Bechra, Hemali Chaniyara, Tanvi Chavda, Shruti Parmar, Princy Ramani, Niyati Vyas

Camp 1: Fall Prevention in Elderly (Assessment and Exercise aimed at Improving Balance) & Camp 2: Effect of Heavy Bagpack & Electronic Device on Posture, Guided By Dr. Shrushti Patel With Students Arun K. Shrestha, Malhar Jadav, S.Sathushehan, Abhinav Kumar, Vidhi Umretiya, Hirva Dave

Camp 1: Lung Disease Prevention and Assessment: Information and Education camp for Workers' health & Camp 2: Student Fitness Evaluation: To Check Flexibility, Endurance and Power for Students, Guided By Dr. Parthkumar devmurari With Students Kajal Ajana, Priya Gadhvi, Purva Kantariya, Mahima Kapta, Tulsi Patoliya, Sitapara Arti

Camp 1: Geriatric Physiotherapy : Assessment and management camp & Camp 2: Healthy Future: Assessing and Managing Obesity and Hamstring tightness in Children, Guided By Dr. Nidhi Ved With Students Hiteshree Parmar, Ketan Khila, Rathod Bindiya, Nidhi Maheta

Camp 1: Physiotherapy Assesment and Management Camp & Camp 2: Healthy Futures: Assessment and Managing Obecity and Hamstring Tightness in Children, Guided By Dr. Chirag Solanki With Students Meet Joshi, Rutu Kapuriya, Mitali Parmar, Jeni Savalia, Sakshi Trivedi, Khushali Vasoya

Camp 1:"A free physiotherapy camp to assess and manage musculoskeletal pain resulting from unhealthy lifestyle choices" & Camp 2:"Focus and Flourish: A Neuro Physiotherapy Camp for Enhancing Cognitive Skills and Memory Mastery", Guided By Dr. Urvi Pithwa With Students Nensi Kundariya, Bhagirath Pokar, Bhakti Santoki, Meenakshi Sharma, Dhaval Solanki, Pranali Vasiyani

Camp 1: "Free Physiotherapy Assessment and Management Camp for Common Musculoskeletal Disorders in Farmers of Tramba Village." & Camp 2: "Camp on Ergonomic Advice & Physiotherapy Awareness for School going Children, Guided By Dr. Namrata Desai With Students Pranav Hadiya, Bhagiya Ekta, Gajera Urvi, Devangi Rangani, Drashti Mavani, Jinal Mavani

Camp 1: Evaluation of Physical & Musculoskeletal Fitness in School going children - Effortless Fitness. & Camp 2: Evaluation of Musculoskeletal disorders of Spine and Knee in Geriartric Population By Dr. Komal Doshi With Students Dixa Bariya, Purva Bhalodi, Harsh Chikhaliya, Parisha Merja, Vishva Raiyani, Devanshi Raiyani

Educational Tour to Bidada by the School of Physiotherapy, RK University

On June 15th, students from the School of Physiotherapy at RK University begin a memorable educational tour to Bidada, a trip that blended hands-on learning with cultural exploration.

Upon arrival in Bidada, the students visited the renowned **Shree Jaya Rehabilitation Center**, where they gained invaluable insights into patient assessment and management. The tour of the center's diverse departments provided a comprehensive understanding of the rehabilitation process, offering students a rare glimpse into the real-world application of their classroom knowledge.

The educational experience was enriched by the guidance of **Dr. Urvi Pithwa**, a distinguished faculty member of the School of Physiotherapy. Her expertise and mentorship ensured that the students made the most of this learning opportunity.

This educational tour was meticulously planned, executed, and organized by **Dr. Chirag Solanki**, a dedicated faculty member of the School of Physiotherapy. His efforts ensured a smooth and enriching experience for all participants, reflecting the university's commitment to holistic and experiential learning.

INTERNATIONAL EDUCATIONAL VISIT

Students from RK University recently embarked on a transformative two-week journey to the University of Applied Sciences in Nysa City, Poland, where they participated in the Health and Personal Well-being course. From July 1st to July 12th, 2024, the students immersed themselves in a diverse academic and cultural experience, broadening their horizons and enhancing their understanding of health and wellness. This unique opportunity not only enriched their academic pursuits but also fostered personal growth and global connections.

BREATH & BEATS SUPPORT GROUP

BREATHS & BEATS SUPPORT GROUP

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GERIATRIC SUPPORT GROUP

RAJKOT KNEE CLUB

PATENT PUBLISHED

Innovative Project of School of Physiotherapy, RKU

This innovative medical device prototype aims to revolutionize shoulder dysfunction management by providing a comprehensive, one-stop solution. It bridges gaps in current treatments with a novel, integrated approach that promises to redefine rehabilitation strategies and enhance patient outcomes. Envisioned as a pioneering solution for physiotherapy clinics, it aims to significantly improve joint movement restoration and overall patient outcomes.

Innovative Project of School of Physiotherapy, RKU

This project focuses on innovating a breathing retraining device to enhance pulmonary rehabilitation and respiratory therapy. Addressing limitations of traditional spirometers, the device offers one-handed usability and adjustable resistance for improved user experience and effectiveness. Development involves literature review, expert consultations, and testing among healthy individuals to ensure functionality and engagement. With features like visual biofeedback and volumetric measurements, the device aims to boost respiratory muscle strength and lung function, promising significant advancements in physiotherapy practice.

Innovative Project of School of Physiotherapy, RKU

The RK LSD (Lunge Sled Device) addresses the prevalence of anterior cruciate ligament (ACL) injuries in sports by targeting knee valgus moments, a major contributing factor. It strengthens gluteal and quadriceps muscles while stretching hip adductors, enhancing stability and balance. By facilitating single-limb squats with translational load, it aims to reduce injury risks and advance preventive care in sports medicine, promising critical improvements in athlete safety and performance.

Innovative Project of School of Physiotherapy, RKU

The project focuses on designing, developing, and testing the kneextend Device to train the quadriceps in terminal knee extension range. Objectives include assessing quadriceps electromyographical activity, device design and development, and testing its efficacy. The design process involved comprehensive research, group discussions, and collaboration with biomedical engineers to address existing device limitations and fulfill specific needs.

Innovative Project of School of Physiotherapy, RKU

The project aims to design, develop, and test a Myomotion Corrector device to enhance knee joint mobility. It involves examining femur and tibial lengths, designing the device through research and group discussions, and testing its effectiveness. Phase 1 entails measuring bone lengths via observational studies. Phase 2 focuses on device design and development, and Phase 3 involves testing the device's functionality in facilitating knee joint mobility.

Innovative Project of School of Physiotherapy, RKU

This study included 100 participants (50 males, 50 females) across four age groups: Group A (20-23 years), Group B (24-27 years), Group C (28-31 years), and Group D (32-35 years). Using purposive sampling, it aimed to innovate and test a device for measuring diaphragm muscle strength. Phase 1 focused on creating a one-handed, adjustable device with visual biofeedback and accurate volumetric measurements. Phase 2 analyzed data from healthy individuals, showing the device's reliability and effectiveness. This tool advances physiotherapy, supporting previous respiratory rehabilitation research.

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INNOVATION & RESEARCH

Patents Granted/Published by Indian Patent Office

A Device for measuring the strength of Planter Intrinsic Muscle

Dr. Amit Sharma & Dr. Priyanshu V. Rathod

A Core Stabilizer with a Biofeedback System

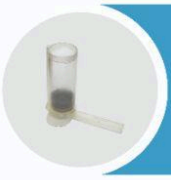
Dr. Hardik Trivedi & Dr. Priyanshu V. Rathod

A Biofeedback Integrated Thoracic Expension Device

Dr. Nidhi Ved & Dr. Amit Sharma

A Human Body Balance Sensing Biofeedback Device

Dr. Shweta Rakholia & Dr. Priyanshu V. Rathod



Breathing Retraining Device

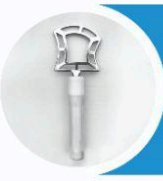
Dr. Parth K. Devmurari & Dr. Priyanshu V. Rathod

RK RESPOTECH - Respiration Enhancing Device

Dr. Vidhi Talati & Dr. Priyanshu V. Rathod

An Adjustable Walker

Dr. Rima Jani & Dr. Priyanshu V. Rathod



Therapeutic Electro Soft Tissue Mobilizer

Dr. Rashi Soni & Dr. Priyanshu V. Rathod

A Spine Mobilization Device

Dr. Priyanshu V. Rathod & Dr. Chetan Patel

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FOUNDATION DAY

RASOTSAV-2023

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Congratulations

Dhaval Solanki
on being awarded as
Student of the Year 2023
School of Physiotherapy, RKU
in recognition of his outstanding achievements
in academics and co-curricular activities
throughout the year.

GALORE 2024

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Dr. Krupa Tank

Rising Star Award for distinguished achievements and experience in Academics, Clinical, and Research fields over the last 10 years in Physiotherapy at the IAPWC conference 2024 in Delhi.

Dr. Namrata Sojitra

The Saroj Sanghavi Award for the best innovation in physiotherapy during the 8th annual conference of the Society of Indian Physiotherapists - SIPCON 2024

Dr. Parthkumar Devmurari

He was honored with the Best Physiotherapist (Academic) award at the prestigious International Conference STRIDE-24, held at SIMATS, Chennai. This recognition celebrates his exceptional contributions to physiotherapy education, innovation, and research.

PHYSIOTHERAPY CAMPS

The School of Physiotherapy has organized a series of community physiotherapy camps aimed at raising awareness, conducting assessments, and providing treatment to promote better health and well-being among the public. Highlights from a few of these camps are presented below.


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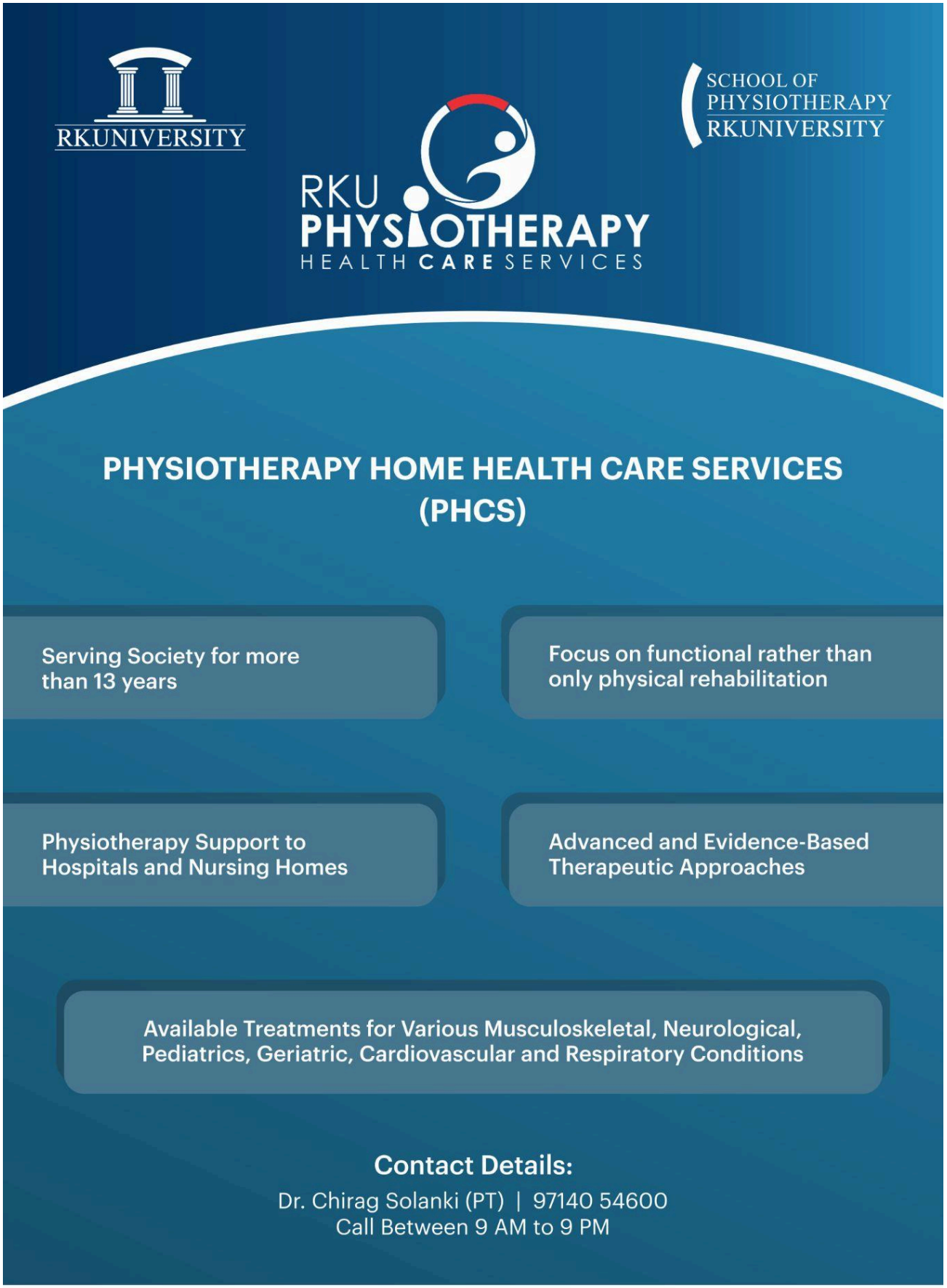
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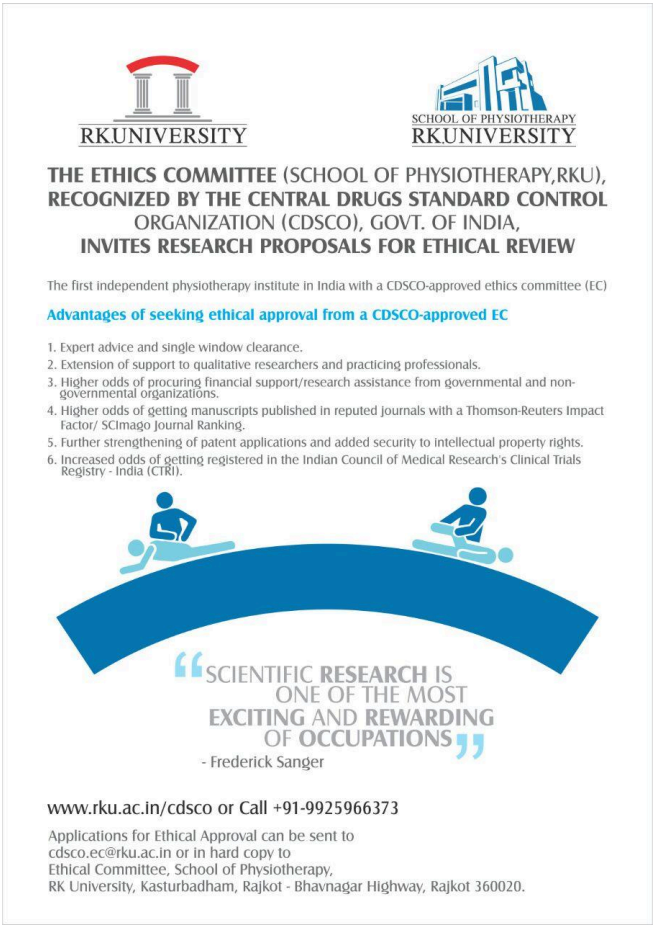
RK Physiotherapy and Rehabilitation and Research Center
Bhaktinagar Circle, Opp. Meghani Rang Bhuvan, Rajkot - 360002
spt@rku.ac.in I www.rku.ac.in

#	Name of Members	Designation in Ethics Committee	Qualification
1	Dr. Bhavesh Kanabar	Clinician	MD PSM
2	Mr. Sabir Lokhandawala	Legal Adviser	B.com LLB
3	Dr. Priyanshu Rathod	Member	PhD
4	Dr. Parthkumar Devmurari	Member Secretory	MPT
5	Mr. Arvind Sorathiya	Lay Person from Community	Self Employed (stationers) BA
6	Dr. Hemal Dholakiya	Member	MD Pharmacoloy
7	Ms. Vaishali Dhakan	Member	Sp. B. Ed. (Psychology)
8	Dr. Ankur Parekh	Chairperson	MPT
9	Dr. Amit Sharma	Member	MPT, PhD



FACULTY CORNER

Design and Develop Comprehensive Physiotherapy Approach for Oral Submucosal Fibrosis (OSMF)

Oral submucous fibrosis (OSMF) is a chronic, insidious scarring disease of the oral cavity, characterized by a progressive inability to open the mouth due to loss of elasticity and the development of fibrous bands in the labial, buccal mucosa, soft palate, lip mucosa, and anterior pillars of the fauces. Recent data suggest that the prevalence of OSMF in Gujarat, India, has increased from 0.03% to 6.42%. The most important risk factor is chewing tobacco.

Need for Developing this Protocol:

Oral submucous fibrosis is a disorder that restricts mouth opening, and no perfect treatment has been found yet. Both surgical and conservative physiotherapy treatments have been tried. Surgical treatment is reported to be very expensive and can lead to scarring and a further decrease in mouth opening after 1–2 years. Therefore, a conservative physiotherapy treatment protocol is needed that can increase mouth opening in individuals who chew tobacco without any side effects.

Comprehensive Physiotherapy Approach to Improve Mouth Opening

Exercise Therapy for Mouth Opening Protocol

A. Jaw Stretching Exercises:

1. Massage: The jaw muscles (masseter and temporalis) use gentle circular motions to relax tightness. Perform for 1 to 2 minutes.

2. Passive Stretching: Mouth Opening by Jaw Opener (10 Rep. with 5 sec Hold (Center of the teeth, Left & Right Side of the teeth)

3. Stick Exercise: Use of wooden ice-cream sticks held together with the help of rubber bands to maintain jaw opening. Gradually increased number of sticks per month opening. (10 Rep. with 5 sec Hold (Center of the teeth, Left & Right Side of the teeth)

4. Side tongue stretch: Stretch the tongue left and right side of buccal mucosa for 10 sec holds with 10 repetitions of each and then move the tongue inside and outside.

5. Cheek puff: First, take in a deep inhalation and puff your cheeks out. Hold the air inside of your buccal mucosa by tightly closing your lips together. Hold the air cheeks for 5 seconds & repeat 10 times. Take another deep breath and only hold air in your left cheek. Then, switch and hold air only in your right cheek.

B. Resisted Mouth Opening: Place a hand under the chin and gently resist while trying to open the mouth. Hold for 5 seconds and relax. Repeat 5–10 times.

C. Jaw Mobilization Exercises: TM joint mobilization: Medial glide & Inferior glide - 5 times of each glide for 3 repetitions for each side.

Electrotherapy in Mouth Opening Protocol

A. Ultrasound Therapy:

Intensity: 1.2 w/cm, Mode: Continues mode,

Frequency: 1 MHz, Time: 7 to 8 minutes

B. TENS (Transcutaneous Electrical Nerve Stimulation): Use TENS to alleviate pain and muscle spasms. Apply electrodes around the TMJ region for 15–20 minutes at a comfortable intensity.

C. Heat Therapy: Use moist heat packs for 10–15 minutes before exercise to relax muscles and improve flexibility in the jaw. These therapies should be applied based on individual tolerance and progression to ensure effective recovery and improved mouth opening.

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"The Role of Working Memory and Attention in Complex Cognitive Processes"

“How often has it been attempted for you to retain a goal, like acquiring dairy, while being inside a supermarket or to remember specific pathways during the planning of a driving journey?” Neither of these activities could have been accomplished without the framework of active memory. Specifically, active memory is described as the capability to preserve and adjust data essential for actions over brief intervals, typically lasting mere moments. It also facilitates bridging temporal interruptions between prompts and actions by employing internalized illustrations of the input.

An additional query arises, "Have you ever observed the sheer variety of inputs vying for awareness within an aeroplane cockpit?” Numerous examples exist: gauges, levers, the external visuals seen through the glass, alongside instructions from air traffic control. Pilots are tasked with ensuring attention is distributed across all these data origins. Such multitasking would be impossible without this neurological process, enabling focus on particular signals or areas.

Both active memory and attentiveness are vital cognitive frameworks, intricately linked through separately explored, as focus substantially governs the activation, retention, and transformation of active memory depictions. These notions are interrelated, and their relationship is comprehended best by analyzing and understanding how each function materializes.

Active memory refers to the cerebral mechanism accountable for the provisional retention and alteration of the data essential for linguistic interpretation, education, and analytical thinking—complicated mental tasks. Only limited volumes of information can be maintained in active memory, including abstract notions or countable objects. It has been proposed that grown individuals possess an active memory capacity ranging between three and four entities, while younger children, including preschool and early primary pupils, can uphold approximately two to two and a half items.

Active memory differs from short-term memory because these two cognitive mechanisms signify distinct mental functionalities. As explained by Goldstein (2011), short-term memory concerns itself with retaining knowledge momentarily (e.g., recalling a contact number), whereas active memory involves managing data during intricate cognitive operations (e.g., holding digits in mind while interpreting a paragraph). Moreover, active memory diverges from short-term memory in its structural divisions: the central manager, visual-spatial workbench, phonological system, and episodic storage.

Another distinction evident between short-term and active memory pertains to their neurological and imaging analysis. Particularly, the anterior brain region and even the dorsolateral anterior cortex (dlPFC) are implicated in both memory systems. Nonetheless, D'Esposito, Postle, Ballard, and Lease revealed that heightened frontal cortex (dlPFC) engagement is observed in tasks demanding data alteration, signifying the application of active memory, compared to tasks requiring solely information preservation, indicating reliance on short-term memory.

Thus, the intensified posterior frontal cortex (dlPFC) stimulation observed during assignments involving data adjustment and thereby active memory usage arises from the greater number of operations necessary, such as focus and processing. The relationship between short-term and active memory concludes that, while distinct, they are mutually dependent, as the data held by short-term memory is requisite for active memory to process—a responsibility entrusted to it.

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"Scope and Impact of Physiotherapeutic Interventions on Lactation Challenges"

Breastfeeding is widely recognized as the optimal method of infant nutrition, providing essential nutrients that support physical growth and cognitive development. However, many mothers encounter difficulties that can hinder successful breastfeeding, including breast engorgement, mastitis, nipple pain, and musculoskeletal discomfort. If left unaddressed, these challenges may lead to early breastfeeding cessation, negatively impacting both maternal and infant health.

Physiotherapy has emerged as a valuable adjunct to conventional lactation support, offering non-invasive strategies to enhance maternal comfort and promote breastfeeding success. Through targeted interventions such as therapeutic ultrasound, manual therapy, postural training, and education, physiotherapists play a crucial role in managing lactation difficulties. This article explores the scope, techniques, and evidence supporting physiotherapy in lactation management.

Physiotherapeutic Interventions for Lactation Challenges

1. **Therapeutic Ultrasound** – Enhances blood circulation, reduces edema, and alleviates engorgement and pain. Studies show significant improvement in breast tenderness and milk flow.
2. **Manual Therapy** – Techniques like lymphatic drainage and myofascial release relieve discomfort and unblock ducts, reducing mastitis recurrence.
3. **Postural Training & Exercises** – Corrects breastfeeding posture, preventing musculoskeletal strain and improving breastfeeding duration.
4. **Education & Psychological Support** – Helps mothers with breastfeeding techniques, early complication detection, and confidence building.

Impact and Future Directions

Physiotherapy enhances breastfeeding outcomes by addressing physical barriers and promoting maternal well-being. However, limited awareness and lack of standardized guidelines restrict its widespread use. Future research should focus on validating techniques and fostering interdisciplinary collaboration.

Conclusion

Physiotherapy provides effective, non-invasive interventions for lactation challenges, improving maternal and infant health. Integrating these techniques into postpartum care can enhance breastfeeding success. Further research and education are vital to expanding physiotherapy's role in lactation management.

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Associate Professor, School of Physiotherapy,
RK University

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Connections and Collaborations

Name of the Faculty	Title of the Paper
Shrushti Patel	Work Related Disorder Among Indian Physiotherapist : Understandings And Opinions Of Clinicians And Professional Bodies Using A Qualitative Design
Krupa Tank	Noninvasive Biofeedback Devices For Pelvic Floor Rehabilitation: A Comprehensive Review Of Applications And Outcomes
Nidhi Ved	Validating Biofeedback Integrated Thoracic Expansion Measuring Device – An Exploratory Study
Hiral Mehta	Study To Find Out Reliability And Con-Current Validity Of Community Balance And Mobility Scale For Assessment Of Balance, Gait And Mobility In Parkinson's Disease Patient – An Observational Study
Urvi Pithwa	Identify The Factors Affecting Fall Predictability And Design The Software Application To Prescribe Walking Aid For Geriatric People: An Exploratory Multiphasic Study
Namrata Desai	Effect Of Cognitive Behavioral Therapy (CBT) Vs Neuro Linguistic Programming (NLP) On Generalized Anxiety Disorder In eSports Athletes – A Comparative Study
Namrata Sojitra	A Study To Compare The Effect Of Muscle Energy Technique And Mulligan Mobilization With Movement On Pain , Range Of Motion And Disability In Patients With Shoulder Adhesive Capsulitis –An Interventional Study
Parthkumar Devmurari	Effectiveness Of Flow-Oriented Incentive Spirometer On Lung Function After Upper Abdominal Surgery.
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Komal Doshi	A Study To Compare The Immediate Effect Of Primal Reflex Release Technique (PRRT) And Positional Release Technique (PRT) On Pain In Patient With Chronic Plantar Fasciitis - An Interventional Study
Harsh Badarakiya	Prevalence Of Radiation Fibrosis In Neck And It's Correlation With Trismus Among Head And Neck Cancer Patients In Saurashtra Region - A Cross Sectional Study
Shrikant Savaniya	A Study To Find Out Reliability And Concurrent Validity Of Triple Spasticity Scale - An Observational Study
Swati Dhrangu	"A Comparative Study Of BMI On Nutrition Level Among Government Versus Private School Children.
Kajal Pokar	A Study to Correlate between Peak Expiratory Flow Rate and Tragus to wall test among Bank Workers: A Correlational Study
Kajal Pokar	The Impact of Social Media Addiction on Perceived Stress among College going Students: A Correlational Study

Swati Dhrangu	Effectiveness of back school exercise versus Yogasana among School Teachers with Chronic Back Pain: A Randomized Controlled Trial
Namrata Sojitra	A Novel Medical Device Prototype, One Stop Solution For Shoulder Dysfunction: A Scientific Note
Parthkumar Devmurari	'Pro-Chest' a Novel Device to Measure Chest Symmetry
Amit Sharma	Bio feedback Integrated Thoracic Expansion Measuring Device – A Technical Note
Nidhi Ved	Evaluating the efficacy of biofeedback integrated thoracic expention measuring Device
Parthkumar Devmurari	Innovative Device for Superficial Sensory Examination; An Exploratory Multiphasic Study- Journal of Society of Indian Physiotherapists- UGC Care-1

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Effectiveness Of Commercial Gaming Based Virtual Reality Movement On Functional Recovery Of Upper Extremity In Subacute Stroke Patients – A Narrative Review.

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Abstract :

Keywords - commercial gaming-based Virtual reality, functional recovery of upper extremity movement. Subacute stroke patients.

Background - The researches such advanced technology in the field of physiotherapy & rehabilitation in this study and commercial gaming based VR to recovery of upper extremity stroke patients.

AIM- To Improve motor activity of functional recovery of Subacute stroke patients with Upper extremity.

Objective- To Evaluate the effectiveness of commercial gaming based Virtual reality (VR) therapy on the Recovery of paretic upper extremity stroke patients.

Method- The search literature was performed using pubmed scopes and Google scholar the search was limited to include peer reviewed articles published in English from January 2015 to December 2022 and included subacute stroke patients.

Introduction : Microsoft Kinect is a recently advanced multimedia console that was created to revolutionize the gaming experience and the way people experience entertainment. Sensors are used with the device which can directly sense a players' movement and their environment.
Maily currently two developing software for the rehabilitation of neurological condition :

1. Virtual rehab 2. Jintronix

Stroke

A cerebrovascular accident or stroke occurs when there is interruption of the blood supply to a particular area of the brain, usually because a blood vessel bursts or is blocked by a clot. This cuts off the supply of oxygen and nutrients, ultimately leading to cell injury and cell death.
Types of stroke : 1. Ischemic stroke 2.Hemorrhagic stroke

Virtual Reality in stroke rehabilitation

- Upper extremity rehabilitation, including range of motion, motor function and gross manual dexterity, using Kinect is perhaps the most studied intervention in stroke due to upper limb deficits occurring in over 66% of patients early after stroke.
- The effects can be highly debilitating which is most evident when there is a loss of manual dexterity. The use of therapy using Kinect-based systems maintained or improved the patient's motor performance.
- The Kinect has been found to be beneficial in promoting recovery for hemiplegic upper limbs of subacute stroke patients at 3 weeks and continued to significantly increase at 12 weeks after training.
- Kinect provides opportunities for gross arm movements exercises, but fine motor control movements of the hand and fingers are more difficult to track. Another study looked hemiplegic stroke survivors who were beyond 6 months since onset in the use of Kinect along with conventional therapy.
- Results showed that all participants who took part improved in all aspects of arm function including range of motion, Fugl - Meyer assessment and the Box and Block test.

RESULTS :

Sr. No.	Author / Year	Title of Article	Type of Article	Methodology	Outcome Measures	Remarks
1	Iris Brunner Et al. 2017	Virtual reality training for upper extremity in subacute stroke (VIRTUES): study protocol for a randomized controlled multicenter trial	Randomized controlled multicenter trial	120 patients up to 12 weeks after stroke will be a group receiving VR training or dose-matched and attention-matched conventional arm training in addition to standard rehabilitation. During 4 weeks , 4–5 training sessions a week of 45–60 min. duration.	Action Research Arm Test (ARAT)	The VIRTUES trial will provide further evidence of VR-based treatment strategies to clinicians, patients and health economists.
2	Yan Leng Et al. 2022	The impact of cognitive function on virtual reality intervention for upper extremity rehabilitation of patients with subacute stroke: prospective randomized controlled trial.	Randomized controlled trial.	Fugl-Meyer Assessment for Upper Extremity (FMA-UE), Barthel Index (BI), and Instrumental Activities of Daily Living (IADL) were recorded at baseline, 3 weeks after the intervention, and 3 and 6 months after the intervention.	Analysis of variance (ANOVA)	The between-group comparison indicated that FMA-UE, BI, and IADL scores improved significantly in both groups after the intervention.
3	Iris Brunner Et al. 2014	Virtual Reality Training for Upper Extremity in Subacute Stroke (VIRTUES)A multicenter RCT .	Randomized controlled trial.	120 participants with upper extremity motor impairment within 12 weeks after stroke were consecutively included at 5 rehabilitation institutions.	Action Research Arm Test (ARAT); Box and Blocks Test and Functional Independence Measure.	Improvement was also similar for our subgroup analysis with mild to moderate and severe upper extremity paresis.
4	Jigna Patel Et al. 2019	Intensive virtual reality and robotic based upper limb training compared to usual care, and associated cortical	Randomized controlled trial.	7 subjects received 8-1 h sessions of upper limb VR. UEFMA, Wrist AROM, Maximum Pinch Force, behavior, WMFT, and also received	Action Research Arm Test (ARAT); Box and Blocks Test and Functional Independence Measure. ANOVA	Improvement was also similar for our subgroup analysis with mild to moderate and severe upper

		reorganization, in the acute and early subacute periods post. Randomized Control Trial.		TMS mapping until 6 months post training.		extremity paresis.
5	Sook Joung Lee Et al	Combination Transcranial Direct Current Stimulation and Virtual Reality Therapy for Upper Extremity Training in Patients With Subacute stroke.Randomized Control Trial	Randomized controlled trial.	Patients were randomly assigned to 1 of 3 groups: group A received cathodal tDCS, group B received VR, and group C received combination therapy (cathodal tDCS was simultaneously applied during VR therapy)	The Modified Ashworth Scale, MMT, MFT, FMS, and Box and Block Test, K-MBI was used.	After treatment, all groups demonstrated significant improvements in MMT, MFT, FMS, and K-MBI scores. The change in MFT and FMS scores was different between the 3 groups.
6	Sevgi Ikbali Afsar Et al. 2018	Virtual reality in upper extremity rehabilitation of stroke patients: a randomized controlled trial	Randomized controlled trial.	The study included 42 stroke patients of which 35 (19 Virtual reality group, 16 control group) completed the study. All patients received 60 minutes of CT 5 times per-week for 4 weeks. Xbox Kinect game system 30 minutes per-day	Box Block Test, Functional independence measure self-care score, Brunnstorm stage and Fugl-Meyer upper extremity motor function scale	We found evidence that kinect-based game systems in addition to CT may have supplemental benefit for stroke patients.

Discussion :

- The main focus of this review is targeting physiotherapy rehabilitation of VR in subacute stroke patients.
- An important finding of our review is the lack of articles providing clear, transparent with the sufficiently detailed information with the conclusion of the previous review.
- PT with stroke with impaired more cognitive function may gain improvement in UL function and an independence in performing ADL after a VR based Intervention.
- Additional UE VR training is not superior but equally as effective as additional CT in the subacute phase after stroke. VR may constitute a motivating starstar training alternative as a supplement to standard rehabilitation. The upcoming results of VR will show whether there is correlated with an increased effect of VR compared to CT.

Conclusion:

- VR rehabilitation training & conventional training both are effective in stroke patients but in upper limb rehabilitation, balance & gait training VR rehabilitation is more effective than conventional physiotherapy. Conventional training is more time consuming than Microsoft Kinect rehabilitation.

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"A NERVE CONDUCTION STUDY OF SCIATIC NERVE IN AN ACADEMICIAN WITH MECHANICAL LOW BACK PAIN: AN OBSERVATIONAL STUDY"

Author: DR. DHRUVA KANUBHAI SORATHIYA

Co-Author: DR. SHRIKANT SAVANIYA

ABSTRACT:

Keywords: Nerve conduction study, H-reflex, Low back pain, Sciatic nerve

Background: Back pain is sometimes associated with a likely etiology but most low back pain cases are because of faulty posture are classified into mechanical low back pain. Nerve conduction study (NCS) is a diagnostic test that measures how fast electrical impulses move through the nerves. H reflex is a monosynaptic reflex elicited by submaximal stimulation of the tibial nerve which is a branch of the sciatic nerve and recorded from the calf muscle.

Method: Ethical clearance for the study was obtained from the Ethic committee, School of Physiotherapy, RK University, Rajkot. A minimum of 30 subjects, they were selected as per criteria by purposive sampling assessed the subjects with the Modified Oswestry Low Back Pain Disability Index (ODI) Then obtaining consent and assessing the form, H reflex was measured in all the subjects.

Result: The result was analysed by using SPSS software and Microsoft excel. Out of 30 academicians, there were no significant correlations between age/gender and the latency or amplitude measures. However, a moderate negative correlation ($r=-0.662$, $p<0.01$) was seen between latency and amplitude.

Conclusion: This study concluded that no significant correlations were found between age and H reflex parameters, indicating age was not a major determinant of sciatic nerve conduction in this sample. No statistically significant gender differences were observed in H reflex latencies. A moderate negative correlation was observed between H reflex latency and amplitude.

INTRODUCTION

"Research is creating new knowledge" -Neil Armstrong

Low back pain (LBP) is the condition which is defined as pain and discomfort in the lumbosacral region, between the space of twelfth rib and the gluteal crease. Three categories of back pain exist: 1) mechanical low back pain; 2) back pain associated with symptoms from the nerve roots; and 3) back pain brought on by a major pathology (such as a fracture, malignancy, ankylosing spondylitis, infection).

The International Association for the Study of Pain (IASP) defines pain as "an unpleasant emotional and sensory experience linked to tissue injury, whether it be real or hypothetical, or expressed as such damage"[(1)]. Additionally, pain can be categorized as acute (lasting less than four weeks), subacute (lasting between four weeks and three months), or chronic (lasting more than three months) based on how long it lasts[(2)].

While spinal stenosis or radiculopathy are common aetiologies of back pain, the majority of occurrences of low back pain because of faulty posture are classified into mechanical low back pain [3]. If you're experiencing one-sided back pain without any discomfort radiating below the knee it might be because of issues with muscles, ligaments, facet joints, or the sacroiliac joint. This type of pain is termed mechanical low back pain[4].

Mechanical low back pain is usually cyclic and it refers frequently to the thighs and buttocks. The person feels morning stiffness or Pain is widespread during the start of the movement. There is pain on forward flexion and often also on going back to the erect position and is also aggravated by extension, side flexion, rotation, standing, walking, sitting and exercise in general. Pain usually becomes worse over the course of the day and relieved by change of position, lying down, especially in the fatal position.

Most cases of mechanical low back pain improve with conservative measures. However, the prognosis depends on factors such as the cause of the pain, the individual's overall health, and adherence to recommended treatments. It's important for individuals experiencing persistent or severe low back pain to seek medical evaluation for an accurate diagnosis and appropriate management.

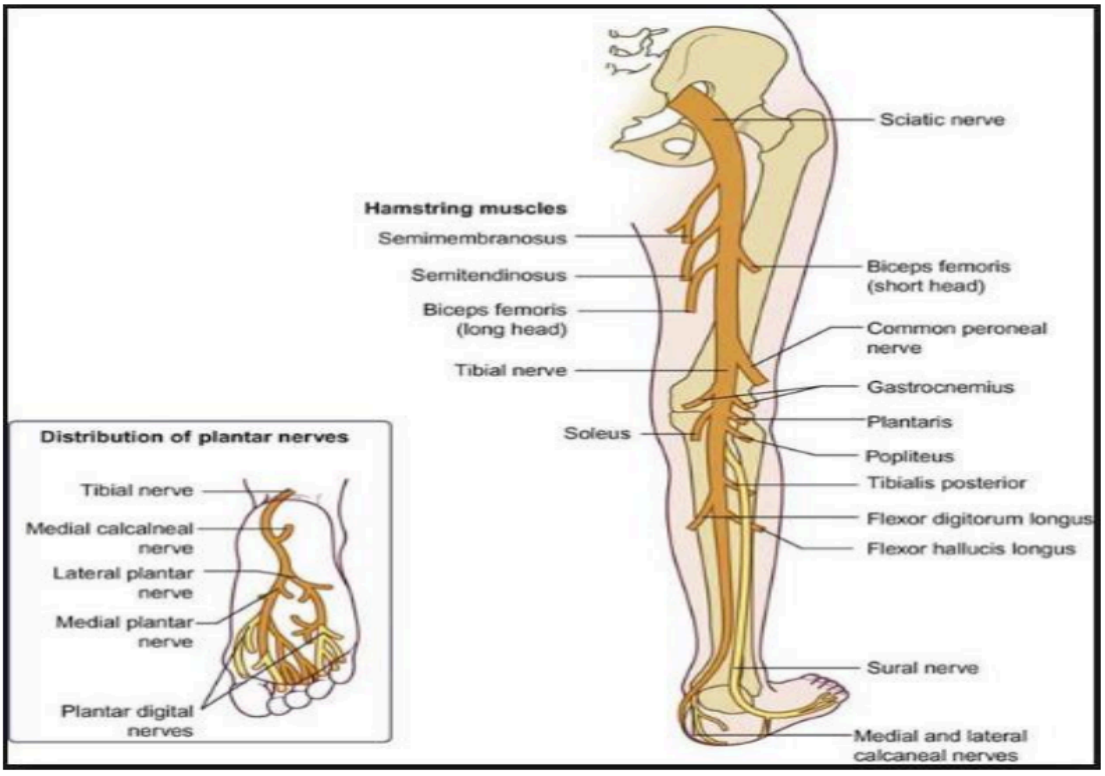


FIGURE : COURSE OF THE SCIATIC NERVE [4]

The sciatic nerve is a major nerve in the body, and it is formed by the amalgamation of nerve roots from the lumbar and sacral areas of the spine. Specifically, it arises from the ventral rami (anterior divisions) of the spinal nerves L4 to S3. These nerve roots converge to form the sciatic nerve in the pelvis. The sciatic nerve is typically developed in the pelvis through the combination of the ventral rami within the spinal nerves mentioned earlier. It is the thickest nerve within the body, and its diameter is about 2 centimetre wide but also can vary among individuals. After its formation, the sciatic nerve travels through the gluteal region (buttocks) and down the posterior thigh. It runs deep to the gluteus maximus muscle and often passes through or under the piriformis muscle. This course can be a potential site for compression or irritation, leading to a condition known as sciatica[5].

The sciatic nerve is quite long, extending down the thigh, knee, and into the leg. Its total length can vary, but it typically extends up to the popliteal fossa. As mentioned earlier, at the superior angle of the popliteal fossa, splits the

sciatic nerve in two main branches: 1) Tibial Nerve: This branch continues down the posterior leg and provides innervation to the skin and muscles on the sole of the foot and the rear leg. 2) Common Peroneal (Fibular) Nerve: This branch wraps around the fibula's head, dividing into the superficial peroneal nerve (innervating muscles across the side of the leg) and the deep peroneal nerve (innervating muscles on the leg's anterior side and dorsum of the foot)[6].

Nerve conduction velocity (NCV), also called as a nerve conduction study (NCS), is a diagnostic test used to assess the function of peripheral nerves. The test specifically measures the rate of electrical impulse transmission along a nerve [7]. Normal NCV: A normal or expected nerve conduction velocity indicates that the nerve is conducting electrical impulses at a healthy speed, suggesting normal nerve function. Abnormal NCV: Slower nerve conduction velocity may indicate nerve damage or dysfunction. Conditions such as peripheral neuropathy, nerve compression (e.g., in carpal tunnel syndrome), or demyelinating diseases (where the protective covering of nerves is damaged) can lead to reduced nerve conduction velocity [8].

H-reflex was described by Hoffmann in 1918, hence called H-reflex. It is a mono synaptic reflex elicited by submaximal stimulation of the nerve. In lower limb H-reflex recorded by the stimulation of sciatic nerve from soleus muscle. The reflex arc of H-reflex includes, 1) large fast conducting group 1a fibres, 2) the spinal cord where afferent fibres connect with alpha motor neurons and 3) efferent motor fibres supplying the muscle.

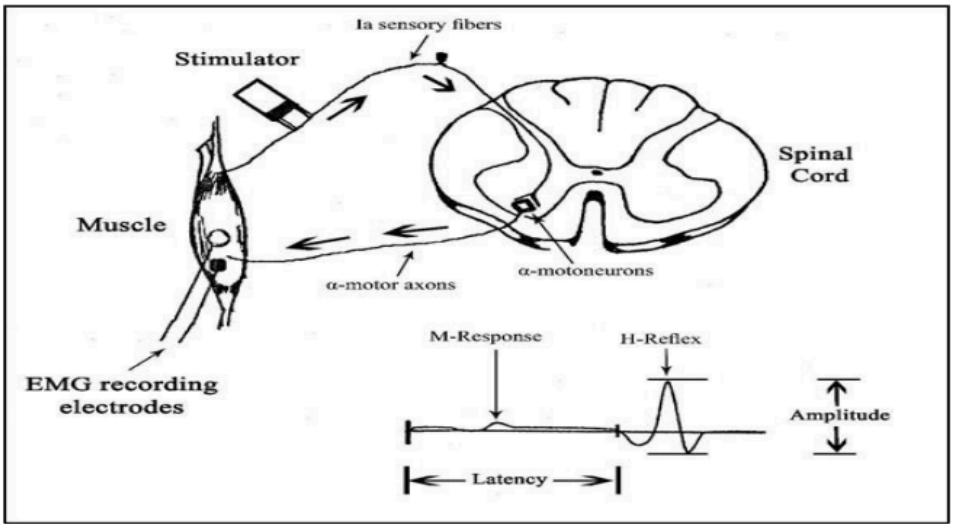


FIGURE : THE REFLEX ARC FOR H-REFLEX [7]

H-reflex is facilitated by submaximal stimulation and inhibited by stronger stimulation. The inhibition of H-reflex on stronger stimulation is attributed to collision of orthodromic conduction in motor axons. H-reflex has the advantage of evaluating the proximal sensory and motor pathways therefore is especially helpful in evaluation of plexopathies and radiculopathies. Soleus H-reflex may be abnormal in L4-S1 radiculopathy. Inhibition of H-reflex shows compression or impingement of nerve root. On the other hand, in patients with radiculopathy, side-to-side differences or absent or reduced amplitude on the affected side likely indicate neural demyelination with significant damage of large diameter nerve axons. In the absence of extensive demyelination, these signs are likely indicative of nerve conduction block [9].

Recording of the soleus's H-reflex muscle has proved to be an effective tool for the examination of damage of the proximal segment of the sciatic nerve.

MATERIALS USED IN THE STUDY

- Plinth
- Pillow
- NCV instrument
- Spirit, Cotton
- Electrode gel
- Adhesive tape
- Bipolar stimulating electrode
- Ground electrode
- Surface electrode
- Data collection sheet
- Consent form
- Pen
- Measure tap

METHODOLOGY

- **STUDY DESIGN:** Observational Study
- **SAMPLING TECHNIQUE:** Purposive sampling
- **STUDY SETTING:** RK University, Rajkot
- **STUDY DURATION:** 6 Months
- **STUDY POPULATION:** Academician with mechanical low back pain
- **SAMPLE SIZE:** Minimum 30 Subjects

INCLUSION CRITERIA[4]:

- Age group between 25-40 years
- **Gender:** Both male and female
- Academician with mechanical low back pain
- Symptoms having more than four weeks to twelve weeks
- Pain is usually cyclic and unilateral
- Pain is often produced by extension, side flexion, rotation, standing and sitting

EXCLUSION CRITERIA:

- Fall injury
- Already diagnosed low back pain
- Abnormal sensory symptoms

- Uncooperative person
- Medication of low back pain
- History of epilepsy

PROCEDURE

- The Proposed study was approved by the Ethics Committee, School of Physiotherapy, RK University, Rajkot. This study was registered in the Clinical Trials Registry-India (CTRI). The Registration number is CTRI/2023/11/059375
- Minimum of 30 subjects, they were selected as per inclusion and exclusion criteria by purposive sampling from RK University, Rajkot.
- After proper explanation about the study's goal patients who agreed to take part in this investigation were requested to sign a return concerned form.
- The data measured were recorded in the measurement form which included demographic data chief complaints and assessed with the Modified Oswestry Low Back Pain Disability Index (ODI).
- After obtaining consent and assessing the form, H reflex was measured in all the subjects
-

OUTCOME MEASURES:

Patient Name:_____ **Date**_____

Modified Oswestry Low Back Pain Disability Questionnaire[a]

This questionnaire has been designed to give your doctor information as to how your back pain has affected your ability to manage in everyday life. Please answer every section and mark in each section only ONE box that best describes your condition today. We realize you may feel that two of the statements may describe your condition, but **please mark only the box that MOST CLOSELY describes your current condition**.

Pain Intensity
- ☐ I can tolerate the pain I have without having to use pain medication.
- ☐ The pain is bad, but I can manage without having to take pain medication.
- ☐ Pain medication provides me with complete relief from pain.
- ☐ Pain medication provides me with moderate relief from pain.
- ☐ Pain medication provides me with little relief from pain.
- ☐ Pain medication has no effect on my pain.

Personal Care (e.g., Washing, Dressing)
- ☐ I can take care of myself normally without causing increased pain.
- ☐ I can take care of myself normally, but it increases my pain.
- ☐ It is painful to take care of myself, and I am slow and careful.
- ☐ I need help, but I am able to manage most of my personal care.
- ☐ I need help every day in most aspects of my care.
- ☐ I do not get dressed, I wash with difficulty, and I stay in bed.

Lifting
- ☐ I can lift heavy weights without increased pain.
- ☐ I can lift heavy weights, but it causes increased pain.
- ☐ Pain prevents me from lifting heavy weights off the floor, but I can manage if the weights are conveniently positioned (e.g., on a table).
- ☐ Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.
- ☐ I can lift only very light weights.
- ☐ I cannot lift or carry anything at all.

Walking
- ☐ Pain does not prevent me from walking any distance.
- ☐ Pain prevents me from walking more than 1 mile. (1 mile = 1.6 km).
- ☐ Pain prevents me from walking more than 1/2 mile.
- ☐ Pain prevents me from walking more than 1/4 mile.
- ☐ I can walk only with crutches or a cane.
- ☐ I am in bed most of the time and have to crawl to the toilet.

Sitting
- ☐ I can sit in any chair as long as I like.
- ☐ I can only sit in my favorite chair as long as I like.
- ☐ Pain prevents me from sitting for more than 1 hour.
- ☐ Pain prevents me from sitting for more than 1/2 hour.
- ☐ Pain prevents me from sitting for more than 10 minutes.
- ☐ Pain prevents me from sitting at all.

Standing
- ☐ I can stand as long as I want without increased pain.
- ☐ I can stand as long as I want, but it increases my pain.
- ☐ Pain prevents me from standing for more than 1 hour.
- ☐ Pain prevents me from standing for more than 1/2 hour.
- ☐ Pain prevents me from standing for more than 10 minutes.
- ☐ Pain prevents me from standing at all.

Sleeping
- ☐ Pain does not prevent me from sleeping well.
- ☐ I can sleep well only by using pain medication.
- ☐ Even when I take medication, I sleep less than 6 hours.
- ☐ Even when I take medication, I sleep less than 4 hours.
- ☐ Even when I take medication, I sleep less than 2 hours.
- ☐ Pain prevents me from sleeping at all.

Social Life
- ☐ My social life is normal and does not increase my pain.
- ☐ My social life is normal, but it increases my level of pain.
- ☐ Pain prevents me from participating in more energetic activities (e.g., sports, dancing).
- ☐ Pain prevents me from going out very often.
- ☐ Pain has restricted my social life to my home.
- ☐ I have hardly any social life because of my pain.

Traveling
- ☐ I can travel anywhere without increased pain.
- ☐ I can travel anywhere, but it increases my pain.
- ☐ My pain restricts my travel over 2 hours.
- ☐ My pain restricts my travel over 1 hour.
- ☐ My pain restricts my travel to short necessary journeys under 1/2 hour.
- ☐ My pain prevents all travel except for visits to the physician / therapist or hospital.

Employment / Homemaking
- ☐ My normal homemaking / job activities do not cause pain.
- ☐ My normal homemaking / job activities increase my pain, but I can still perform all that is required of me.
- ☐ I can perform most of my homemaking / job duties, but pain prevents me from performing more physically stressful activities (e.g., lifting, vacuuming).
- ☐ Pain prevents me from doing anything but light duties.
- ☐ Pain prevents me from doing even light duties.
- ☐ Pain prevents me from performing any job or homemaking chores.

FOR OFFICE USE ONLY

Score: /50 x 100 = ____% points

Scoring: For each section the total possible score is 5: if the first statement is marked the section score = 0, if the last statement is marked it = 5. If all ten sections are completed the score is calculated as follows: Example: 16 (total scored) / 50 (total possible score) x 100 = 32%

If one section is missed or not applicable the score is calculated: 16 (total scored) / 45 (total possible score) x 100 = 35.5%

Minimum Detectable Change (90% confidence): 10% points (Change of less than this amount may be attributed to error in the measurement.)

Source: Fritz JM, Irrgang JJ. A comparison of a modified Oswestry Low Back Pain Disability Questionnaire and the Quebec Back Pain Disability Scale. Physical Therapy. 2001;81:776-788.

[a]Modified by Fritz & Irrgang with permission of The Chartered Society of Physiotherapy, from Fairbanks JCT, Couper J, Davies JB, et al. The Oswestry Low Back Pain Disability Questionnaire. Physiotherapy. 1980;66:271-273.

METHOD FOR RECORDING H-REFLEX FROM SOLEUS

- **POSITION OF THE PATIENT:** Patient should be semireclining comfortably or lie in a prone with leg and thigh firmly with dorsum at right angle to tibia.
- **ELECTRODE PLACEMENT:**
  - **Recording Active:** Electrode is positioned at the distal edge of calf muscle.
  - **Recording Reference:** Positioned over Achilles tendon.
  - **Ground Electrode:** The ground electrode should be placed anywhere between stimulating and recording electrode.
  - **Bipolar Stimulating Electrode**: The cathode is located over the sciatic nerve at the popliteal fossa with the anode distal. A pulse width of 0.5-1.0 ms is optimal and the current intensity is slowly increased until the H-reflex is maximized with an absent or minimally present Soleus Compound Motor Action Potential (CMAP).

- **INSTRUMENTATION PARAMETERS:**
  - **Sweep Speed:** 5 ms /div
  - **Sensitivity:** 1.0 mV/div
  - **Filter Setting:** 5 Hz- 10 KHz

FIGURE: RECORDING OF H-REFLEX FROM SOLEUS MUSCLE

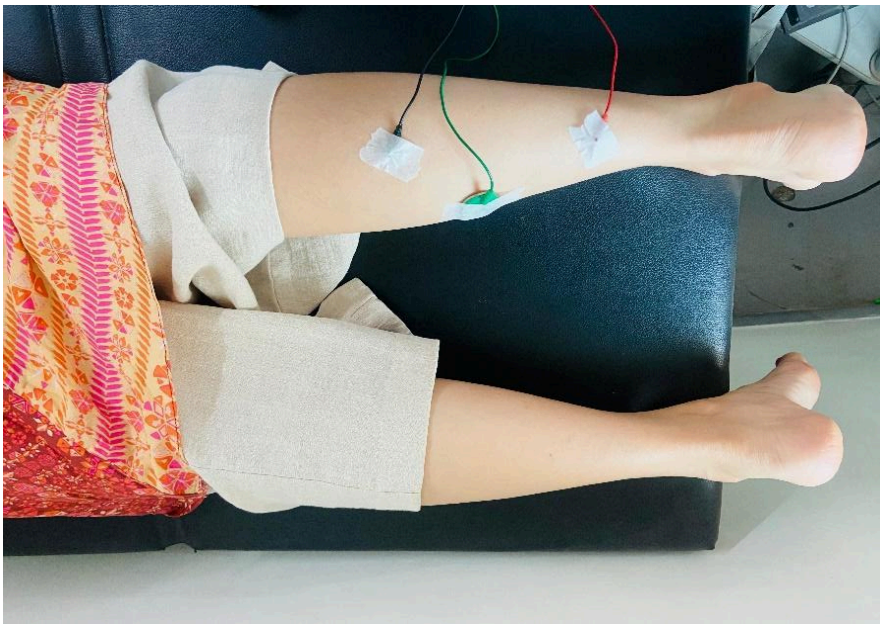


FIGURE: PLACEMENT OF ELECTRODES FOR H-REFLEX RECORDING FROM SOLEUS

RESULT

	H reflex Latency (ms)	H reflex Amplitude (mV)
Mean	31.44	9.62
95% CI of mean	30.27 -32.62	8.85-10.39
SD	3.15	2.06
Median	30.7	9.75
IQR	3.4	2
Minimum	28	4.1
Maximum	44	14.3

Table: Analysis of H reflex Latency and H reflex Amplitude (mV) among academician with mechanical low back pain (N=30)

Overall, the H reflex latency and amplitude averages are within normal limits in this sample of academics with mechanical low back pain. A small proportion maybe somewhat extended latencies approaching the upper limit of normal. The amplitude findings are normal. This suggests the majority have no electrophysiological evidence of sciatic nerve involvement.

H reflex Latency	No. of academicians	% of academicians
Normal	25	83.3
Abnormal	05	16.7

Table: Analysis of H reflex Latency among academician with mechanical low back pain (N=30)

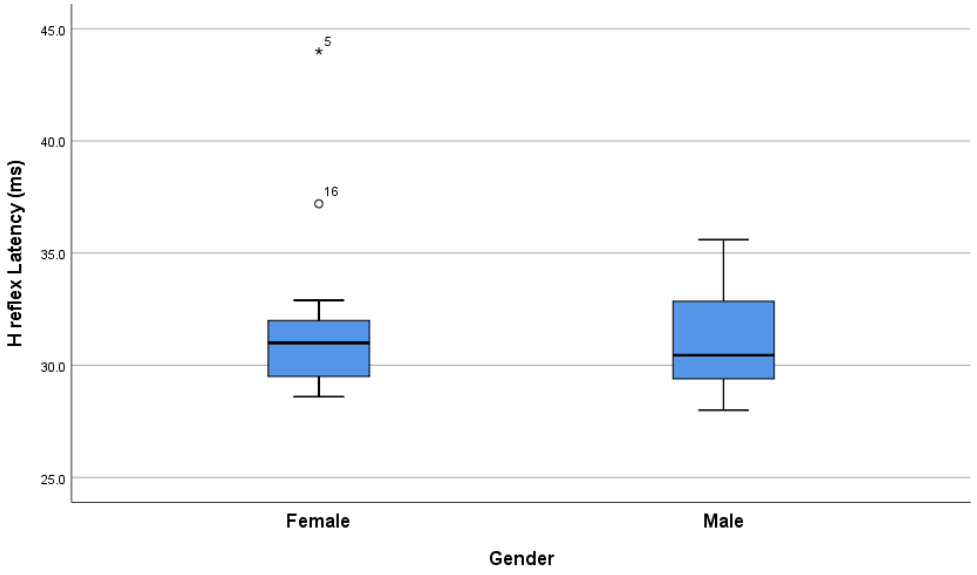
In summary, the sample was predominantly normal but a subset of academics with lumbar discomfort did have electrophysiological evidence of sciatic nerve involvement based on prolonged H reflex latencies. This indicates concomitant nerve root impingement causing sciatic conduction slowing in 16.7% of the academics with mechanical low back.

Gender	H reflex Latency			
	Normal		Abnormal	
	No.	%	No.	%
Male	09	36	03	60
Female	16	64	02	40
Pearson's χ^2 =0.25, df=1, p value=0.61				

Table: Comparison of H reflex Latency between both gender (N=30)

A chi-square test was conducted to analyse if there was a substantial distinction in the percentage of abnormal latencies between genders. The p-value was 0.61, indicating there isn't a statistically significant distinction between male and female.

Consequently, this example does not demonstrate a significant gender discrepancy in the prevalence of prolonged H reflex latencies among academics with low back pain. The small subset with abnormal latencies included both genders reasonably proportionately.

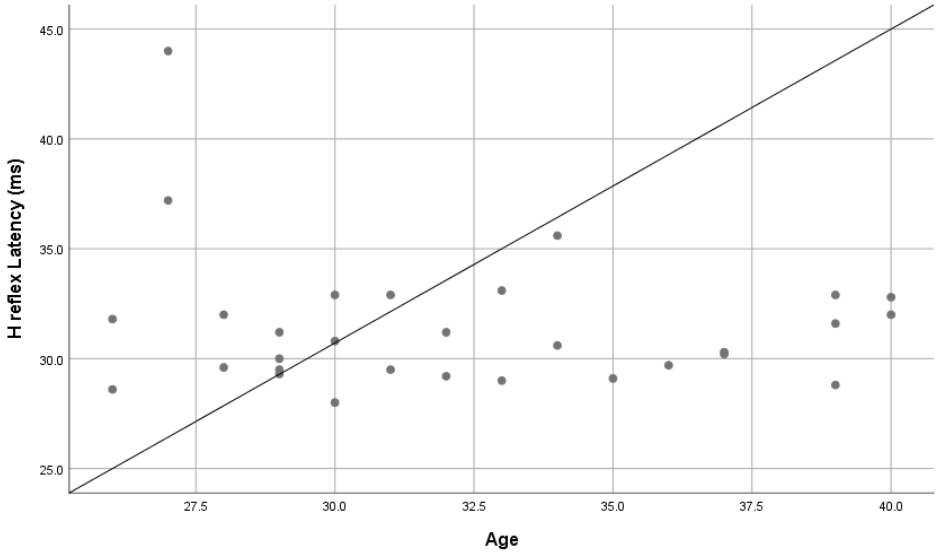


GRAPH 4.1: Comparison of H reflex Latency between both gender (N=30)

Gender	H reflex Latency		Test Statistics
	Median	IQR	Mann Whitney U test
Male	31.07	3.5	**Z value=** -0.06
Female	31	2.8	**p value=** 0.94

Table: Comparison of H reflex Latency between both gender (N=30)

In summary, according to this statistical research, there isn't evidence of a gender difference in H reflex latency of the sciatic nerve among these academics with mechanical low back pain based on the median values. The conduction in the sciatic nerve appears equivalent between males and females in this sample.



GRAPH: Co-relation of H reflex Latency with age of academician with mechanical low back pain (N=30)
Pearson's co-relation r value = -0.15, p value=0.42

This figure examines the relationship between age and H reflex latency of the sciatic nerve in the sample of academics with low back pain.

A Pearson's correlation test was done to assess the correlation between age and latency. The r value from the correlation test was -0.15 and the p-value was 0.42. Since the p-value is greater than 0.05, there is no discernible statistical relationship between age and H reflex latency based on this sample.

The negative r value indicates a weak negative association, with latency tending to decrease slightly with increasing age. However, this negative correlation is not statistically significant. Latency appears to be consistent across age groups within the limited spread of this sample.

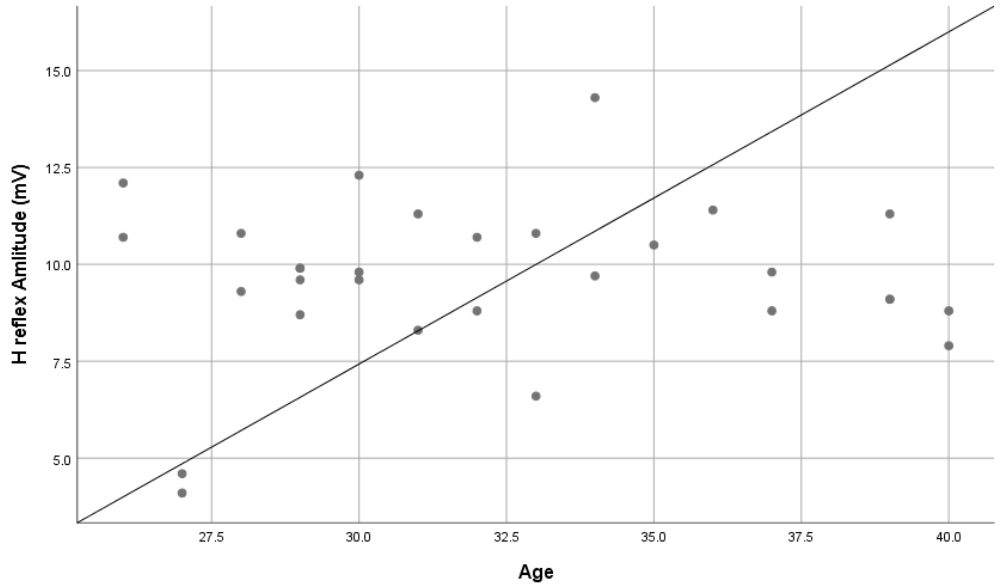
An expanded sample with a broader age range distribution may help further elucidate if age impacts sciatic nerve conduction. But in this data set, age does not seem to be a major determinant of latency.

H reflex L Amplitude (mV)	No. of academicians	% of academicians
Normal	30	100
Abnormal	00	00

Table: Analysis of H reflex Amplitude (mV) among academician with mechanical low back pain (N=30)

In summary, the H reflex amplitudes were normal and within the expected range in the entire sample of academics with mechanical low back pain. The amplitudes were preserved suggesting no sciatic nerve involvement or axonal pathology in any of the subjects.

The amplitude analysis complements the earlier latency findings. While a subset showed prolonged latencies indicating demyelination/conduction slowing, the amplitudes imply axonal continuity is intact across the sample. This points to a conduction block type phenomena rather than axonal loss in the academics with abnormal latencies.



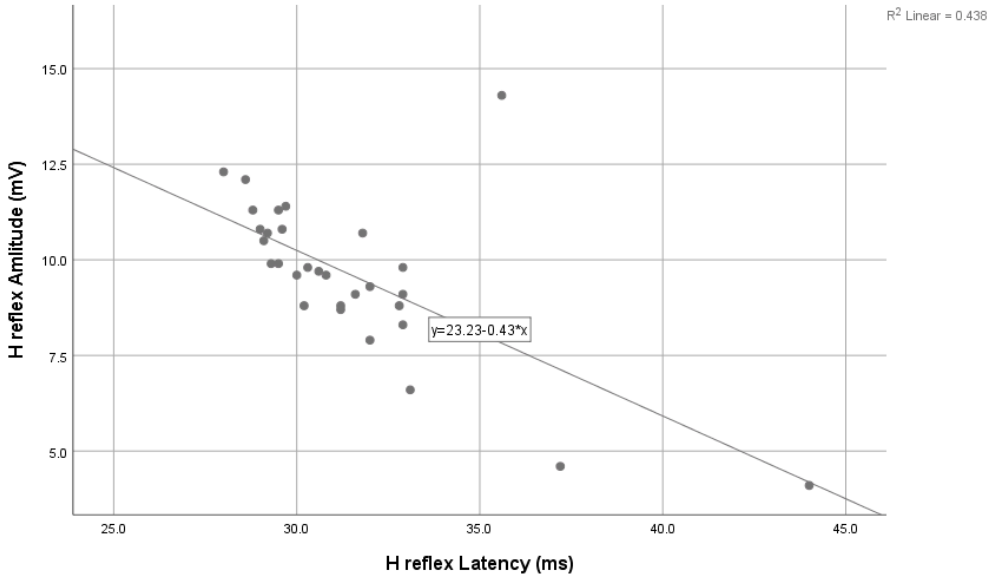
GRAPH: Co-relation of H reflex Amplitude with age of academician with mechanical low back pain (N=30)
Pearson's co-relation r value = 0.81, p value=0.66

This figure examines the relationship between age and H reflex amplitude of the sciatic nerve in the sample of 30 academics with low back pain.

A Pearson's correlation test was done to assess the correlation between age and amplitude. The r value from the test was 0.81 and the p-value was 0.66.

Since the p-value is greater than 0.05, there is no discernible statistical relationship between age and H reflex amplitude according to this data. The positive r value indicates a somewhat favourable correlation between age and amplitude, but this is not a statistically significant relationship.

In summary, there is no significant age-related decline or reduction observed in the H reflex amplitudes of the sciatic nerve in this sample of academics with mechanical low back pain. Amplitude appears preserved across age groups within the limited spread of this cohort.



GRAPH: Co-relation of H reflex Latency with H reflex Amplitude among mechanical low back pain (N=30) Pearson's co-relation r value = -0.662, p value<0.01

This figure examines the relationship between H reflex latency and amplitude of the sciatic nerve in the sample of 30 academics with low back pain.

A Pearson's correlation test was done to assess the correlation between latency and amplitude. The r value from the test was -0.662 and the p-value was <0.01. Since the p-value is less than 0.01, there is a statistically significant inverse association between latency and amplitude based on this data.

The negative r value indicates that as latency increases, amplitude tends to decrease. This suggests that prolonged latencies corresponding to demyelination or conduction slowing in the nerve are associated with a decline in amplitude or axonal loss.

In summary, there is a considerable, somewhat negative correlation between sciatic nerve latency and amplitude in this sample with low back pain. The conduction slowing indicated by prolonged latency is accompanied by a reduction in amplitude, implying axonal involvement in those with abnormal latencies.

This points to conduction block from demyelination along with axonopathy in the subset of academics with abnormal H reflex studies.

DISCUSSION

The current investigation sought to evaluate the electrophysiological findings of sciatic nerve involvement in an academician with mechanical low back pain using Hoffmann reflex (H reflex) parameters. The H reflex is a valuable electrodiagnostic technique that assesses the functional integrity of the entire reflex arc, including peripheral sensory, motor, and spinal pathways involved in the stretch reflex[24]. H-reflex is extensively used as both a research and clinical tool. The simplicity with which this reflex can be elicited in several muscles throughout the body makes it an attractive tool[25]. Alterations in H reflex parameters, particularly latency and amplitude, can provide insights into the underlying pathophysiology affecting the sciatic nerve roots or nerve trunk.

H Reflex Latency Findings:

The mean H reflex latency in the sample of 30 academicians with low back pain was 31.44 ms (95% CI: 30.27-32.62 ms), which falls within the normal range of less than 32 ms[26]. However, the upper limit of the 95% confidence interval approached the cut-off value, suggesting the existence of a subset with mildly prolonged latencies. This finding was further supported by the categorization of latencies into normal and abnormal ranges. While the majority (83.3%) of the academician demonstrated normal latencies, a notable proportion (16.7%) exhibited prolonged latencies beyond the 32 ms cut-off, indicative of abnormally delayed conduction in the sciatic nerve.

Prolonged H reflex latencies can arise from a number of diseases processes affecting the sciatic nerve, including demyelination, conduction block, or nerve root compression[25]. In the context of mechanical low back pain, the most likely underlying mechanism is nerve root impingement or compression due to disc degeneration and facet hypertrophy, or disc herniation[27]. Such compression can lead to focal demyelination or transient conduction block, manifesting as delayed conduction velocity and prolonged latencies[28].

The presence of one academician with an H reflex latency below 28 ms is an interesting finding. While this could represent normal biological variation or technical factors, it may also suggest a depressed ankle reflex, such as polyneuropathy, sciatic neuropathy, or S1 radiculopathy[29]. However, further clinical correlation would be necessary to determine the underlying cause in this specific case.

H Reflex Amplitude Findings:

In contrast to the latency findings, the analysis of H reflex amplitudes revealed no evidence of abnormalities in the study sample. All 30 academicians (100%) exhibited normal amplitudes above the lower limit of 4 mV. This observation suggests the absence of ongoing axonal loss or sciatic neuropathy, as significant axonal degeneration typically leads to reduced amplitudes[25,29].

The preservation of H reflex amplitudes, coupled with the presence of prolonged latencies in a subset of academicians, implies a conduction block phenomenon rather than axonal loss[30]. This pattern is consistent with the proposed mechanism of nerve root compression or focal demyelination causing conduction slowing while preserving axonal continuity[31].

Correlation with Age:

The study investigated the potential impact of age on H reflex parameters by examining the correlation between age and latency, as well as age and amplitude. The results demonstrated no discernible statistical relationship between age and H reflex latency ($r = -0.15$, $p = 0.42$) or amplitude ($r = 0.81$, $p = 0.66$) in this sample of academicians with low back pain.

However, it is crucial to remember that the age range in this investigation, there might have been limited, potentially hindering the identification of age-related effects, if any. Numerous investigations have shown that the elderly population showed a smaller H-wave than younger populations[32,33]. So, here larger studies with a wider age distribution would be beneficial in further elucidating the impact of aging on sciatic nerve conduction in the context of low back pain.

Gender Differences:

The analysis of gender differences in H reflex latency revealed no statistically significant discrepancy between males and females in the study sample. The proportion of academicians with abnormal latencies was reasonably proportionate across genders (males: 60%, females: 40%), and the median latencies were comparable (males: 31.07 ms, females: 31 ms). These conclusions align with the findings of **Buschbacher RM et al** who have reported no significant gender differences in H reflex parameters in healthy individuals[26].

However, it is essential to consider that the relatively small sample size in the current investigation may have restricted the capacity to identify subtle gender-related differences, if present. Additionally, the potential influence of other demographic or anthropometric factors, such as height or body mass index, on H reflex parameters warrants further investigation in larger cohorts.

Latency-Amplitude Correlation:

An intriguing finding from the study was the statistically significant inverse relationship between H reflex latency and amplitude ($r = -0.662$, $p < 0.01$). This inverse connection implies that as latency increases, reflecting conduction slowing or demyelination, there is a corresponding decline in amplitude, implying axonal involvement or loss.

This observation is in keeping with the idea of conduction block and subsequent Wallerian degeneration, where prolonged demyelination or nerve compression can ultimately lead to axonal degeneration and amplitude reduction[34]. The negative correlation observed in the study sample supports the hypothesis that the conduction slowing indicated by prolonged latencies may be accompanied by axonal involvement in a subset of academicians with abnormal H reflex studies.

The results of this investigation resonate with previous literature investigating the connection between low back pain and sciatic nerve involvement. Several Studies have revealed irregularities in the electrophysiology in the lower limb nerves, including the sciatic nerve, in individuals suffering from low back pain[35,36]. These abnormalities, such as prolonged latencies and reduced amplitudes, have been attributed to nerve root compression or radiculopathy secondary to degenerative spine pathologies[36].

Furthermore, the observed correlation between latency and amplitude aligns with the pathophysiological mechanisms proposed in various neuropathic conditions. For instance, in diabetic neuropathy, a well-established correlation exists between prolonged latencies and reduced amplitudes, reflecting the forward-thinking quality of the disease, where demyelination precedes axonal degeneration[37]. Similarly, in chronic inflammatory demyelinating polyneuropathy (CIDP), conduction slowing and amplitude reduction are commonly observed, indicating the coexistence of demyelination and axonal involvement[38].

CONCLUSION

The current research offers insightful information into the electrophysiological assessment of sciatic nerve involvement in an academician with mechanical low back pain. The key findings include:

1. A subset of academics (16.7%) exhibited prolonged H reflex latencies, indicative of conduction slowing or demyelination in the sciatic nerve, likely due to nerve root compression or impingement.
2. H reflex amplitudes were preserved in the complete set of samples, suggesting the lack of significant axonal loss or neuropathy.
3. There were no significant correlations found between age and H reflex parameters, indicating age was not a major determinant of sciatic nerve conduction in this sample.
4. No statistically significant gender differences were found in H reflex latencies, although larger studies may be needed to detect subtle discrepancies, if present.
5. A moderate negative connection found between H reflex latency and amplitude, suggesting that prolonged latencies (conduction slowing) may be accompanied by axonal involvement or loss in a subset of academicians with abnormal findings.

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A Study to Compare the Effects of Child Pose and Cobra Pose on Pain and Function Performance in Subjects with Non-Specific Low Back Pain-A Pilot Study

Author: Aekta Nilesh Shah

ABSTRACT:

BACKGROUND:

Non-specific low back pain is a relatively common and recurrent condition for which at present there is no effective cure. The lifetime prevalence of low back pain is reported to be as high as 84% and prevalence of chronic low back pain is about 23% with 11-12% of the population being disabled by low back pain. Child pose is a 5000- year- old healing system that combines use of body positions, breathing and mental focus to achieve better health through liberation from suffering and to reduce non-specific low back pain. Cobra pose helps to strengthen the spine and relieve stress.

AIM:

The study aimed at comparing the effects of cobra pose and child pose on non-specific low back pain

METHODLOGY:

The present study was carried out in physiotherapy centres in Rajkot city. Total 10 subjects of age group 30-50 years old were selected on the basis of inclusion and exclusion criteria. Subjects performed cobra pose and child pose for 10 days with 3 repetitions and 30 second's hold. Subjects were examined with baseline data and pre and post NPRS and Oswestry low back disability scale was taken on 1st day and 10th day of the study. Results obtained were analysed.

STATISTICAL ANALYSIS:

Data was not following normal distribution so, with group comparison Wilcoxon Signed rank test and Between group analysis Mann Whitney U test was used. P- value kept at 0.05 level of significance.

RESULTS AND CONCLUSION:

The study concluded that both poses are effective as it helps in reducing pain and increasing functional performance.

KEYWORDS:

Non-specific low back pain, Child pose, Cobra pose, NPRS, Oswestry low back disability scale.

INTRODUCTION:

Non-specific low back pain is a relatively common and recurrent condition for which at present there is no effective cure. Non-specific low back pain is defined as low back pain not attributable to recognisable known specific pathology (for example; infection, tumour, osteoporosis, fracture etc). The lifetime prevalence of low back pain is reported to be as high as 84% and prevalence of chronic low back pain is about 23% with 11-12% of the population being disabled by low back pain. The cause of non- specific low back pain does not have a known pathoanatomical cause; treatment focuses on reducing pain and its consequences. Child pose is a 5000- year- old healing system that combines use of body positions, breathing and mental focus to achieve better health through liberation from suffering and to reduce non-specific low back pain. Cobra pose helps to strengthen the spine and relieve stress. Lumbar muscle dysfunction is due to pain related to altered lumbar muscle structure. Muscle degeneration is characterized by a decrease in cross sectional area and an increase in fat infiltration in lumbar paraspinal muscle. So the study is designed to compare the effects of cobra pose and child pose on pain and function performance with non-specific low back pain.

MATERIALS AND METHODLOGY:

Materials used for the study are consent form, data collection sheet, yoga mat, stopwatch, scales and required stationery.

Inclusion criteria includes age group between 30 to 50 years, gender both male and female, acute phase and subjects having non-specific low back pain and Exclusion criteria includes subjects having any recent trauma or surgeries and any neurological and cardiovascular conditions.

The present study was carried out in physiotherapy centres in Rajkot city. Total 10 subjects of age group 30-50 years old were selected on the basis of inclusion and exclusion criteria. Subjects performed cobra pose and child pose for 10 days with 3 repetitions and 30 second's hold. Subjects were examined with baseline data and pre and post NPRS and Oswestry low back disability scale was taken on 1st day and 10th day of the study. SPSS version 26.0 for windows software was used. Microsoft Excel was used to generate graphs and tables. Data was not following normal distribution so, with group comparison Wilcoxon Signed rank test and Between group analysis Mann Whitney U test was used. P- value kept at 0.05 level of significance.

RESULTS:

There is no significant difference between the two groups. But there is a significant difference between the pre and post value of group 1 and group 2.

The study concluded that both poses are effective as it helps in reducing pain and increasing functional performance.

The study results may guide the healthcare providers in selecting the most effective pose for reducing nonspecific low back.

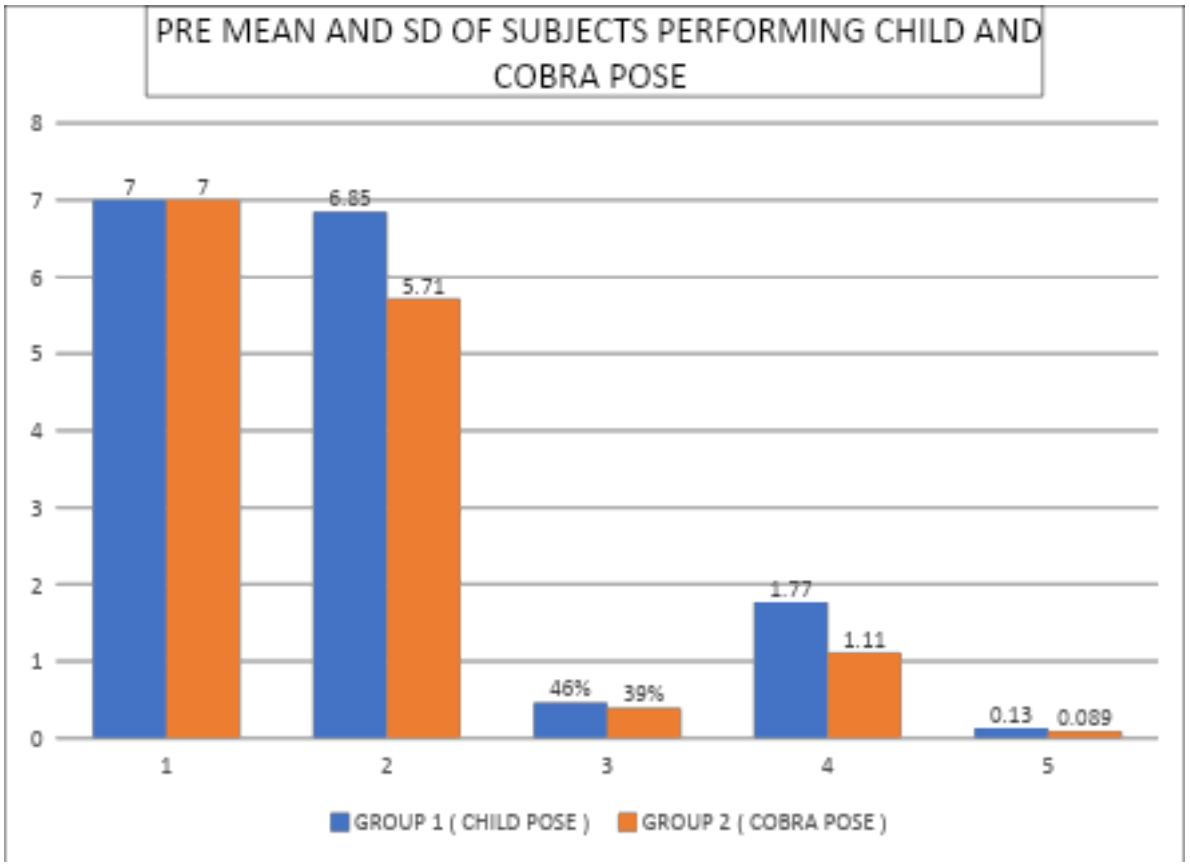
DISCUSSIONS:

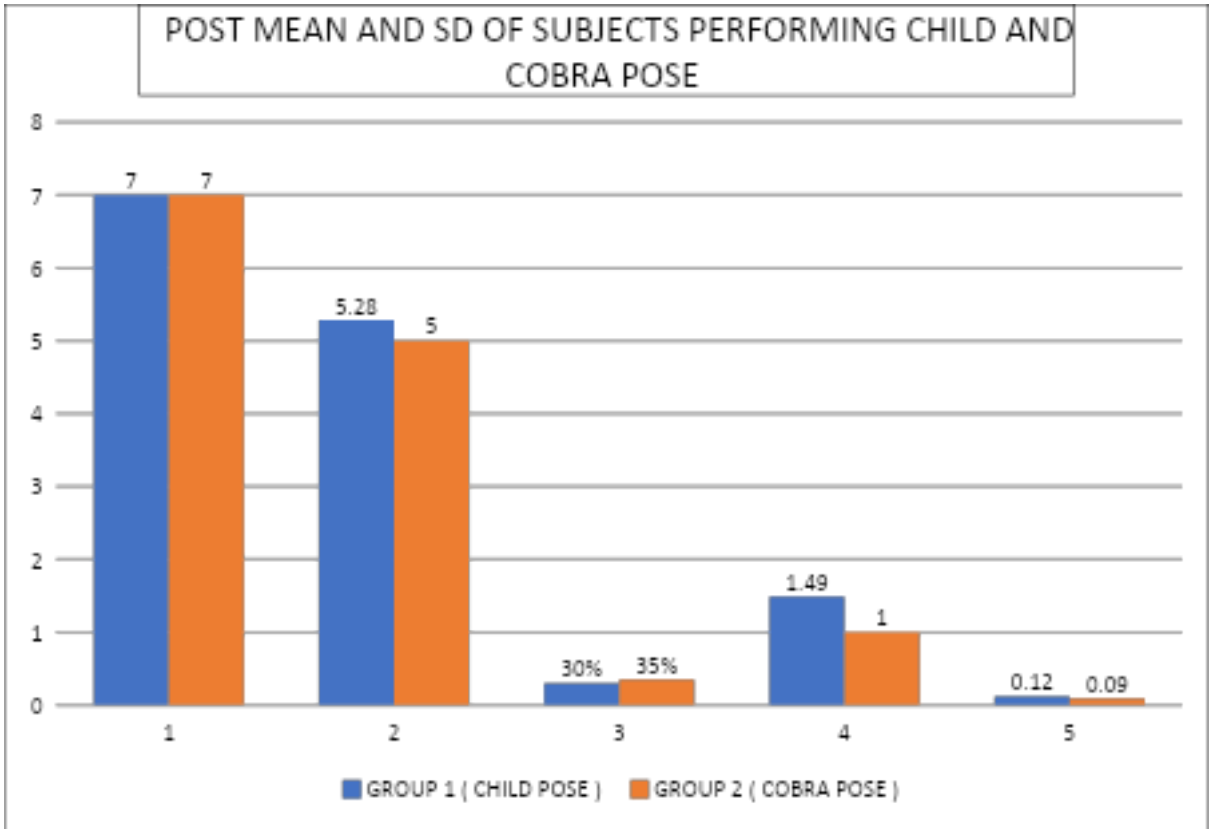
The data were collected from 14 subjects and it shows within the group null hypothesis is rejected and alternative hypothesis is accepted whereas between group null hypothesis is accepted and alternative hypothesis rejected. Child pose and cobra pose enabled on creating a moment of rest where the body can be still. It engages muscles of upper back and shoulders which claims to stretch, strengthen, and lengthen the involved muscles. Studies claimed that integrated yoga showed improvements in physical and social health domains of non-specific low back pain. In intention to treat analysis, the subjects showed significant difference in the pain intensity in both groups after performing child pose and cobra pose respectively.

TABLES:

Table 1: Within group Analysis					
Outcome measures	**Group**	**Mean ±SD**		**P-value**	**Z-value**
		PRE	**POST**		
NPRS	Child pose	6.85±1.77	5.28±1.49	0.015	-2.428
	Cobra pose	5.71±1.11	5±1	0.025	-2.236
Oswestry Disability Index	Child pose	46%±0.13	30%±0.12	0.0186	-2.371
	Cobra pose	39%±0.089	35%±0.09	0.026	-2.232

Table 2: Between group		
Outcome measures	**P-value**	**Z-value**
NPRS	0.638	-0.47
Oswestry Disability Index	0.335	-0.964





CONCLUSIONS:

The study concluded that both poses are effective as it helps in reducing pain and increasing functional performance. The study results may guide the healthcare providers in selecting the most effective pose for reducing nonspecific low back. Yoga serves as an aerobic workout and contributes immensely to cardiopulmonary fitness. It is a low impact alternative for calorie burning and cardiovascular conditioning. Yoga helps in increasing the performance and the strength of core muscles. It can be used in conjunction with conventional treatment for management, pain reduction and progressing physical functioning in non-specific low back pain subjects. Studies aimed to determine that yoga yields more benefits for balance, speed of walking and improving cognitive functions. Yoga has been shown to be beneficial for any chronic conditions that may be improved by a decrease in measures of abdominal adiposity. It shows a reduction in measures of visceral adiposity which is an important measure of metabolic risk.

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There are no conflicts of interests

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A Study to Compare the Effects of Normal Diet and Protein Rich Diet on Muscle Strengthening in Individuals with Knee Pain

Author: Jeet Vachhani.

ABSTRACT:

BACKGROUND:

Knee pain is a highly prevalent condition with multiple etiologies with two of the most common conditions being osteoarthritis and patellofemoral pain. These conditions can lead to reduced physical function and poor quality of life. The overall prevalence of primary knee osteoarthritis in big cities was around 33.2%, 19.3% in small cities, 18.3% in towns and 29.2% in villages. There are many etiologies of knee pain like meniscus tears, ligaments sprain, patellofemoral dysfunction, poor diet, obesity etc.

Protein rich diet is helpful in growth, repair, and maintenance of body tissues.

AIM:

The study aimed at comparing the effects of normal diet and the protein rich diet on muscle strengthening in individuals with knee pain.

METHODOLOGY:

The present study was carried out in physiotherapy OPDs in Rajkot city. Total 10 individuals were taken, and these individuals was divided into two groups. In Groups A the patients were guided to consume the regular diet an in-Group B the patient were guided to consume the protein rich diet based on exclusion and inclusion criteria. Both the groups strength of muscle was examined by repetition maximum criteria after 10 days. Strength of muscles was checked by exercises like Last 15° knee extension; SLR ; Side Lying SLR; High sitting – knee extension. Results obtained was analyzed.

STATISTICAL ANALYSIS:

Data was following normal distribution so with group and between group analysis Paired T test was used. P- value kept at 0.05 level of significance.

RESULTS AND CONCLUSION:

The study concluded that a protein rich diet is more effective than a normal diet as it helps in reducing pain and increasing the strength of muscles.

KEYWORDS:

Protein rich diet, Normal rich diet, Knee pain, Muscle performance, Repetition maximum

INTRODUCTION:

Knee pain is a highly prevalent condition with multiple etiologies with two of the most common conditions being osteoarthritis and patellofemoral pain. These conditions can lead to reduced physical function and poor quality of life. The overall prevalence of primary knee osteoarthritis in big cities was around 33.2%, 19.3% in small cities, 18.3% in towns and 29.2% in villages. There are many etiologies of knee pain like meniscus tears, ligament sprain, patellofemoral dysfunction, poor diet, obesity etc.

Protein rich diet is helpful in growth, repair, and maintenance of body tissues.

- The greater protein requirement enhanced protein synthesis necessary to assist in the repair and remodeling process of skeletal muscle fibers damaged during resistance exercise session.
- Risk factors for knee pain include obesity, age, any trauma to the joint and repeated stress on the knee.

MATERIALS AND METHODOLOGY:

Materials used for the study are consent form, data collection sheet, sandbags, stopwatch, VMO board and required stationery.

Inclusion criteria includes age group between 40 to 70 years, gender both male and female, acute phase and subjects having knee pain and Exclusion criteria includes subjects having any recent trauma or surgeries and any neurological and cardiovascular conditions.

The present study was carried out in physiotherapy OPDs in Rajkot city. Total 10 individuals were taken, and these individuals was divided into two groups. In Groups A the patients were guided to consume the regular diet an in-Group B the patient were guided to consume the protein rich diet based on exclusion and inclusion criteria. Both the groups strength of muscle was examined by repetition maximum criteria after 10 days. Strength of muscles was checked by exercises like Last 15° knee extension; SLR ; Side Lying SLR; High sitting – knee extension. Results obtained were analyzed. Data was following normal distribution so with group and between group analysis Paired T test was used. P-value kept at 0.05 level of significance.

RESULTS:

There is a significant difference between the two groups. Protein rich diet shows significant difference in the repetitions and increasing the strength of muscles. The study concluded that a protein rich diet is more effective than a normal diet as it helps in reducing pain and increasing the strength of muscles. The study results may guide the health care providers in selecting the best protein rich diet for increasing the strength of muscles as well as increasing the repetitions of the exercises.

DISCUSSION:

The data were collected from 10 subjects and it shows alternative hypotheses.

Protein rich diet helps to promote weight management, enhance glycaemic regulation and increase calcium absorption.

Studies claimed that an integrated protein rich diet showed improvements in physical and social health domains of knee pain.

Studies showed that the repetitions of the exercises were increased due to intake of a protein rich diet.

Protein rich diet helps in speeding recovery after any type of injury as well as helps to improve the functional performance of the subjects.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	PRE LAST 15 DEGREE - POST LAST 15 DEGREE	-3.400	2.591	0.819	-5.253	-1.547	-4.150	9	0.002
Pair 2	PRE SLR - PRE SLR	-3.000	2.582	0.816	-4.847	-1.153	-3.674	9	0.005
Pair 3	PRE SIDE SLR - POST SIDE SLR	-2.900	2.470	0.781	-4.667	-1.133	-3.713	9	0.005
Pair 4	PRE KNEE EXT - POST KNEE EXT	-3.200	2.573	0.814	-5.041	-1.359	-3.932	9	0.003

CONCLUSIONS:

The study concluded that a protein rich diet is more effective than a normal diet as it helps in reducing pain and increasing the strength of muscles. The study results may guide the health care provider in selecting the best protein rich diet for increasing the strength of muscles as well as increasing the repetitions of the exercises. It helps in reducing pain

as well as increase the functional performance of one's life. It helps to keep the subject's lifestyle healthy as well as increase the strength of the muscles. It helps in improving the cardiopulmonary health and alternative for calorie burning.

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There are no conflicts of interests

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"Immediate Effect of Dynamic Stretching and Active Release Technique (ART) on Sit and Reach, in a Patient with Calf and Hamstring Tightness –A Comparative Interventional Study"

Arya Nandalal Dadhaniya , Dr. Himashi Harshadrai Ruparelia (PT) , Dr. Ashish Dhirajlal Kakkad.

ABSTRACT:

BACKGROUND: Flexibility is a very important physiological component of physical fitness required for our daily activity or for athletic events. If there is reduction in flexibility then it can cause inefficiency at the workplace and can be a risk factor for various conditions like muscle strain during sports, lower back pain, knee pain etc. Tightness of muscle can affect activities of daily living (ADL) of an individual. There are many methods available to measure muscular tightness, one of the methods for identifying the flexibility of the lower limb muscle is by performing the sit and reach test. By using this test, it can be identified if the muscle tightness is present and also post treatment improvement in flexibility can be noted. To improve flexibility stretching can be useful, methods like static stretching, dynamic stretching etc. can be given also manual techniques like active release technique (ART), positional release technique can be useful. So, aim of this study is to compare immediate effect of Dynamic Stretching and ART

OBJECTIVE: To study and compare the effect of active release technique and sit and reach on subjects with calf and hamstring tightness

METHOD: The subjects fulfilling selection criteria were selected between the age of 18-30 years, then they were randomly divided into either of two groups (Dynamic Stretching or ART). Before giving the intervention, analysis of flexibility by sit and reach test was done. The intervention was given for both hamstrings and calf muscles in the form of active release technique or the dynamic stretching. Then post evaluation for Calf and Hamstring tightness by sit and reach test was done.

RESULTS: The statistical analysis shows that there is a significant improvement (P value<0.05) in flexibility when analysis is done within a group using paired t- tests in both the groups. But there was no significant difference between both the intervention when analysed using unpaired t test.

CONCLUSION: This study concludes that individuals receiving dynamic stretching and active release techniques both techniques are equal effectiveness on calf and hamstring tightness in sit and reach test.

KEYWORDS

Dynamic stretching, Active Release technique, Sit and Reach test, Flexibility

INTRODUCTION

Flexibility is a very important physiological component of physical fitness required for our daily activity or for athletic events. [1] If there is reduction in flexibility then it can cause inefficiency at the workplace and can be a risk factor for the various conditions like muscle strain during sports, lower back pain du, knee pain etc. [2] The ability of an individual to move smoothly depends on his flexibility, an attribute that enhances both safety and optimal physical activities. [3] There are various causes for limitation in flexibility like sex, joint type, extensibility of tendons and ligaments, and muscle relaxation ability. [3] Hamstring tightness is reportedly associated with a posterior rotation of the pelvis in standing. [3] A posterior rotation of the pelvis tends to flatten the lumbar spine, which may increase the risk of low back pain. [3] Gastrocnemius tightness results in a significant increase in knee flexion at initial contact and mid-stance. Continuity and development of flexibility is ensured by stretching exercises. Numerous stretching techniques have been developed, reported and applied by physical therapists, coaches and athletic trainers for improving ROM as well as for warm - up purposes. [4] Dynamic stretching (DS) – Low - intensity active stretching, using repeated, short - duration, end range active muscle contractions of the muscle opposite the shortened muscle are a form of self - stretching exercise [4] Active release technique (ART) is a manual therapy for treating soft tissue problems in muscles, joints, and connective tissue.[5] Active Release Technique is based on the theory of cumulative trauma disorder (CTD). CTD is a soft tissue injury that results from acute injury, repetitive injury, or a constant pressure/tension injury. [6] The active release technique (ART) is a treatment method used for soft tissue injuries of muscles and myofascial that cause mechanical dysfunction, which can lead to pain and muscle weakness. [4]

Long duration sitting is a contributory factor for developing tightness. [7] Flexibility dysfunction is a widespread problem faced by common people as well as sportspersons, especially in the case of the hamstring group of muscles. A tight gastrocnemius (with increased compensatory pronation) also predisposes patients to plantar fasciitis. The need of the study is to identify the effective technique to reduce the tightness of the muscle. [7]

METHODS

This study was conducted in and around Rajkot city, ethical permission was taken from the departmental ethical committee. Total 30 subjects were selected who would fulfill the criteria of selection [8]. Criteria for selection were: inclusion criteria – Individuals between 18-30 age, Male and Female both, Calf and hamstring both muscles tightness should be present. Exclusion criteria - History of previous lower limb injury or pain from past one year, history of fracture or surgery of back, pelvis, hip, knee or ankle from past one-year, inflammatory condition that could affect motion, Spinal deformity or any neurological condition. After proper explanation about the purpose and procedure of the study, individuals who participate in this study were requested to sign a written consent form. The selection of participants was done by convenient sampling and then randomly divided into either of the two groups by odd and even number into either Group – A DS and Group – B ART. After proper explanation about the purpose and procedure of the study, individuals who participate in this study were requested to sign a written consent form. A pre-participation evaluation form consisting of a basic assessment chart was filled which included name, age, gender, occupation, address, and ROM and sit and reach test. For GROUP – A: Dynamic Stretching exercises for both hamstring and calf muscles 15 repetitions were given. For Hamstrings muscle (Figure 1): The subject contracted the hip flexors with knee extended and flexed the hip joint so that the leg swung forwards to the anterior aspect of his body i.e. front kick through the active ROM of the hip joint. For calf muscle (Figure 2) – Step forward with one leg and keep back heel flat on the ground while knee was flexed. Contraction of quadriceps and tibialis anterior muscles to extend back knee. At the same time, move forward to the point of mild stretch on the back calf muscle and then immediately release i.e., forward lunge. [9]

For Group B – ART Subjects lie supine on the plinth and gentle tension is applied to the hamstring muscle along the entire length (longitudinal length) while stretching the leg in different positions to better work the muscle, then palpate the taut band. Then the individual was asked to perform a movement for 15 times. [10] The calf muscle subject was in a prone lying position with the knee flexed to 90 degree and the ankle maintained in plantarflexion. Therapist applied deep manual pressure on the trigger point and while sustaining it the subject actively extended the knee as well as dorsiflexes the ankle15 repetitions were performed (Figure 3).[11]

Following intervention post data for V sit and Reach test was taken and statistical analysis was done.

RESULTS

The result of current study analysis was done by Statistical Package for the Social Sciences (SPSS). Data of test are of interval/ratio type, and normality was followed according to Shapiro-willk test. So parametric test was applied. Intra-group comparison was done by applying Paired t- Test. And inter group comparison between both the group was done by Unpaired t- Test. Analysis shows that there is a significant improvement in flexibility when analysis is done within group using paired t- test in both the groups. This suggests that there both the techniques are helpful for improving flexibility. When comparison is done between the effectiveness of two techniques, it has been identified that there is no significant difference between them. This suggests that both techniques can improve the flexibility equally.

Tables:

Table 1: shows within group comparison for Dynamic stretching technique

TABLE 1

GROUP B	Mean	Std. Deviation	P - value
Pre data of Sit and reach test	36.67	14.201	.000
Post data Sit and reach test	41.87	13.043	

Table 2: shows within group comparison for Active release technique

GROUP A	Mean	Std. Deviation	P value
Pre data of Sit and reach test	32.93	7.554	.000
Post data Sit and reach test	40.40	6.243	

TABLE 2

Between Group Analysis	Mean	Std. Deviation	P - value
GROUP A	7.47	3.720	.142
GROUP B	5.20	4.459	

TABLE 3

Table 3: shows comparison between both the technique as the p value is more than 0.05, analysis suggest no significant difference between the efficacy of both the techniques

DISCUSSION

The purpose of this study was to find the effective treatment for improving flexibility by assessing through sit and reach test performance between DS and ART. According to the analysis both groups show improvement in flexibility. But when compared between two groups both show equal improvement when flexibility is evaluated by Sit and Reach test performance. The effects of DS component for increase in ROM post intervention can one possible effect of an elevated muscle temperature resulting from dynamic stretching is a decrease in muscle viscosity.[12] It is reported that passive stiffness decreased following dynamic stretching, also it has been proposed that an increase in temperature may decrease the viscous resistance of muscles and by consequence enhance tissue extensibility.[12] One of the research article also found that DS caused a sustained reduction in passive stiffness of the hamstrings and increase in knee ROM, as well as a less lasting increase in passive torque at the onset of pain. As increased passive stiffness of the hamstrings and decreased knee ROM are both risk factors for hamstring injury during sports.[13] Another study done by Kaushik on the immediate effect of active release technique (ART) versus muscle energy technique (MET) on hamstring tightness in sewing

machine operators. concluded that Active Release Technique (ART) is more effective than Muscle Energy Technique (MET) in reducing hamstring tightness immediately. [14] Another study done by Jain NM, Zore L, Kumar A. on comparison of active release technique and positional release therapy for gastroc soleus trigger point release in recreational runners, concluded that there was a significant increase in the ankle dorsiflexion range of motion following ART, but PRT shows better improvement by reducing pain. [11] Both of these articles support our findings that ART can improve flexibility, the possible mechanism by which ART improves pain could be because of breaking the cross-fibre adhesions which restricts the smooth movement of tissues by adhering to adjacent tissues. [11]

Conclusion:

This study concludes that individuals receiving dynamic stretching and active release techniques both have similar effectiveness on calf and hamstring tightness in sit and reach tests. Hence any technique can be useful for improving flexibility in clinical practices.

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Correlation of Musculoskeletal Disorders and Sleep Quality among Office Workers

Drashti R Mistry , Alpa Purohit

ABSTRACT

Background: Office workers are at higher risk for musculoskeletal disorders as they spend a long time working in front of computers. Long-term sitting, static postures, repetitive work, computer work, and poor environmental conditions lead to the development of MSD. Aim of the study: Musculoskeletal pain (MSP) can negatively affect subjective sleep quality & cause sleep disturbance due to persistent pain. Poor sleep quality makes MSP worse, resulting in a vicious cycle of sleep disturbance & pain. So, here the need arises to evaluate the frequency of MSD among office workers & their relationship with sleep quality. Materials and Methods: In this observational study, 60 office workers will be selected according to inclusion criteria. A NORDIC musculoskeletal questionnaire & Pittsburgh Sleep Quality Index (PSQI) will be used to collect the data. Statistical Analysis: Data was analysed in SPSS Statistics software. The normality of the distribution was examined by the Shapiro-Wilk test. Spearman's correlation coefficient was used to examine the correlation between the variables. Result and Conclusion: This study shows office workers have body pain and poor sleep quality but there is negligible correlation between these characteristics.

Keywords: Musculoskeletal Disorders, Sleep Quality, Nordic Questionnaire, Pittsburgh Sleep Quality Index, Office Workers

INTRODUCTION

Musculoskeletal disorders (MSDs), affecting the body's movement system, are a leading cause of work-related illness globally, recognized as a significant concern since the 1600s [1]. These conditions are characterized by pain and limitations in physical function [2]. Research indicates that MSD-related pain is a major factor in employee absenteeism [3]. Several elements, including work environment, occupation, age, gender, physical activity habits acquired over time, and stress, can influence sleep quality [4]. Sleep disorders are especially prevalent among healthcare workers, though many factors, such as demographics and job type, can play a role [4]. Office workers, due to extended periods spent at computers, face a heightened risk of MSDs. Factors like prolonged sitting, awkward postures, repetitive tasks, computer use, and poor working conditions contribute to MSD development. Musculoskeletal pain (MSP) can disrupt sleep quality by causing sleep disturbances due to constant pain. In turn, inadequate sleep can exacerbate MSP, creating a cycle of pain and sleep problems. Sleep disturbances can further impact employee well-being, potentially leading to anxiety, depression, reduced daytime function, lower quality of life (QOL), increased work accidents, and decreased job performance. Therefore, it's crucial to assess the prevalence of MSDs among office workers and their connection to sleep quality.

- **Nordic musculoskeletal questionnaire:**[5] The Nordic Musculoskeletal Questionnaire (NMQ) is a standardized tool [5] used to assess musculoskeletal pain and limitations in ergonomic or occupational settings. The NMQ focuses on nine body regions and evaluates musculoskeletal pain in two ways: prevalence (how often it is experienced) over the past year and the past week, and how often it limited usual activities at work or home during the past year.
- **Pittsburgh Sleep Quality Index (PSQI):** [6] The PSQI uses a combination of 19 self-reported questions and five additional questions completed by the respondent's bed partner or roommate. These additional five

questions are for clinical purposes only and are not included in the final PSQI score discussed in this article. The 19 self-reported questions explore various aspects of sleep quality, such as how long it typically takes to fall asleep, how many hours of sleep are typically obtained, and how often certain sleep disturbances occur. These 19 questions are categorized into seven different areas, with each area scored on a scale of 0 to 3 (with 0 indicating no problems and 3 indicating the most severe problems). The scores from these seven areas are then added together to create a total PSQI score. This total score can range from 0 to 21, with higher scores reflecting poorer sleep quality.

MATERIALS AND METHOD:

An Observational study was conducted among office workers residing in different cities of India. Data was collected via an online questionnaire created with Google Forms and analysis was carried out using SPSS Statistics Software 20. The questionnaire was divided into 3 sections: (1) Demographic Details including name, age, gender, height, weight, etc. (2) Nordic Musculoskeletal Questionnaire including pain and prevention in different body regions. (3) Pittsburgh Sleep Quality Index including questions about their sleep quality, duration, problems, etc. Total 70 participants filled out the questionnaire with their consent. 10 Participants who not matched inclusion criteria were excluded. A sum of 60 responses was done and analysed.

INCLUSION CRITERIA

- Both males & females.
- Age: 18-60 years
- Working experience minimum 2 years.
- Working hours minimum 2 hours/day

EXCLUSION CRITERIA

- Recent history of trauma and post-surgical complications in past 6 months.
- Any chronic condition
- Any congenital condition
- Severe neurological or cardiovascular disorders

RESULT:

Total 60 samples were included with % males and % females. Table 1 shows mean values of Demographic Details of subjects. Figure 1 shows Prevalence of musculoskeletal disorders and Figure 2 shows Sleep Quality of office workers. Table 2 shows Normality test the values. It shows data was not normally distributed. So, Spearman's Correlation Coefficient was used to correlate body regions having pain and sleep quality. Table 3 shows negligible correlation between total body areas having pain and global PSQI scores.

for

[Figure 1]

Characteristics	Mean ± SD
Age (Years)	32.5 ± 4.94
Height (cms)	163.5 ± 2.12
Weight (Kgs)	71 ± 12.72
BMI (Kg/m²)	26.50 ± 4.07
Males (%)	75% (45)
Females (%)	25% (15)

r - value

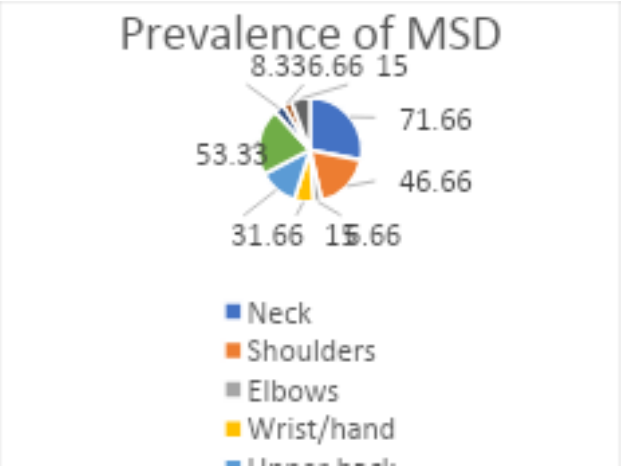
p - value

[Table 1: Demographic Details of subjects]

Correlations

			global PSQI	total body area	age
Spearman's rho	global PSQI	Correlation Coefficient	1.000	.033	-.229
		Sig. (2-tailed)	.	.805	.078
		N	60	60	60
	total body area	Correlation Coefficient	.033	1.000	.086
		Sig. (2-tailed)	.805	.	.512
		N	60	60	60
	age	Correlation Coefficient	-.229	.086	1.000
		Sig. (2-tailed)	.078	.512	.
		N	60	60	61
	BMI	Correlation Coefficient	.037	-.055	.206
		Sig. (2-tailed)	.781	.676	.111
		N	60	60	61

DISCUSSION:



In this study,71.66% individuals participating in the study had pain in the neck, 53.33% in the lower back, 46.66% in the shoulder, 6.66% in the knee, 31.66% in the upper back, 15% in the ankle, 15% in the wrist, 8.33% in the hip and 6.66% in the elbow. According to, Pittsburgh Sleep Quality Index (PSQI) 62% of individuals are poor & 38% individuals have good sleep quality. There was a negligible correlation between the age, BMI, number of body areas where the pain was reported and the PSQI score. Contrary to these studies, Katsifaraki et al. (2018) found no relationship between PSQI scores and pain. Even in that study, other sleep-related factors such as daytime sleepiness and insomnia were associated with MSD.[7] Sleep quality is a crucial factor for health. Poor sleep quality can lead to MSP. Insufficient sleep can lead to an increase in both pain and fatigue. This is an interactive relationship. The presence of MSP is associated with shorter sleep hours and lower sleep quality. [1] In this study, it was found that those who had pain in the shoulder, neck, lower back, knee, and ankle regions had a higher mean PSQI score than those who did not. In addition, it was found that the PSQI score increased as the number of pain regions increased.[1] In a systematic review that investigated the relationship between back pain and neck pain and physical activity; no clear relationship between physical activity and low back pain was found. [8] Office work often requires long hours of computer use and desk work, which requires long sitting durations. Prolonged sitting may cause a decrease in joint mobility and muscle strength. Weak lumbar mobility and muscle strength are considered as the risk factors for lumbar pain. [9] In addition, a previous study reported that being overweight was associated with disc degeneration in the lumbar spine. In our study, we found a close correlation between BMI and duration of pain. [9] Limitations of this study areLess sample size and it was not possible to comment on whether the pain or the sleep disturbance was the cause or the result of the vicious circle between these two phenomena since it was self-reported by the respondents which may lead to some inaccurate answers. Since the present study was performed on office workers, the results of the study cannot be generalized to other groups of employees. In Future, this study can be done with a higher number of individuals as some literature reviews correlation between total body areas having pain and sleep quality. And also, can be planned to investigate both physical and psychosocial factors that may cause sleep disorders in office workers.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
total body area	.207	60	.000	.882	60	.000
global PSQI	.141	60	.004	.961	60	.053

a. Lilliefors Significance Correction

[Table 2]

CONCLUSION:

- As per this study, musculoskeletal pain has high prevalence among office workers, especially neck and lower back. PSQI shows 62% of individuals have poor sleep quality and 38% of individuals have good sleep quality. But there was negligible correlation between age, BMI, total body areas having pain and global PSQI score. Ergonomic consideration to improve posture and prevent further risk factors can be given clinically.

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Correlation Between Craniovertebral angle, Neck disability Index and Trapezius Muscle Strength in Healthy Young Individuals: An Observational Study.

Dhruvi Patel, Dr. T kanna Amarnath

ABSTRACT

Background :- The purpose of this study is to determine whether the craniovertebral angle (CVA) and modified neck disability index has correlation between trapezius muscle strength in subjects with forward head posture with or without pain. The effect of trapezius muscle isometric strength on CV Angle and modified neck disability index. Isometric strengths of the upper, middle and lower trapezius muscles were measured using a handheld dynamometer. **Material and Methodology :-** In this observational study , 50 subjects [male and female] with no history of Surgery in neck ,back and shoulder, Clavicle fracture, Fracture in back and shoulder, Shoulder dislocation, Metal implantation Malignancy , infection . Craniovertebral angles were measured by kinovea software, Trapezius muscle strength measured by hand dynamometer with different position of upper, middle and lower fibers. **Result :- :** Statistical analysis was performed using the spss version23. In this study there were a total 50 participants in each group 25 female and 25 male. There was a significant difference in the homogeneity test between groups ($p<0.005$). **Conclusion :-** This study concluded that more use of electronic gadgets may lead to the forward head posture in that craniovertebral angle decreases so it puts the shoulder in an altered position, leading the UT muscle to become overactive and that is caused by the weakness of middle trapezius. Inhibition of LT, may be linked to hyperactivation of UT.

Key words: CV Angle, hand dynamometer, modified neck disability index ,kinovea software .

INTRODUCTION

Modern lifestyles and work requirements mean that many people spend long periods of time looking at screens on electronic devices, often resulting in awkward postures (Toh et al., 2017; Yadegaripour et al., 2021). Forward head posture (FHP) is one of the most common postural deviations observed with different FHP severity levels (Mahmoud et al., 2019); individuals with FHP often have an excessively anterior head position relative to the shoulder (Neumann et al., 2017).According to recent reviews on FHP, this postural deviation is associated with neck pain, vestibular deficits, decreased proprioception, abnormal muscle activity, and altered breathing patterns (Mahmoud et al., 2019; Migliarese & White, 2019; Szczygiel et al., 2020).

Proper posture maintains the musculoskeletal balance equilibrium, and poor posture might result in muscle imbalance that causes a faulty relationship among various body parts. Forward head posture (FHP) is one of the most common cervical abnormalities that predisposes individuals toward pathological conditions, such as headache, neck pain, temporomandibular disorders, vertebral bodies disorders, soft-tissue length and strength alteration, or even scapula and shoulder dyskinesis.

Kwonet al [10] concluded that the altered head position changes the kinematics of the head and shoulders and the activation of muscles. In addition, a study by Thigpen et al [11] reported that the internal rotation of the shoulder complex was significantly higher in patients with RSP.

Neck pain or neck dysfunction is a musculoskeletal disorder caused by improper posture with physical impairment or functional limitation. FHP usually results in shortening of not only the cervical extensor muscles including the splenii and upper trapezius, but also the SCM muscle. In addition, FHP causes weakness of the cervical flexor muscles as well as scapular retractors such as the middle trapezius.

MATERIALS AND METHODS

Ethical approval for the study was taken by Institutional Ethical Approval Committee, an observational study was conducted using purposive sampling on people under the age group of 18 to 34 who were willing to participate with CV angle less than 49 considered as a forward head posture. People who had any surgical or traumatic past history or fracture of head, neck and shoulder and any neurological condition were excluded from this study.

The duration of study was one month, during which 50 data was collected with 25 females and 25 male who had forward head posture from Ahmedabad city. Demographic data was collected from subjects and the subject signed consent form.

Collection of data had been done by using kinovea software for measuring CVA and hand dynamometer for measuring trapezius muscle strength and neck pain measured by neck disability index scale.

PROCEDURE

Measuring craniovertebral (CV) angle is one of the common objective methods in assessing head posture. It is the angle formed by a horizontal line drawn through the spinous process of the seventh cervical (C7) vertebra and a line joining the spinous process of C7 vertebra with the tragus of the ear. I used kinovea software for measuring CV angle.

Trapezius muscle strength

Upper-middle and lower trapezius muscle strength Measurements were made with manual hand dynamometer. In order to obtain the highest level of isometric contraction during trapezius muscle strength measurements, the middle angle of the scapula was chosen as the most suitable angle of scapula movement due to the high level of length-tension relationship. In order to determine the true and correct muscle strength during the measurement, resistance was applied to the subject until the efforts of the tester were equalized.

Elevation action was determined as scapular movement in the upper trapezius (UT) muscle strength measurement. The dynamometer was placed on the the subject scapular superior region in sitting position. For measurement, force was applied directly inferiorly to depress the scapula. In order to reach the precise muscle strength during the measurement, resistance was applied to the subject until the efforts of the subject and the tester were equalized.

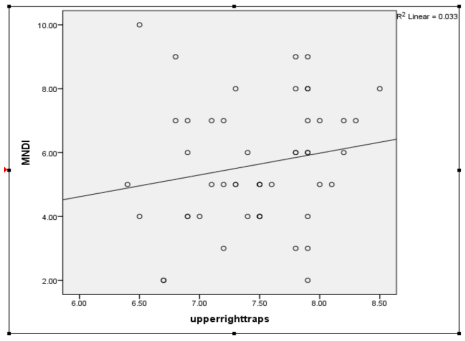
Middle trapezius (MT) muscle strength was measured when the subject was in the prone position, the humerus was abducted at 90°, and the glenohumeral joint was in full external rotation. The measurement was made by applying force to the wrist region, towards the lateral aspect of the distal radius of the athlete, who was asked to perform horizontal abduction with external rotation with the measuring arm in the current position. In order to obtain the true muscle strength during the measurement, resistance was applied to the subject until the efforts of the subject and the tester were equalized.

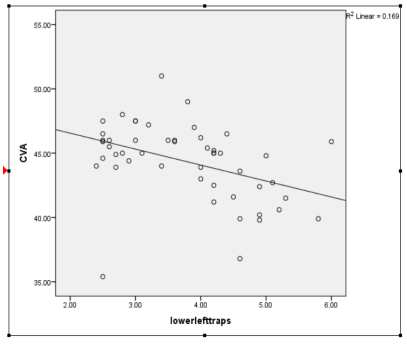
The lower trapezius (LT) muscle strength measurement, while the subject is in the prone position and the humerus is at 145° elevation and the force was applied from the midpoint of the subject spine of the scapula in the superior and lateral directions, parallel to the long axis of the humerus. The tester performed the measurement by applying downward resistance from the outer side of the radius. In order to determine the correct muscle strength during the measurement, resistance was applied to the subject until the efforts of the subject and the tester were equalized.

RESULT

Statistical analysis was performed using the spss version23. The correlation between craniovertebral angle, neck disability index and trapezius muscle strength for the dominant and non dominant side.

Trapezius muscle		R value R L	P Value R L	Correlation R L
Upper	CVA	0.154 0.167	0.462 0.425	P P
	MNDI	0.046 0.185	0.826 0.376	P P
Middle	CVA	0.387 0.472	0.056 0.020	P P
	MNDI	0.016 0.126	0.912 0.385	P P
Lower	CVA	-0.395 -0.411	0.005 0.003	N N
	MNDI	0.177 0.129	0.219 0.371	P P





DISCUSSION

This study was conducted to find out correlation between craniovertebral angle, neck disability index and trapezius muscle strength. This study showed a male & female upper trapezius and middle trapezius has low to moderate positive correlation with CV angle (r=0.154 to r=0.425), lower trapezius has low negative correlation (r=-0.395 to -0.411), and three fibers of trapezius muscle has positive correlation with moderate neck disability index score (r= 0.129 to 0.177).

The current study's findings corroborated those of Yasa et al. who found a link between decreased shoulder girdle muscular strength on the dominant side and nondominant side. The electromagnetic field of an electronic gadget's frequency interferes with action potential propagation to nerve axons, resulting in insufficient acetylcholine release and muscle membrane depolarization, causing muscle weakness and tone.

Shoulder muscle imbalances are caused by a forward head position. The middle trapezius which are involved in scapular stabilization, become weak when the craniovertebral angle decreases. Excessive activation of the upper trapezius (UT) is caused by weakness of the middle trapezius (MT).

Another explanation for this is that more use of electronic gadgets may lead to the forward head posture in that craniovertebral angle decreases so it puts the shoulder in an altered position, leading the UT muscle to become overactive and that caused by the weakness of middle trapezius. Inhibition of LT, may be linked to hyperactivation of UT. These muscles are required for scapular upward rotation, and they must be contracted in a coordinated manner in order to achieve proper shoulder elevation. After adapting forward head posture for a long time may cause an aberrant scapular force coupling, obstructing normal shoulder elevation and resulting in shoulder impairment.

CONCLUSION:

This study showed a male & female upper trapezius and middle trapezius has low to moderate positive correlation with CV angle (r=0.154 to r=0.425), lower trapezius has low negative correlation (r=-0.395 to -0.411), and three fibers of trapezius muscle has positive correlation with moderate neck disability index score (r= 0.129 to 0.177).

Clinical implications: Subject with forward head posture in which we have to give more focus on middle trapezius strengthening which ultimately decrease the overactivity of upper trapezius muscle.

Limitation :- Limited number of subjects were taken , Age limitation.

Future recommendations:- It should be done with larger sample size. For further study researcher can check correlation between CV angle and other muscles group which also affected in forward head posture.

REFERANCES:

Impact On Evidence-Based Clinical Practice of Considering Therapeutic Interventions in Patients with Chronic Kidney Disease

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Co-author: Dr. Dhaval Patel
Co-author: Dr. Gaurav Patel

ABSTRACT: -

Background: - Chronic kidney disease (CKD) is a progressive condition that may negatively affect musculoskeletal health. Patients with chronic kidney disease may experience better health outcomes when they engage in physical exercise.**Objective: -** This literature study aims to provide a better understanding about the pathophysiology of chronic kidney disease and role of therapeutic intervention and its implication in patients with CKD and to evaluate the best treatment strategies for chronic kidney disease.**Method: -** Relevant keywords will be used for the research through the electronic database PubMed, Medline, and Google scholar from January 2016 till January 2023. An open-source reference management software Zotero was used to manage bibliographic data and related research materials.Result: - Databases such as PubMed, Medline, Google scholar in which 10 articles where initially screened and meet the inclusion criteria. In PUBMED, GOOGLE SCHOLAR, MEDLINE 56,214 citations were screened from January 2015 to January 2023. After applied inclusion/ exclusion criteria such as an abstract screen, full text screen, and during data extraction 56,204 articles were excluded. **Conclusion: -** This review highlights the wide range of approaches used in clinical practice to evaluate physical performance and activity. Enhancing symptom management is critically needed to improve quality of life in advanced chronic kidney disease (CKD), even if minimizing mortality is still an important objective for kidney disease.

Key words: chronic kidney disease, prevalence of CKD, Physiotherapy treatment strategies.

INTRODUCTION:

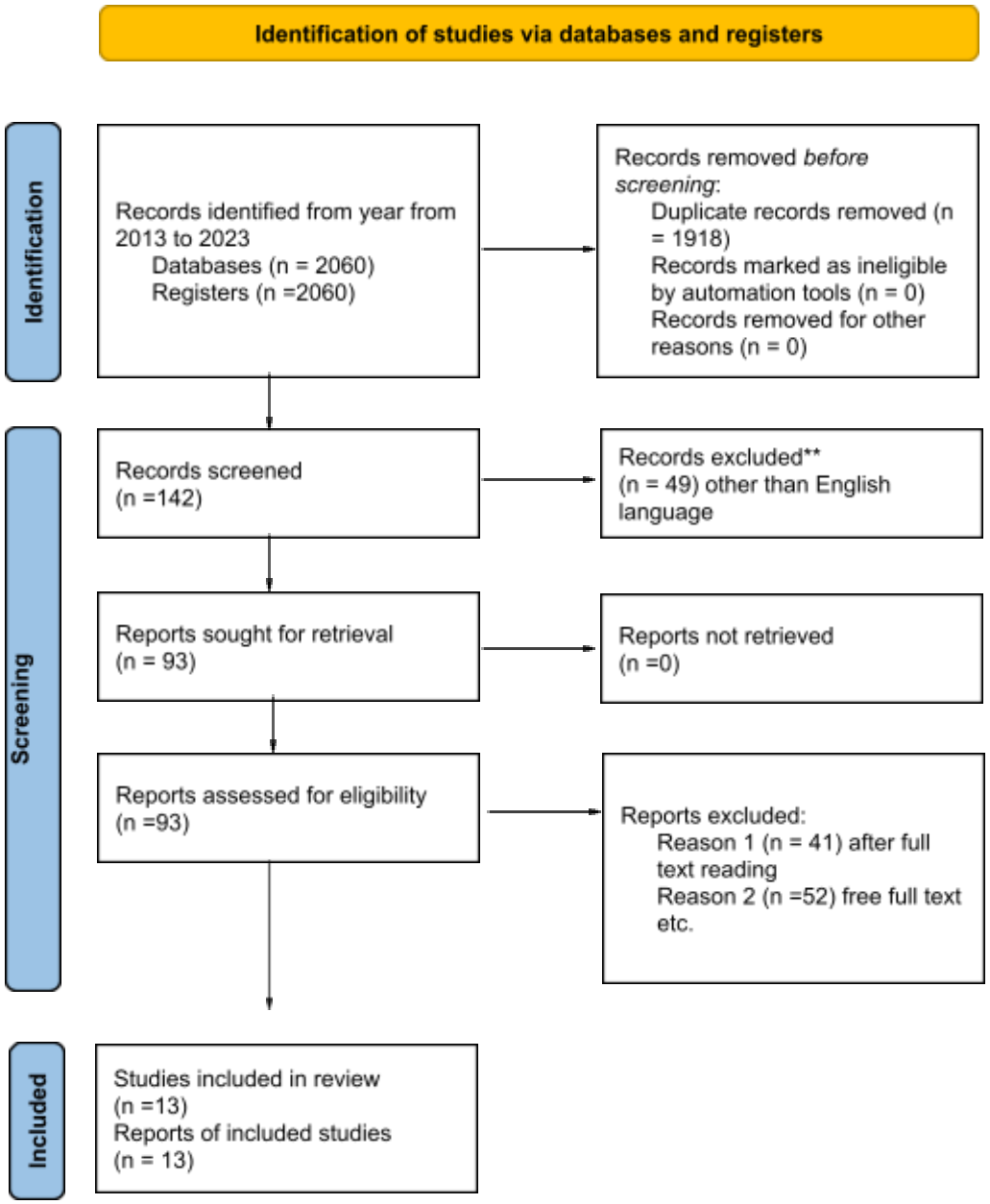
Chronic kidney disease (CKD) is defined as the presence of kidney damage or an estimated glomerular filtration rate (eGFR) less than 60 ml/min/1.73 mt2, persisting for 3 months or more, irrespective of the cause. It is a state of progressive loss of kidney function, ultimately resulting in the need for renal replacement therapy (dialysis or transplantation).[1] The 6 categories include:G1: GFR 90 ml/min per 1.73 m2 and above , G2: GFR 60 to 89 ml/min per 1.73 m2, G3a: GFR 45 to 59 ml/min per 1.73 m2 , G3b: GFR 30 to 44 ml/min per 1.73 m2 , G4: GFR 15 to 29 ml/min per 1.73 m2 , G5: GFR less than 15 ml/min per 1.73 m2 or treatment by dialysis. The three levels of albuminuria include an

albumin-creatinine ratio (ACR): A1: ACR less than 30 mg/gm (less than 3.4 mg/mmol), A2: ACR 30 to 299 mg/gm (3.4 to 34 mg/mmol), A3: ACR greater than 300 mg/gm (greater than 34 mg/mmol). [2] Chronic kidney disease represents an especially large burden in low- and middle-income countries, which are least equipped to deal with its consequences.[3]The reported prevalence of CKD in different regions ranges from <1% to 13%, and recently, data from the International Society of Nephrology's Kidney Disease Data Centre Study reported a prevalence of 17%. The aetiology of CKD varies considerably throughout India. [4] Progression of chronic kidney disease (CKD) involves the

recruitment and engagement of cellular processes originating in specific compartments of the kidney on the one hand and biochemical pathways of cell injury that contribute to these processes on the other hand.[5,6] Physical inactivity and a lack of regular exercise remain as key modifiable risk factors for general morbidity. Moreover, the need for health care practitioners to provide a formal exercise prescription to people with chronic disease has been recognized by multiple stakeholders [7,8]. High-intensity interval training (HIIT) increases mitochondrial biogenesis and cardiorespiratory fitness in chronic disease populations, however has not been studied in people with chronic kidney disease (CKD). The aim of this study was to compare the feasibility, safety, and efficacy of HIIT with moderate-intensity continuous training (MICT) in people with CKD. [9 ,10, 11] Aerobic exercise with a single exercise duration longer than 30 min has a more significant effect on the estimated glomerular filtration rate, and aerobic exercise by walking or running can more effectively improve the serum creatinine in CKD patients.[12,13,14,15] The neuromuscular electrical stimulation (NMES) is used on patients suffering from chronic obstructive pulmonary disease and heart failure. The results are promising, showing improvement in functional capacity of these patients. As patients suffering from CKD.[16]

NEED OF THE STUDY: Considering the roles that exercise plays in health, the purpose of this study is to look at the viability and possible advantages of various forms of exercise for individuals with chronic kidney disease. Because kidney disorders differ from one another, it is clinically relevant to investigate how different forms of exercise affect physical function and many aspects of health in patients.

METHOD AND MATERIALS: -



RESULT:

Evidence was reviewed and analysis was done based on Pedro's score and CEBM's Level of Evidence Scale. In the screening process, 2060 studies with potential relevance were initially identified. According to the eligibility criteria 13 articles are included in this study.From 13 articles nine articles were RCTs and three were experimental studies and one was comparative study. According to the results of four investigations, patients with CKD present poor physical conditioning, low muscular strength, and low tolerance to exercise. Neuromuscular Electrical Stimulation (NMES) was improving quadriceps muscle strength and the functional capacity of patients with CKD.Two studies investigated different exercise training application techniques.

DISCUSSION:

A review of the literature on clinical research design was done qualitatively. We found that 13 trials evaluating the use of resistance training, high-intensity interval training, aerobic exercise, and neuromuscular electrical stimulation to treat chronic kidney disease lacking key methodological components. The population characteristics, study design, primary outcomes, and interventions were among these components. Exercise is well known to have potent anti-inflammatory effects. The mechanisms underlying these effects include: the release of interleukin-6 (IL-6) from contracting skeletal muscle, which increases levels of anti-inflammatory cytokines; the reduction of proinflammatory cytokine production secondary to the reduced expression of toll-like receptors on monocytes and macrophages; and the reduction of visceral fat, which decreases secretion of pro-inflammatory adipokines.[15]Thaís B de Araújo et. Al. conducted the study revelling that it was mandatory the development of supervised home-based Resistance Training (RT) protocols in patients with chronic kidney disease Results provide new evidence that supervised home-based progressive RT may be a relevant intervention to attenuate the progression of CKD and improve functional capacity, bone mineral density, and the immunometabolism profile.

CONCLUSION:

In conclusion, this evidence-based study demonstrated the positive effects of different forms of exercise on chronic kidney diseases. Physical Exercise (aerobic and resistive exercise) along with neuromuscular electrical stimulation When it is all considered, there appear to be significant benefits for CKD patients, including better glomerular filtration, lowered cardiovascular risk factors, increased maximal oxygen uptake, enhanced muscle protein synthesis, increased or maintained strength, improved body composition, improved quality of life, and other health-related aspects.

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The Role of Gluteal Muscles in Athletic Performance and Injury Prevention: A Systematic Review

Akshay Rajeshbhai Kacha , Vinay Kumar Singh

Abstract

The gluteal muscles, especially gluteus maximus and gluteus medius, play an important role in running, jumping and stabilization of the hip and pelvis. Specific exercises targeting these muscles could potentially improve athletic performance. This systematic review aimed to evaluate the evidence on the role of gluteal muscles in athletic performance and the effects of gluteal-focused exercise programs on measures of athletic performance like jumping, sprinting and change of direction speed in athletes. A literature search was done on PubMed, Web of Science and Google Scholar databases using keywords like “gluteal muscles”, “exercise”, “athletes”, “performance”. Fifteen studies evaluating gluteal muscle function and effects of training programs in athletes were included. Several studies found the gluteal muscles are highly active during running, producing large hip extension and stabilization forces. Gluteal muscle strength and activation was greater in elite compared to recreational athletes in some sports. Multiple studies in team sport athletes found 6-15 week gluteal-focused exercise programs improved vertical jump height, sprint speed, change of direction speed and sport-specific skills like shooting accuracy. Case studies also found strengthening gluteal muscles helped reduce hamstring over-activation and prevent recurrent injuries in runners. The evidence indicates gluteal muscles play an important role in athletic performance, especially running and power activities. Targeted exercise programs focusing on these muscles can enhance performance and potentially reduce injury risk in athletes from various sports.

Keywords: gluteal muscles, exercise, athletes, performance etc.

Introduction:

The gluteal muscle group comprises three main muscles – gluteus maximus, gluteus medius and gluteus minimus. These muscles perform several important functions at the hip joint like extension, abduction, internal and external rotation[1]. The large gluteus maximus is a dominant hip extensor muscle and plays an important role in running, jumping and other powerful movements of the lower limb[2–4]. The gluteus medius and minimus predominantly control frontal and transverse plane hip motions and help stabilize the pelvis[5,6].

The importance of gluteal strength and activation has also been highlighted in vertical jump performance[11,12]. Since the gluteals are important hip extensors, they can make a significant contribution to vertical propulsion during jumps[11–13]. There is some evidence that plyometric jump training can increase gluteus maximus strength and activation[14]. However, it’s not clear if more targeted gluteal muscle exercises may enhance strength and jumping performance.

Considering their substantial force generating capacity, specifically targeting the gluteal muscles with strength training could be beneficial for athletic performance in sports involving running and jumping. Improving gluteal strength and control could also help prevent injuries like hamstring strains and reduce muscle activation imbalances[15,16]. Although gluteal-focused exercises like hip thrusts are becoming more popular, the efficacy of targeted gluteal muscle training programs for improving athletic performance and preventing injuries has not been systematically evaluated.

Therefore, the purpose of this systematic review was to evaluate the current evidence on:

1. The function and activation patterns of gluteal muscles during athletic movements like running and jumping
2. The effects of targeted gluteal muscle exercise programs on measures of athletic performance like jumping, sprinting and agility/change of direction ability
3. The role of gluteal muscle strength and activation in injury prevention in athletes

Methods

A systematic search of PubMed, Web of Science and Google Scholar databases was done from inception up to December 2022 to identify relevant studies on gluteal muscles in athletic performance and injuries. The search terms used were "gluteal muscles" OR "gluteus" OR "gluteal" AND "exercise" OR "training" OR "activation" OR "strength" AND "athletes" OR "performance" OR "sport" in various combinations. Additional searches for specific sports like "running", "football", "soccer" etc. were also done along with screening of reference lists.

The inclusion criteria for studies were: 1) Evaluated gluteal muscle function/activation during athletic movements, OR 2) Investigated effects of gluteal-targeted training programs on performance measures like jumping and sprinting in athletes, OR 3) Evaluated role of gluteal muscles in exercise-related injuries in athletes. Biomechanics studies evaluating gluteal forces and electromyography (EMG) studies assessing gluteal activation during athletic movements were included for criterion 1. For criterion 2, studies that used gluteal-focused exercises like hip thrusts, bridges etc. and assessed pre-post changes in performance measures were included. Case-studies demonstrating the effects of improved gluteal strength or activation on reducing injuries were included for criterion 3. Only full text studies on healthy, athletic population published in English language journals were considered. Studies that did not meet the inclusion criteria as well as systematic reviews were excluded.

A total of 432 search results were screened, out of which 15 studies met the inclusion criteria and were included in the review. These comprised of: Five biomechanics studies analyzing gluteal function during running and jumping, six training studies evaluating effects of gluteal-targeted programs on performance in team sport athletes, three EMG studies comparing gluteal activation between elite and non-elite athletes and one case study demonstrating gluteal strengthening for injury prevention. The quality of studies was assessed based on factors like appropriate sample size, valid performance measures, adequate intervention duration and accounting for confounding factors.

Results

Gluteal muscle function during athletic movements. Several biomechanics studies using modelling, force plates and EMG have evaluated the role of gluteal muscles during dynamic athletic movements, especially running and jumping. A modelling analysis found the gluteus maximus generates very large muscle forces during sprinting (over 5000 N) and makes an important contribution to forward propulsion[17]. The peak gluteus maximus force during running was estimated to be over 5 times bodyweight[10].

Overall, biomechanics studies indicate the gluteal muscles, especially gluteus maximus, play an important role in force generation and propulsion during powerful athletic movements like sprinting and jumping. They experience high activation levels and musculotendon loads. Effects of gluteal-focused exercise programs on athletic performance

Several recent studies have evaluated the effects of targeted gluteal muscle exercises and training protocols on measures of athletic performance like jumping, sprinting and change of direction speed in team sport athletes.

The training protocols used a variety of gluteal-focused exercises like hip thrusters, hip bridges, side lying abduction, prone hip extension, quadruped hip extensions, and lateral band walks[18,20–22]. The duration of these programs ranged from 6-15 weeks with 2-3 sessions per week. A majority of studies (5 out of 6) found significant improvements in performance measures like vertical jump height, sprint speed, change of direction speed, and horizontal jump distance after the training programs. The improvements ranged from 2-17% after the gluteal training interventions.

Overall, a majority of the studies found that gluteal-targeted training performed for 6-15 weeks can improve jumping, sprinting and change of direction ability in team sport athletes. There is also some evidence that gluteal activation exercises performed in the warm-up enhance acute power performance on vertical jumps. However, effects on sport-specific skills may be less consistent. Gluteal muscle activation and performance in elite athletes

A few studies have compared gluteal muscle activation and strength between elite athletes and non-elite controls. In a study on elite and non-elite junior speed skaters, the elite athletes had significantly higher isometric gluteus maximus strength[25]. There was also a significant correlation between gluteal strength and skating performance.

In elite female short track speed skaters, there was evidence of asymmetry and higher fatigue in the gluteus maximus muscles[25]. The authors suggested this could increase injury risk and that training should aim to reduce muscle activation imbalances.

Overall, these studies indicate elite athletes from sports like skating and volleyball have higher gluteal strength and muscle activation compared to non-elite recreational athletes. However, side-to-side muscle imbalances in gluteal activation should be monitored to avoid potential injury risks.

Gluteal strengthening for injury prevention

A few case studies have highlighted the importance of gluteal muscle strength and activation in preventing lower limb injuries like hamstring strains, which are common in sports involving high-speed running[15,26].

In an elite triathlete with recurrent hamstring cramping during running, a 12-week rehabilitation program focused on strengthening the gluteus maximus using exercises like hip extensions and bridging[15]. After training, gluteus maximus strength increased by 53% and activation of the hamstrings decreased during key phases of the running stride. This helped eliminate the recurrent cramping and enabled the athlete to return to full triathlon training.

Discussion

This systematic review found consistent evidence that the gluteal muscles, especially gluteus maximus, play an important force generating role during athletic movements like running, sprinting and jumping. They exhibit high EMG activation and produce large muscle forces during the stance phase as they extend the hip. Multiple studies in team sport athletes found that 6-15 weeks of targeted training programs involving hip extension, thrusting and gluteal isolation exercises enhanced performance measures like vertical jumps, sprints and change of direction ability.

There are some key mechanisms by which improved gluteal strength and activation could contribute to superior athletic performance:

1. Greater propulsive force production during hip extension to improve jump height, sprint speed and change of direction speed[21,22]
2. Enhanced stabilization of the pelvis and trunk to allow force transfer to the legs during movements like sprinting and cutting[18,24]
3. Reduced hamstring activation through appropriate distribution of hip extensor forces to prevent strains[15,22]
4. Increased hip extensor torque capability to enable a longer stride length and greater power output[19,26]

Interestingly, a couple of studies also demonstrated that performing just 5-10 minutes of bodyweight gluteal activation exercises during the warm-up enhances acute power output on vertical jumps[10,27]. This indicates neuromuscular activation of the gluteals just prior to competition could also facilitate performance. However, one study found no significant difference between different gluteal warm-up volumes indicating there may be a threshold effect[19].

The evidence indicates elite athletes have greater gluteal strength and activation compared to non-elite recreational athletes, highlighting the importance of these muscles for high-level performance[15,21]. But side-to-side muscle imbalances may increase injury risk[25].

Some limitations should be considered when interpreting the findings of this review. The biomechanics studies assessing gluteal function during athletic movements often estimate rather than directly measure muscle forces and activation. The training studies evaluating gluteal-targeted programs generally had small sample sizes and most were in team sport athletes. The adaptations could differ for endurance athletes and runners for instance.

Conclusion

In conclusion, this systematic review found consistent evidence that the gluteal muscles play an important role in athletic performance for movements involving running, jumping and rapid changes of direction. Gluteal muscle forces and activation were high during athletic tasks and greater in elite compared to recreational athletes. Both long-term gluteal-focused training programs and acute gluteal activation exercises enhanced performance on tests like vertical jumps in team sport athletes. But strength imbalances between sides may increase injury risk. Therefore, athletes and coaches should incorporate targeted gluteal muscle exercises into training programs focusing on both strengthening and bilateral balance. However, more research is needed on dose-response and mechanisms of gluteal training for performance gains. Overall, the gluteal appear to be an important muscular target for athletic development and injury prevention.

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Effect of Brain Gym Exercise on Hot Flushes Among Peri-Menopausal Females

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ABSTRACT

Background: Hot Flushes is a most common menopausal symptom and is experienced by 52% of peri-menopausal females. Brain gym exercises also known as educational kinesiology, it consist of series of moments that activates brain, promote neurological re-patterning and facilitate whole brain learning. Brain gym exercises were discovered to stimulate, release and relax brain by performing various movement patterns. **Aim of the Study:** To evaluate the effect of the brain gym exercise in perimenopausal females suffering from hot flushes. **Materials and Methodology:** In this experimental study, 32 perimenopausal females was selected according to inclusion criteria. Menopause Rating Scale (MRS) and Hot Flash Related Daily Interference Scale (HFRDIS) was used to collect data. **Statistical Analysis**: Data was analysed IBM SPSS statistics 2.0 software. Wilcoxon test was used for within group analysis. **Result and Conclusion:** According to statistics, the treatment showed significant improvement among the group. Before the treatment total mean score of menopause rating scale (MRS) and hot flash related daily interference scale (HFRDIS) was 20.63 and 30.69 respectively. While after treatment mean score of MRS and HFRDIS was 17.06 and 26.50 respectively.

Key Words: Hot Flushes, Brain Gym Exercise, Perimenopausal Females, Menopause Rating Scale, Hot Flush Related Daily Interference Scale.

INTRODUCTION:

Hot flushes are "Transient episodes of flushing, sweating and a sensation of heat, often accompanied by palpitations and a feeling of anxiety, and sometimes followed by chills."[1] The cause of hot flushes is still unknown and appears to be due to a change in hypothalamic control of temperature regulation.[2] Brain gym exercises also known as educational kinesiology, it consist of series of moments that activates brain, promote neurological re-patterning and facilitate whole brain learning.[3] Brain gym exercises were discovered to stimulate, release and relax brain by performing various movement patterns.[4] The climacteric or perimenopause are the names given to the transition as a whole. This stage is characterized by many complex biological, psychological, and sociocultural changes. Lasting on average 7 to 10 years and spanning up to 25 years.[5]

Menopause Rating Scale (MRS): [6] This scale is comprised of 11 items divided into three subscales: somatic (α=0.61), psychological (α=0.86), and urogenital (α=0.67). The total α=0.85. In this study the internal consistency coefcient was α=0.86. Each item is graded by the subjects from 0 (not present) to 4 (very severe) and the score of each subscale is the sum of the scores of its items. The total score is the sum of the three subscales. Thus, the higher the score, the more severe the symptoms.

Hot Flash Related Daily Interference Scale (HFRDIS): [1] This tool was designed to measure the impact of hot flashes on overall quality of life (item 10) as well as on 9 specific activities (items 1–9: work, social activities, leisure activities, sleep, mood, concentration, relations with others, sexuality, enjoyment of life). The HFRDIS consists of a series of 0–10 point numeric rating scales and was modeled on the Brief Pain Inventory and the Fatigue Symptom Inventory. Both the Brief Pain Inventory and the Fatigue Symptom Inventory invite respondents to rate the degree that the symptom (pain or fatigue) interferes with various daily activities as well as overall enjoyment or quality of life. Thus, the HFRDIS was designed to follow the same format

MATERIALS AND METHOD:

An experimental study was conducted among peri-menopausal women residing in Ahmedabad city of Gujarat, India. Data was collected via two questionnaires Menopause Rating Scale (MRS) and Hot Flash Related Daily Interference Score (HFRDIS) and data was analysed using IBM SPSS Statistics 2.0 software.

INCLUSION CRITERIA

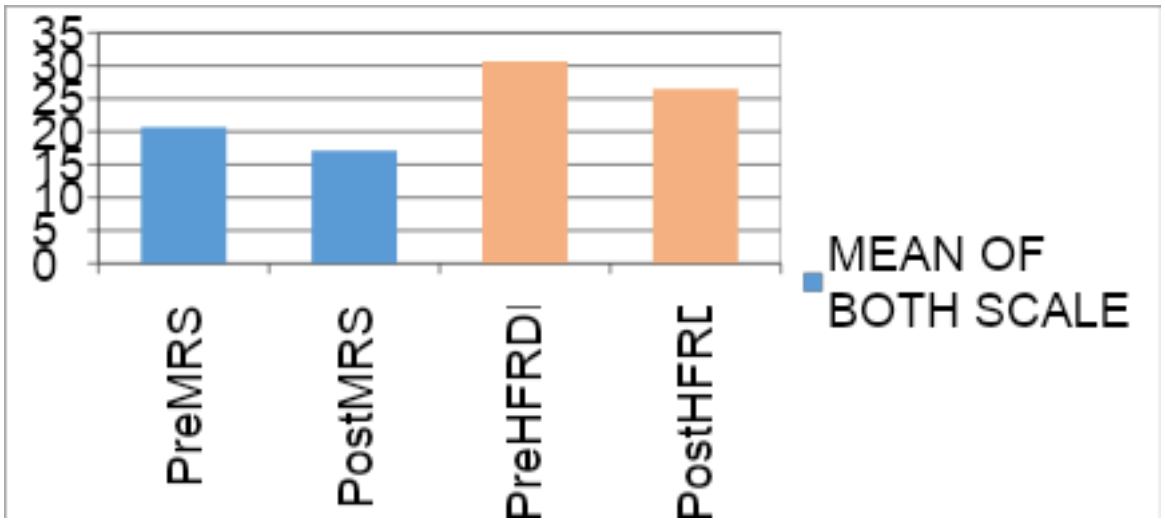
- Subjects willing to participate
- Age 41-45 years
- Female having Hot Flushes as a Menopausal Symptoms.

EXCLUSION CRITERIA

- Any psychological disorder
- Hysterectomy or any recent surgery.

RESULTS:

- Data was analyzed in IBM SPSS Statistics 2.0 version software.
- Wilcoxon test was used for within group analysis.
- According to statistics, the treatment showed significant improvement among the group.
- Before the treatment, total mean score of Menopause rating scale (MRS) and Hot flash related daily interference scale (HFRDIS) was 20.63 & 30.69 respectively while, after treatment mean score of MRS & HFRDIS was 17.06 & 26.50 respectively.
- The t value of pre HFRDIS post HFRDIS is 14.66. z value of pre MRS & post MRS is 4.962.



Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	32	41	45	43.53	1.459
BMI	32	18.10	33.30	24.6750	3.58167
PreMRS	32	12	33	20.63	5.661
PostMRS	32	11	25	17.06	4.392
PreHFRDIS	32	18	48	30.69	7.925
PostHFRDIS	32	15	42	26.50	7.457
Valid N (listwise)	32				

DISCUSSION:

- This study was conducted in 32 participants in perimenopausal females, showing significant reduction in score of menopausal rating scale and hot flush related daily interference scale.
- Deborah R. Fenlon, Jessica L. Corner and Joanne S. Haviland (2008), suggested in his study that the use of relaxation training reduced both the incidence and the severity of hot flushes. There may be link between post-

menopausal changes and a norepinephrine-mediated causes of flashes, as estrogen levels affect the number of adrenergic receptors in the brain, which in turn, modulate the amount of norepinephrine available. The relaxation responses directly influences central norepinephrine, and it maybe postulated that relaxation might have a favorable effect on flushes through the modulation of norepinephrine release. Saffa A Badr, Fatma A El-Esrigy, Yara M Heikal (2018), in their study they concluded that Most perimenopausal women suffer from hot flushes with different degrees of severity. Moreover, the most significant factor was BMI greater than 25.

CONCLUSION:

- The results of this study indicates the effect of brain gym exercise on hot flushes among perimenopausal females. There is reduction in score of post MRS and post HFRDIS scales. Brain gym exercise is seen to be effective in reducing hot flushes symptoms among perimenopausal females.

LIMITATIONS:

- Long term follow up was not taken.
- No control group

FUTURE RECOMMENDATION:

- The study should be done in more number of sample size and long term effect should be seen after multiple session of intervention.

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Title: Effect of Intrinsic and Extrinsic Foot Muscles Exercise in School Children with Flat Feet: Implications For Foot Function, Development Of Planter Arch and Balance.

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ABSTRACT:

Background: Flattering or lowering of medial longitudinal arch may cause change in foot posture and it is known as flat feet. Lesser physical activity, laxity of ligaments, age, gender, overweight/obesity, footwear type, weakness of intrinsic and extrinsic foot muscle and tight gastrocnemius muscle can cause flattening of medial longitudinal arch. Recent articles states that 48-77.9% of children and adolescents aging from 2-16 years are suffering from flatfoot. Intrinsic foot muscles and extrinsic foot muscles are the primary variables to maintain correct foot posture and balance. **Aim:** To check the effect of intrinsic and extrinsic foot muscle exercises on navicular drop, foot posture and static and dynamic balance. **Method:** 377 students were screened with ink method and 55 subjects were having flatfoot according to the ink method. 43 students were selected according to inclusion and exclusion criteria. Informed written consent was taken from the parents of the students. Pre-treatment assessed with navicular drop test, foot posture index and static-dynamic balance was checked with sense balance sense move balance mini board. 6-week exercises protocol was given to the subjects for 3 days/week. **Result:** Navicular drop and foot posture index shows significant improvement after intervention, but static and dynamic balance did not show statistical improvement after exercise. Although, mean value is improving in almost all variables of static and dynamic balance. **Conclusion:** Intrinsic and extrinsic foot muscle exercise improves navicular drop and foot posture. But static and dynamic balance is not getting statistically improved.

KEYWORDS: Flatfoot, Children, Intrinsic and extrinsic foot muscle exercise, Navicular drop, Foot posture, Static and dynamic balance

1. INTRODUCTION:

Foot is a complex structure made up of 26 bones, 33 joints, muscles, tendons and ligaments and contributes to the foot shape(1). First three metatarsals, three cuneiforms, navicular, talus and calcaneus make a medial longitudinal arch(2). Flattering or lowering of medial longitudinal arch may cause change in foot posture and it is known as flat feet and reforming of medial longitudinal arch in non-weight bearing position is called flexible flatfeet(3,4). Foot musculature have two types of muscle: Intrinsic foot muscles and Extrinsic foot muscles(5). Medial and lateral longitudinal arches are aligned by the first two layers of intrinsic muscle and the deep layers configure transverse arch(6). Extrinsic foot muscles which act as global movers, generate foot motion with the help of their long tendons and provide support to medial

longitudinal arch in dynamic activities(7). Lesser physical activity, laxity of ligaments, age, gender, overweight or obesity, footwear type, weakness of intrinsic and extrinsic foot muscles and tight gastrocnemius or tendo-achillis are the common causes of flatfeet(8). Recent articles states that 48-77.9% of children and adolescents aging from 2-16 years are suffering from flatfoot(9). A lowered medial longitudinal arch negatively impacts on static and dynamic balance because of insufficient produced by intrinsic foot muscles resulting in less stable base of support(10).

Aim of the study: Intrinsic foot muscles and extrinsic foot muscles are the primary variables to maintain correct foot posture and balance. Weak intrinsic muscles could be the reason of flatfeet. There is less evidence of combined effect of intrinsic foot muscle and extrinsic foot muscle strengthening exercises on flatfeet and balance. So, need of the study is to check the combined effect of strengthening exercise of intrinsic foot muscle and extrinsic foot muscle on foot posture and balance in children with flatfeet.

2. MATERIALS AND METHODS

Materials: Consent form (Figure 1), Assessment form (Figure 2), Pen, paper, ink, Container, Chair, towel, Index card, Ruler scale, Laptop, Pedalo sensemove sensebalance miniboard

Methodology:

- **Study design:** Interventional study
- **Study setting:** RK university, Rajkot
- **Source of data collection:** schools of Rajkot area
- **Study population:** school children with flatfoot aged between 7-17 years
- **Sampling technique:** convenient sampling technique
- **Study duration:** 6 months
- **Sample size:** 43 subjects

Criteria for selection

- **Inclusion criteria:** Subjects with flexible flat feet, Age group of 7 years to 17 years, Subjects with unilateral/bilateral flatfoot
- **Exclusion criteria:** Subjects with any previous foot injury, Subjects with previous foot surgery, Subjects with any congenital deformity

Procedure (Figure 5): The study was approved by ethical committee, school of physiotherapy, RK University, Rajkot (Figure 3). The study was registered in the Clinical Trial Registry-India (CTRI) and the registration number is CTRI/2023/11/060369 (Figure 4). Permission to perform data collection from school were taken from school authority. 377 students were screened with ink method and 55 subjects were having flatfoot according to the ink method. Sample size of 43 was calculated by G power formula. 5 subjects were excluded because of further investigation was done by navicular drop test. Another 7 subjects were excluded because their parents didn't give the consent. 43 students were selected according to inclusion and exclusion criteria. Informed written consent was taken from the parents of the students. Follow up sheet was given to the all subjects to tick mark the date given in the follow up sheet when they have done the exercises. Telephonic follow up was taken every week. Pre-treatment assessed with navicular drop test, foot posture index and sense balance sense move balance mini board.

Outcome measures

- Ink method (Figure 6): Place both legs in an ink water tray and step on a blank paper. The foot print was observed and noted that medial portion of the foot is completely visible(11).
- Navicular drop test (Figure 7): Subjects were asked to first sit on a chair with ankle placed neutral on the floor. Then place an index card vertically beside the medial aspect of foot touching the navicular tuberosity. The prominence of navicular tuberosity was marked with marker on index card. Then subjects were asked to stand and apply equal weight on both legs and again place the index card vertically on floor beside the navicular tuberosity and mark the prominence of navicular tuberosity with marker on index card. More than 10 mm difference will be noted as positive navicular drop test(12)
- Foot posture index: Foot posture index shows foot pronation and navicular height. It was filled by the therapist. The subjects stand in standing position and the therapist notes the foot in transverse, frontal and sagittal plane. Forefoot and rearfoot examination were done. If total score is between 0 to +5 will be noted as normal. +6 to +9 is pronated and +10 is noted as highly pronated(13).
- Pedalo sensemove sensebalance miniboard (Figure 8): The sensemove miniboard have a sensor behind it and it works like a wobble board. Tilts in different direction were measured with 2D sensors. The software for sensebalance miniboard was installed in laptop and laptop screen was

used to give biofeedback to the subjects to perform balance according to instructions given by software. Static balance was checked in centre, front, back, right and left direction and dynamic balance was checked with proprioception, reaction time and coordination were measured in front, back, right and left directions(14).

Treatment protocol(7,15,16): All exercises were given for 6 weeks for 3 sessions per week. Follow up sheet were given to all the participants and asked to tick mark on the date on which they have done the exercise

- Intrinsic foot muscle exercises: Short foot exercise (3 sets of 15 repetitions) (Figure 9), Great toe extension (3 sets of 15 repetitions) (Figure 10), Lesser toe extension (3 sets of 15 repetitions) (Figure 11), Toe spread (3 sets of 15 repetitions) (Figure 12)
- Extrinsic foot muscle exercises: Ankle dorsi flexion (3 sets of 15 repetitions) (Figure 13), Ankle plantar flexion (3 sets of 15 repetitions) (Figure 14), Foot supination (3 sets of 15 repetitions) (Figure 15), Towel curling (3 sets of 15 repetitions) (Figure 16), Calf stretching (30 seconds hold,3 repetitions) (Figure 17)

3. RESULTS:

The statistical analysis was done with the help of SPSS software (statistical package for the social sciences) version 21 (IBM SPSS). Excel version 2402 was used to generate data and graphs. Shapiro-wilk test was used to check normality of all data. Significance value of >0.05 is noted as the data is normally distributed and bell shaped symmetrical around the mean is noted as the data is normally distributed.

Demographic Data: A total of 43 school children with flatfeet were included in the study (Table 1). The majority of participants (60.5%) were in the age group of 11-14 years (Figure 18). About 25.6% were ≤10 years old and 14% were ≥15 years old. There were more male participants (62.8%) compared to females (37.2%) (Figure 19).

Ink Method: 15% of total subjects were having flatfoot according to ink method test (Figure 22).

Analysis Of Navicular Drop Test: Navicular drop reduced in before and after 6-week exercise program (Figure 21). statistically significant, with a large t-value of 7.31 and 8.77 and $p<0.01$ (Table 2).

Analysis Of Foot Posture Index: The analysis of foot posture index indicates the 6-week intrinsic and extrinsic foot muscle exercise program significantly improved foot alignment and arch characteristics in school children with flatfeet (Figure 20). This reduction was statistically highly significant and $p<0.01$ (Table 3).

Analysis Of Sensemove Sensebalance Miniboard

- **Analysis Of Static Balance Centre:** Static balance was assessed at the centre of the miniboard at 1-2, 3-4 and 5-6 seconds. There were no statistically significant differences in mean sway at the centre. The p-values were >0.05 at all-time intervals (Table 4). Median sway and interquartile ranges also showed minimal differences pre and post exercise at 1-2, 3-4 and 5-6 seconds. But mean value is reducing after intervention in all given time period (Figure 25).

- **Analysis Of Static Balance All Directions:** There was a statistically significant improvement in static balance in the front, back, right, and left direction (Table 5). But mean value is reducing after intervention in all directions (Figure 23,Figure 24,Figure 26,Figure 28).
- **Analysis Of Proprioception Angle Difference:** The mean joint position sense error reduced slightly (Figure 31). However, these reductions were not statistically significant, as the p-values were >0.05 in the front, back and left directions based on Wilcoxon signed rank test results (Table 6).
- **Analysis Of Proprioception Radius Difference(Figure 30):** intrinsic and extrinsic foot muscle exercise program significantly improved proprioception in the back direction but did not have significant effects in the front, right and left directions (Table 7).
- **Analysis Of Reaction Time**: The analysis of reaction time indicates exercise program significantly improved neuromuscular response speed in the front, back, right and left(Figure 29). These reductions were statistically highly significant in all directions with $p<0.01$ (Table 8).
- **Analysis Of Travel Time:** The mean travel time reduced in the left direction after the exercises, and this change was statistically significant ($p<0.05$) (Table 9) (Figure 32).
- **Analysis of co-ordination:** For the front-back coordination, the mean value reduced but this change was not significant ($p=0.81$) (Table 10) (Figure 33).

4. DISCUSSION:

A study conducted by Juntip Namsawang and some previous studies shows the similar effect on navicular drop. The study stated that short foot exercise alters the abductor hallucis muscle activity and abductor hallucis muscle maintains the navicular drop and supports the medial longitudinal arch(17). Lydia Willemse, et al conducted a systematic review and concluded that strengthening of intrinsic foot muscles have low-certainty level evidence to improve dynamic balance control. The study stated that it is disputable on performance of the subjects, strength of intrinsic foot muscles and physically active subjects(10). A study conducted by Manuel Pabón-Carrasco, et al stated that toe curl exercise makes good control on foot pronation and navicular drop. Abductor muscles of the toes get strengthen and helps stabilizing and maintaining the foot core system(18). A meta-analysis done by Abbis H. Jaffri, et al on intrinsic foot muscle training for foot function and concluded that short foot exercise, great toe extension, lesser toe extension, toe spread and toe-curling exercises are helpful to strengthen the intrinsic foot muscles and have positive results on navicular drop and foot posture and dynamic balance(19). Overall, this study provides evidence that intrinsic and extrinsic foot muscle exercises can improve navicular drop, foot posture, static balance control, and reaction time in school children with flatfeet. But additional proprioceptive and dynamic balance training may be required for optimal sensorimotor control outcomes. These findings have clinical implications for designing comprehensive exercise programs for flatfeet that incorporate stretching, strengthening, balance, and proprioceptive stimuli for improving foot posture, stability, and movement quality in children.

5. CONCLUSION:

This study investigated the effects of a 6-week exercise program focused on intrinsic and extrinsic foot muscle exercise in school children with flatfeet. The results demonstrated that the exercise protocol is significantly useful to improve navicular drop and foot posture on children with flatfoot. Almost all variables of static and dynamic balance are not improving statistically. Although mean value is improving in almost all variables of static balance and dynamic balance except co-ordination.

6. CONFLICT OF INTEREST:

No conflict of interest related to this article is noted

7. ACKNOWLEDGEMENTS:

My special thanks to my younger brother, Mr. Rushi Prajapati for constant support and helping me with technical work for the research. My sincere thanks to BAPS Swaminarayan vidyamandir for allowing me to perform data collection in school campus.

TABLES: *Table 1: Demographic data*

Table 2:

Variables	Categories	No.	%
Age groups (years)	≤ 10	11	25.6
	11-14	26	60.5
	≥15	06	14
Gender	Male	27	62.8
	Female	16	37.2
BMI (kg/m$^{2)}$	<18.5 (Underweight)	19	44.2
	18.5-22.9 (Normal)	16	37.2
	23-24.9 (Overweight)	07	16.3
	≥25 (Obese)	01	2.3

Variable	Before intervention		After intervention		Test statistics Paired t test	
	Mean	SD	Mean	SD	t value	p value
Navicular drop test (mm) Right	14.16	2.62	10.14	2.58	7.31	<0.01
Navicular drop test (mm) Left	14.16	2.68	11.4	2.68	8.77	<0.01

Analysis of navicular drop test

Table 3: Analysis of foot posture index

Variable	Before intervention		After intervention		Test statistics Wilcoxon rank test
	Mean	SD	Mean	SD	p value

Foot posture index Right		6.28		1.54	4		1.17	<0.01			
Foot posture index Left		6.3		1.55	4.05		1.21	<0.01			

Table 4: *Analysis of static balance centre*

Static Balance	Time (Second)	Before intervention				After intervention				Test statistics Wilcoxon sign rank test	
		Mean	SD	Median	IQR	Mean	SD	Median	IQR	Z value	p value
CENTRE	1-2	0.5	0.14	0.5	0.2	0.5	0.13	0.5	0.2	-0.35	0.72
	3-4	0.5	0.14	0.5	0.2	0.46	0.14	0.4	0.2	-1.47	0.14
	5-6	0.47	0.13	0.5	0.2	0.44	0.09	0.4	0.1	-1.27	0.2

Static Balance	Time (Second)	Before intervention				After intervention				Test statistics Wilcoxon sign rank test	
		Mean	SD	Median	IQR	Mean	SD	Median	IQR	Z value	p value
FRONT	1-2	0.29	0.14	0.3	0.2	0.21	0.11	0.2	0.1	-3.86	<0.01
	3-4	0.28	0.27	0.2	0.1	0.17	0.06	0.2	0.1	-3.34	<0.01
	5-6	0.24	0.2	0.2	0.2	0.18	0.07	0.2	0.1	-1.86	<0.01
BACK	1-2	0.41	0.6	0.3	0.2	0.24	0.09	0.2	0.1	-3.13	<0.01
	3-4	0.28	0.27	0.2	0.2	0.18	0.07	0.2	0.1	-2.65	<0.01
	5-6	0.24	0.17	0.2	0.2	0.17	0.07	0.2	0.1	-2.72	<0.01
RIGHT	1-2	0.33	0.21	0.3	0.2	0.24	0.15	0.2	0.1	-2.41	<0.05
	3-4	0.26	0.14	0.2	0.2	0.21	0.12	0.2	0.1	-2.41	<0.05
	5-6	0.22	0.11	0.2	0.2	0.19	0.1	0.2	0.1	-1.89	0.058
LEFT	1-2	0.33	0.15	0.3	0.2	0.25	0.08	0.3	0.1	-3.54	<0.01
	3-4	0.26	0.15	0.2	0.2	0.23	0.09	0.2	0.1	-1.44	0.14
	5-6	0.25	0.17	0.2	0.2	0.23	0.08	0.2	0.1	-1.72	0.86

Table 5: Analysis of static balance all directions

Static Balance	Before intervention				After intervention				Test statistics Wilcoxon sign rank test	
	Mean	SD	Median	IQR	Mean	SD	Median	IQR	Z value	p value
FRONT	30.03	43.56	12.9	27.4	18.73	23.72	12.7	18.9	-1.19	0.23
BACK	9.86	11.47	6.8	11.3	10.01	7.7	7.7	9.9	-0.93	0.34
RIGHT	21.14	24.18	11.9	21.2	12.63	8.17	12.2	7.4	-1.91	0.05
LEFT	17.84	27.53	11.8	17.2	14.94	13.52	11.6	17.4	-0.44	0.65

Table 6: Analysis of proprioception angle difference

Static Balance	Before intervention				After intervention				Test statistics Wilcoxon sign rank test	
	Mean	SD	Median	IQR	Mean	SD	Median	IQR	Z value	p value
FRONT	0.63	0.55	0.5	0.8	0.47	0.38	0.4	0.5	-1.2	0.22
BACK	0.71	0.65	0.6	0.8	0.42	0.29	0.3	0.4	-2.46	<0.01
RIGHT	0.58	0.53	0.4	0.7	0.46	0.39	0.4	0.6	-1.09	0.27
LEFT	0.55	0.62	0.4	0.6	0.42	0.27	0.4	0.4	-0.7	0.43

Table 7: Analysis of proprioception radius difference

Reaction time	Before intervention (Seconds)	After intervention (Seconds)	Test statistics Wilcoxon sign rank test

	Mean	SD	Median	IQR	Mean	SD	Median	IQR	Z value	p value
FRONT	1.1	0.5	1	0.6	0.74	0.32	0.7	0.2	-3.76	<0.01
BACK	1.03	0.48	1	0.5	0.8	0.35	0.7	0.3	-2.66	<0.01
RIGHT	1.42	0.84	1.2	0.7	1.04	0.56	0.9	0.5	-2.63	<0.01
LEFT	1.23	0.69	1	0.6	0.85	0.33	0.8	0.5	-3.16	<0.01

Table 8: Analysis of reaction time

Static Balance	Before intervention (Seconds)				After intervention (Seconds)				Test statistics Wilcoxon sign rank test	
	Mean	SD	Median	IQR	Mean	SD	Median	IQR	Z value	p value
FRONT	1.55	0.84	1.4	0.7	1.33	0.77	1	0.8	-1.49	0.13
BACK	1.39	0.4	1.3	0.5	1.41	0.66	1.2	0.7	-0.41	0.6
RIGHT	1.98	0.82	1.8	0.9	1.78	0.8	1.6	1.1	-1.38	0.16
LEFT	1.71	0.64	1.6	0.7	1.4	0.48	1.3	0.5	-2.22	<0.05

Table 9: Analysis of travel time

Co-ordination	Before intervention				After intervention				Test statistics Wilcoxon sign rank test	
	Mean	SD	Median	IQR	Mean	SD	Median	IQR	Z value	p value
FRONT BACK	0.11	0.12	0.1	0.1	0.08	0.1	0.1	0.1	-1.07	0.81
LEFT RIGHT	0.17	0.1	0.2	0.1	0.2	0.1	0.2	0.2	-0.81	0.41

Table 10: Analysis of co-ordinati

FIGURES:

CONSENT FORM

Research title: Effect of intrinsic and extrinsic foot muscles exercise in school children with flat feet: implications for foot function, development of planter arch and balance.

Researcher's Name: Dr. Upasana Y. Prajapati

Participant's Name: _____

Brief information of the research: foot exercises are developed to reduce flatfeet and helps to improve altered balance because of flatfeet. The exercise protocol helps to create curvature of medial longitudinal arch. The exercise protocol helps to improve ankle and foot function and alleviate the chances of foot pain in future.

Consent of the research participant/ parents: The Research work has been explained to me in my mother tongue. I willingly give my consent of my child for voluntary participation in this research. I have not been forced to make my child participate in the research. I have been told that my child can leave the research at any time without having to give any reason.

I know that there will be no physical or mental problems caused to my child due to this research. Also, I understand that I and my child will be responsible for any problems caused during this research work.

I have been made clear in case of the occurrence of any problems due to any other reasons during the research work, the researcher will not be responsible for it. There will be no demand for compensation or legal actions taken by me. With all this knowledge I willingly would like to make my child participate in this research.

I understand that my child's information is used only for the research work for new techniques or treatment approaches and will remain confidential. I have been assured that my information will not be misused. I give my complete consent of my child to participate in this research.

DATE:
PLACE:
PARENT'S SIGNATURE: _____

ASSESSMENT FORM

Name of participant: Date:

Age:

Gender:

Height:

Weight:

BMI:

Contact no.:

Address:

Outcome measures:

Out come measures	Pre	Post(after 6 weeks)
Navicular drop test		
Foot posture index		

*Figure SEQ Figure * ARABIC 2: Assessment form*

SCHOOL OF PHYSIOTHERAPY
RKUNIVERSITY

Ref. No.: RKU/SPT/2023/10/25 **Date:** 05/10/2023

Review Report from Ethics Committee, School of Physiotherapy, RK University (ECR/259/Indt/GJ/2016/RR-21)

To,
Ms. Prajapati Upasana Yogeshbhai
MPT Student,
School of Physiotherapy, RK University

MPT Guide: Dr. Amit Sharma

Dear Ms. Prajapati Upasana Yogeshbhai,
Subject: Review Report from Ethics Committee, School of Physiotherapy, RK University (ECR/259/Indt/GJ/2016/RR-21)

Ref: Research entitled **"Effect of Intrinsic and Extrinsic Foot Muscles Exercise in School Children with Flat Feet: Implications for Foot Function, Development of planter arch and Balance"**

This has reference to your request letter dated 26th August 2023 for review and ethical approval of above referred research work. We understand that above study is proposed to be carried out by you, Ms. **Prajapati Upasana Yogeshbhai**, MPT Student, Faculty of Medicine, School of Physiotherapy, RK University.

The protocol of clinical study has been reviewed on 2nd September 2023 by following members of Ethical Committee (EC):

#	Name of Members	Designation in Ethics committee	Qualification	Status present /Absent
1	Dr. Bhavesh Kanabar	Clinician	MD PSM	Present
2	Mr. Shabbir Lokhandawala	Legal Adviser	B.com LLB	Present
3	Dr. Priyanshu Rathod	Member	PhD	Absent
4	Dr. Amit Sharma	Subject Expert	PhD	Present
5	Ms. Vaishali Dhakan	Clinical Psychologist-	Sp. B. Ed. (Psychology)	Present
6	Dr. Parthkumar Devmurari	Member Secretary	MPT	Present
7	Mr. Arvind Sorathiya	Lay Person from Community	Self Employed (stationers) BA	Present
8	Dr. Krupa Tank	Subject Expert	MPT	Present

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info@rku.ac.in | www.rku.ac.in

*Figure SEQ Figure * ARABIC 3: Ethical approval letter*

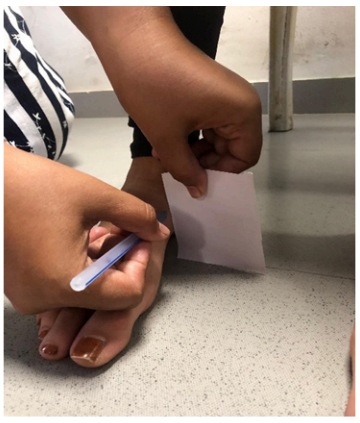
Clinical Trial Details (PDF Generation Date :- Thu, 30 Nov 2023 11:16:20 GMT)

CTRI Number	CTRI/2023/11/060369 [Registered on: 30/11/2023] - **Trial Registered Prospectively**
Last Modified On	29/11/2023
Post Graduate Thesis	Yes
Type of Trial	Interventional
Type of Study	Physiotherapy (Not Including YOGA)
Study Design	Single Arm Study
Public Title of Study	Enhancing Foot Health in School Children: A Study on Intrinsic and Extrinsic Foot Muscle Exercises and Their Impact on Plantar Arch Development and Balance
Scientific Title of Study	Effect of Intrinsic and Extrinsic Foot Muscles Exercise in School Children with Flat Feet: Implications for Foot Function, Development of planter arch and Balance

Secondary IDs if Any	**Secondary ID**	**Identifier**
	NIL	NIL

Details of Principal Investigator or overall Trial Coordinator (multi-center study)	**Details of Principal Investigator**	
	Name	Prajapati Upasana Yogeshbhai
	Designation	Post Graduate Student
	Affiliation	school of physiotherapy, R K University
	Address	School of Physiotherapy, RK University, Kasturbadham, Rajkot-Bhavnagar Highway, Rajkot, Gujarat, India Rajkot

*Figure SEQ Figure * ARABIC 4: CTRI registered number*



a) starting position

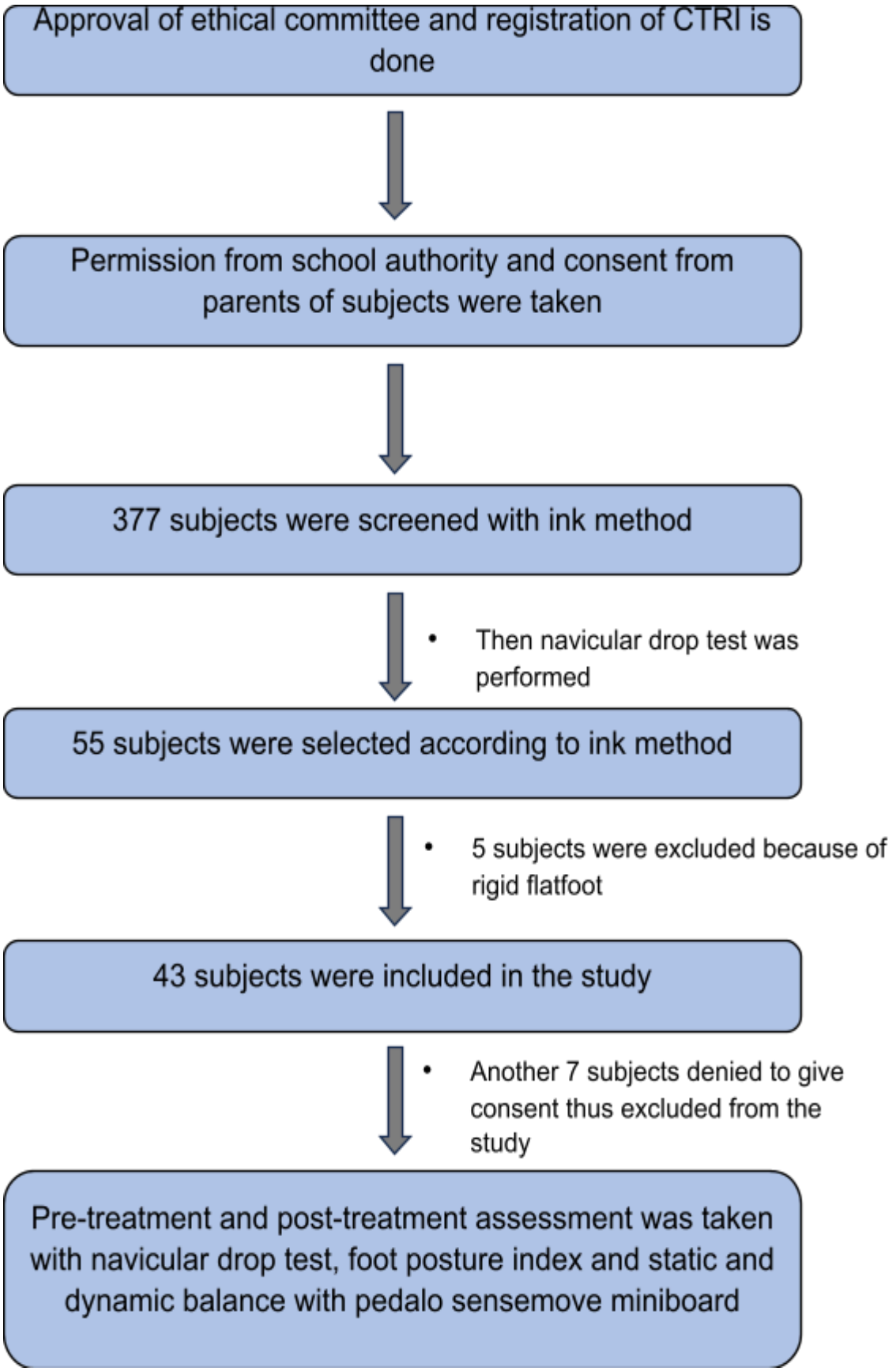
b) ending position

a) starting position

b) ending position

a) starting position

b) ending position


Approval of ethical committee and registration of CTRI is done
Permission from school authority and consent from parents of subjects were taken
377 subjects were screened with ink method
Then navicular drop test was performed
55 subjects were selected according to ink method
5 subjects were excluded because of rigid flatfoot
43 subjects were included in the study
Another 7 subjects denied to give consent thus excluded from the study
Pre-treatment and post-treatment assessment was taken with navicular drop test, foot posture index and static and dynamic balance with pedalo sensemove miniboard

a) starting position

b) ending posiiton

a) starting position

b) ending position

a) starting position

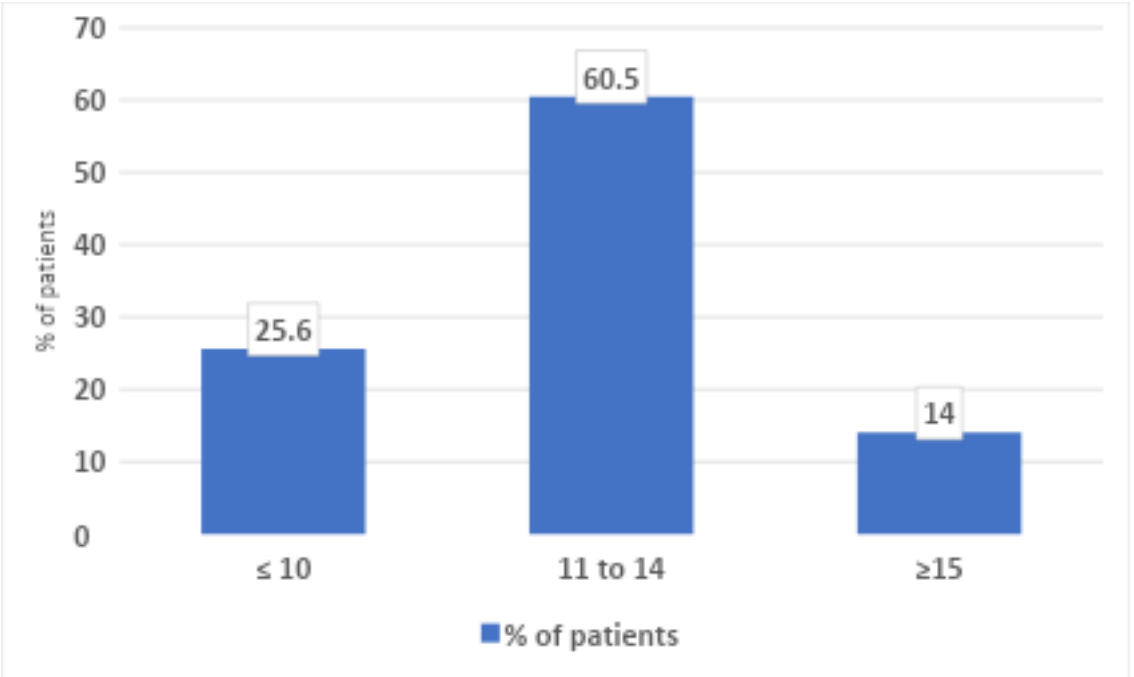
b) ending position

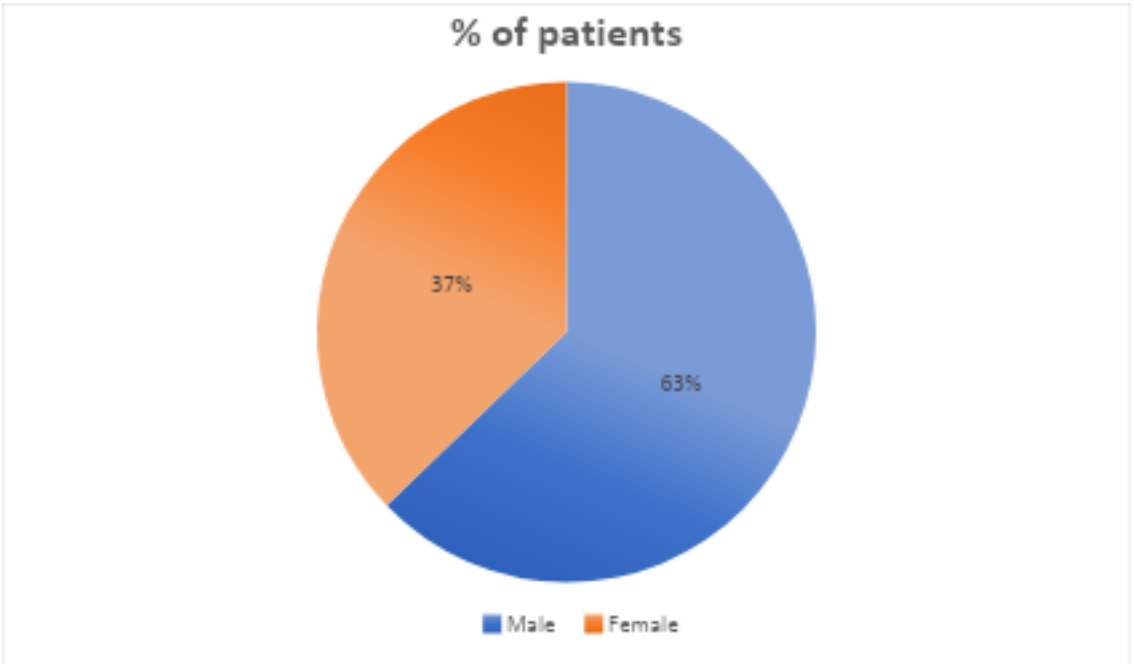
a) starting position

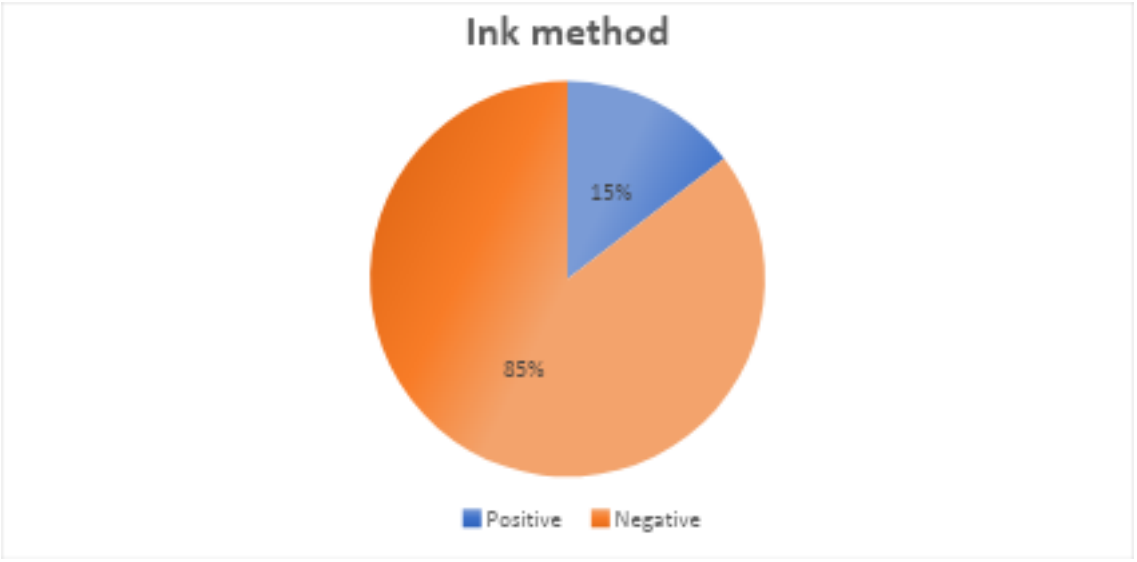
b) ending position

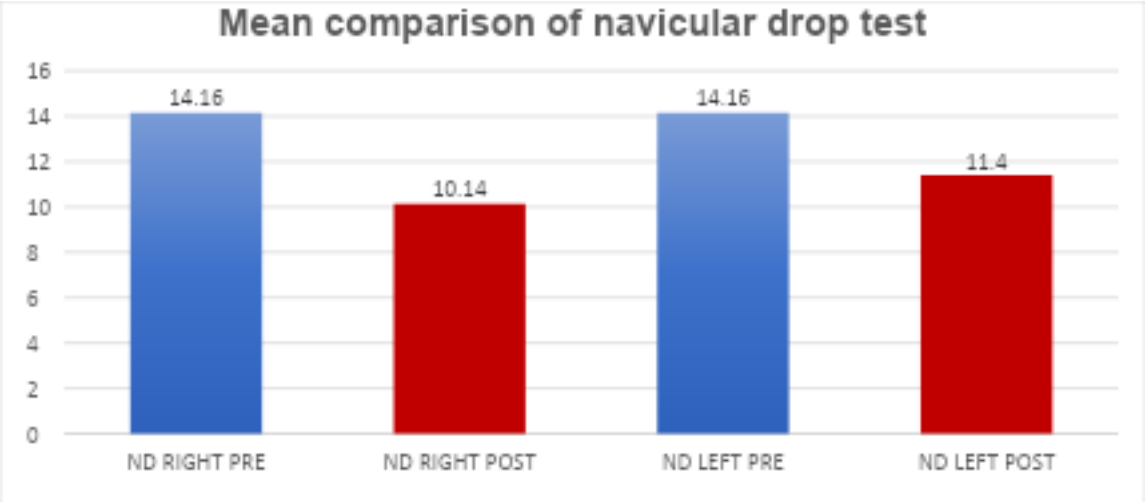
a) starting position b) ending position

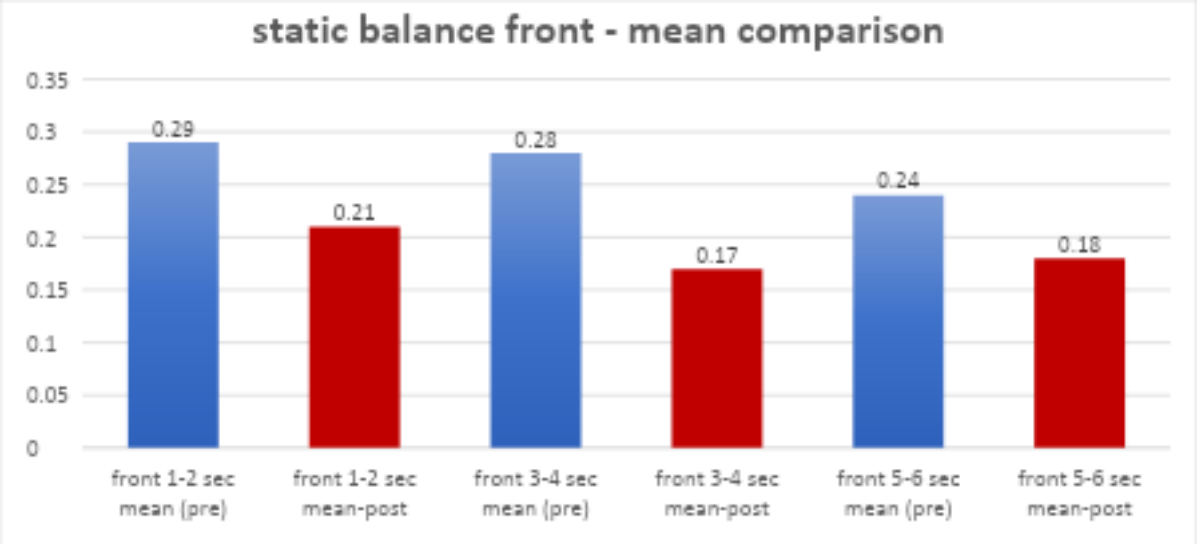
a) starting position b) ending position

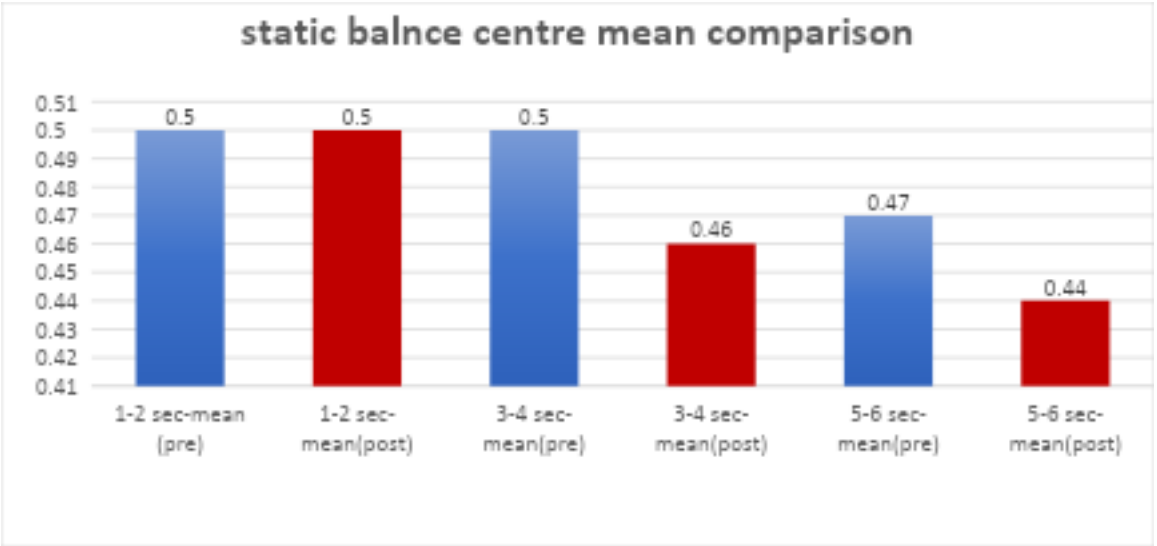


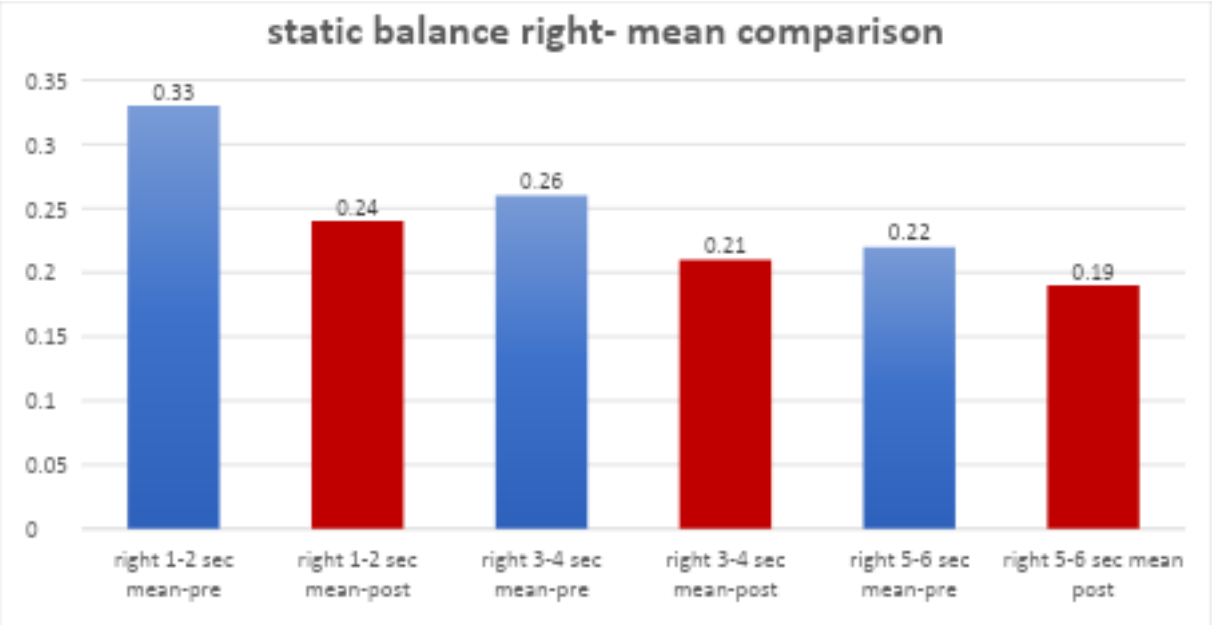

% of patients
37%
63%
Male
Female


Ink method
15%
85%
Positive
Negative


Mean comparison of navicular drop test
16
14
12
10
8
6
4
2
0
14.16
10.14
14.16
11.4
ND RIGHT PRE
ND RIGHT POST
ND LEFT PRE
ND LEFT POST


static balance front - mean comparison
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0.29
0.21
0.28
0.17
0.24
0.18
front 1-2 sec mean (pre)
front 1-2 sec mean-post
front 3-4 sec mean (pre)
front 3-4 sec mean-post
front 5-6 sec mean (pre)
front 5-6 sec mean-post


static balnce centre mean comparison
0.51
0.5
0.49
0.48
0.47
0.46
0.45
0.44
0.43
0.42
0.41
0.5
0.5
0.5
0.46
0.47
0.44
1-2 sec-mean (pre)
1-2 sec-mean(post)
3-4 sec-mean(pre)
3-4 sec-mean(post)
5-6 sec-mean(pre)
5-6 sec-mean(post)



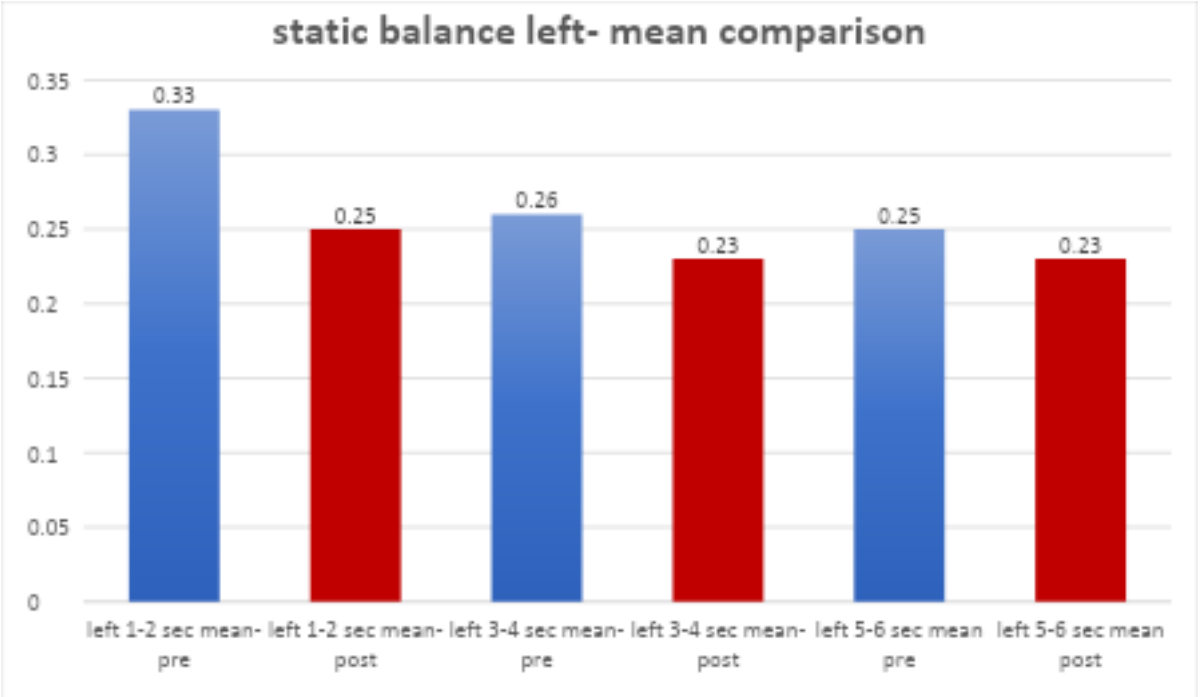


*Figure SEQ Figure * ARABIC 26: Mean comparison static balance right*

*Figure SEQ Figure * ARABIC 24: Mean comparison static balance front*

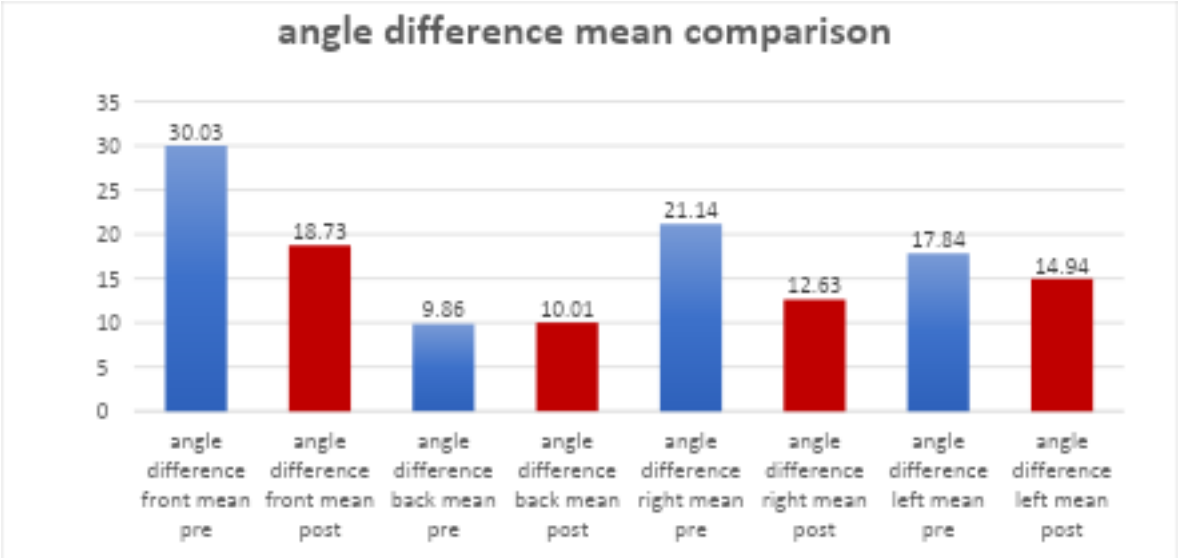


*Figure SEQ Figure * ARABIC 31: Mean comparison angle difference*

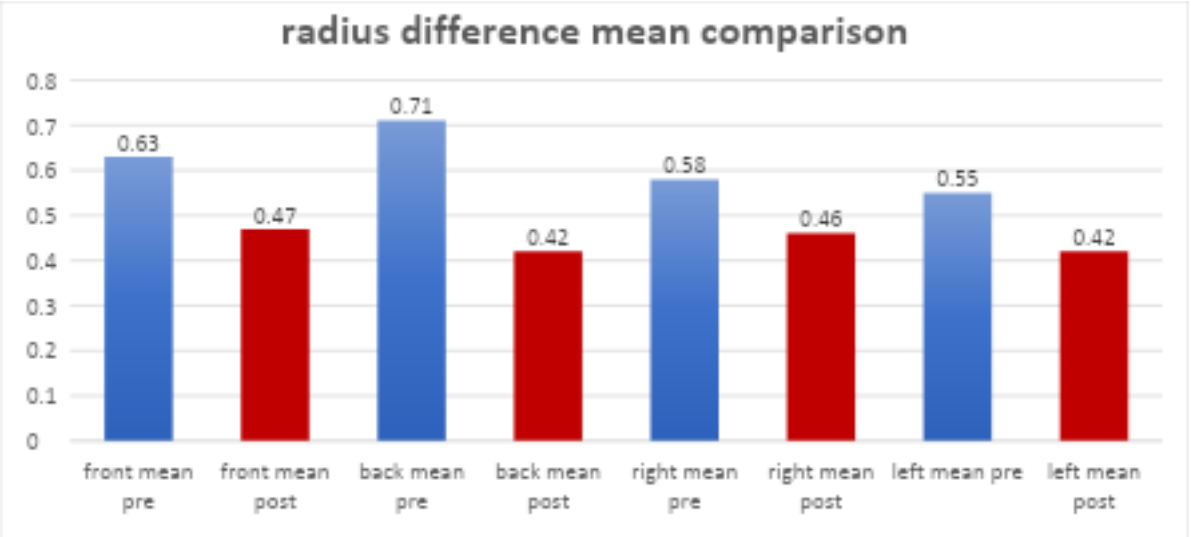


*Figure SEQ Figure * ARABIC 30: Mean comparison radius difference*

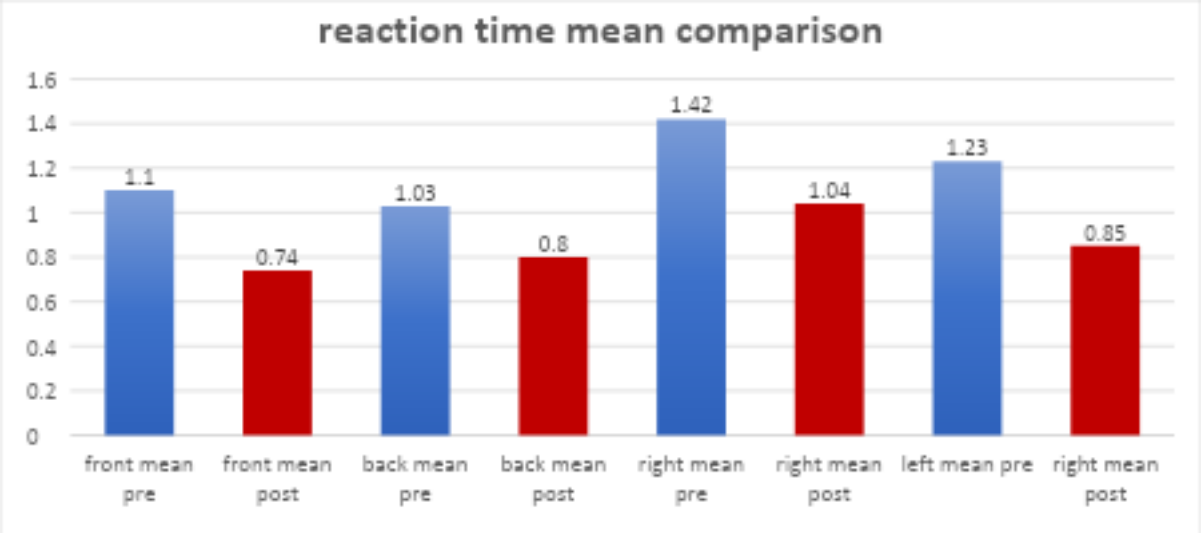


*Figure SEQ Figure * ARABIC 29: Mean comparison reaction time*

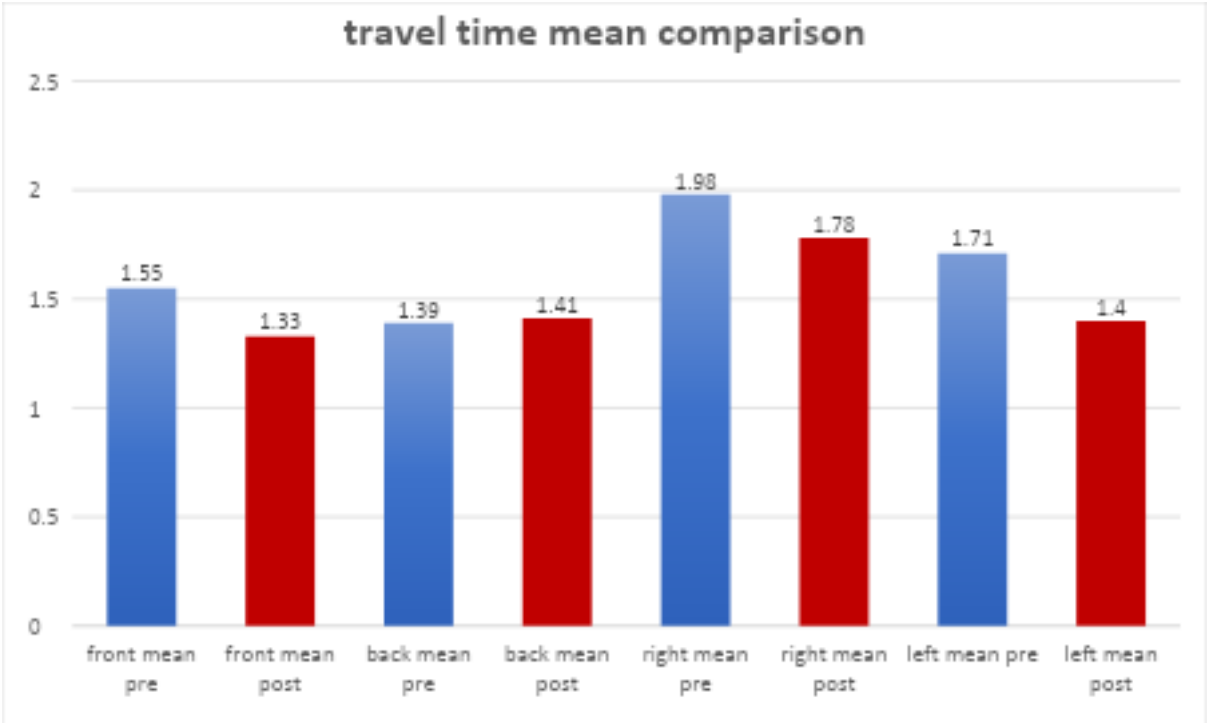


*Figure SEQ Figure * ARABIC 32: Mean comparison travel time*

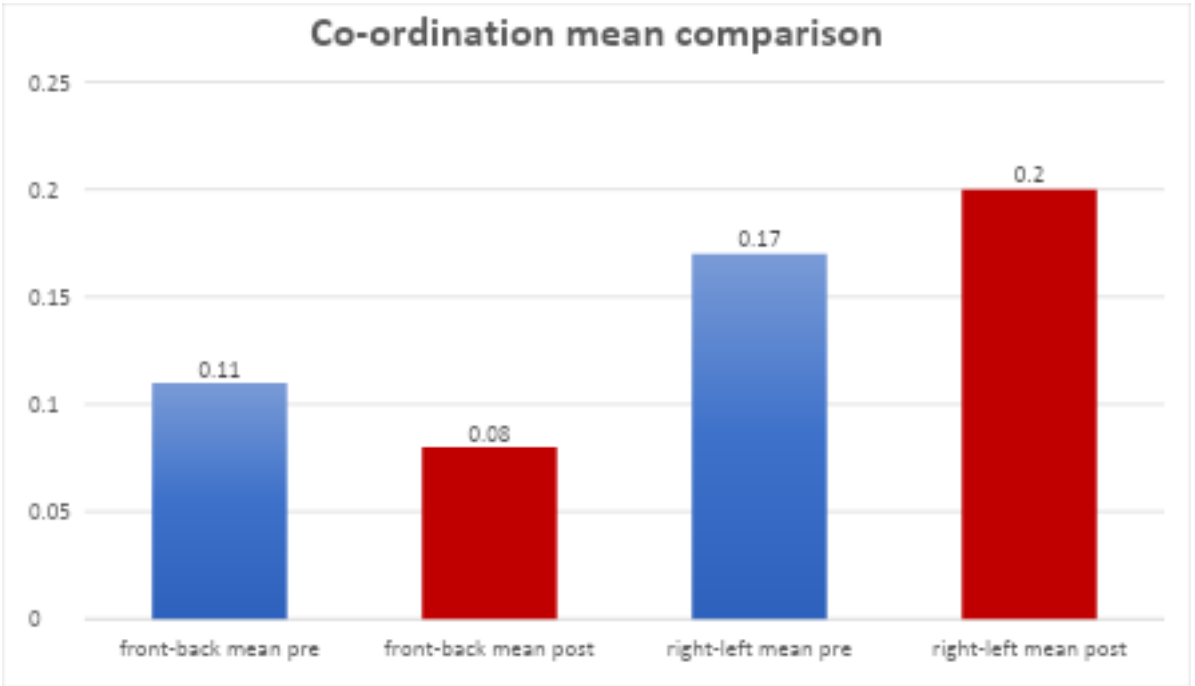


*Figure SEQ Figure * ARABIC 33: Mean comparison co-ordination*

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EFFECT OF RESPIRATORY MUSCLE STRETCH GYMNASTIC ON CHEST EXPANSION AND PEAK EXPIRATORY FLOW RATE AMONG PEOPLE WITH CRONIC OBSTRUCTIVE PULMONARY DISEASES: NARRATIVE REVIEW

Dimpal Rana, Dr Harita Vyas

ABSTRACT

BACKGROUND & NEED OF THE STUDY: Chronic obstructive pulmonary diseases (COPD) is a common progressive and treatable condition; characterized by persistent airflow limitation and associated with an enhanced chronic inflammatory response. Respiratory muscle stretch gymnastic (RMSG) is designed to decrease chest wall stiffness, particularly in the chest wall respiratory muscle. RMSG is based on theory of lap-scale's law-ventilation of lung depends upon the length of respiratory muscle. Maximal force is generated by the respiratory muscle when they are in optimal length. Peak expiratory flow rate (PEFR) is an parameter of pulmonary function test and reflects mainly the calibre of the bronchi and larger bronchioles, which are subjected to reflex bronco constriction. It is a good indicator of respiratory efficiency as it denotes the expiratory flow rate during the peak of FVC.

METHODOLOGY: A search for relevant articles was carried out using key words RMSG COPD and using search engines google scholar, Pub-med, Science-direct, Research-gate. Studies were selected from year 2013 to 2023 with eligibility criteria: (1) Article published in indexed journals (2) Article published in English language (3) Intervention study on chest expansion and PEFR among COPD geriatric population.

RESULT: 10 studies were included in which there were randomized control trial and systemic review. Article showed various respiratory muscle stretch technique that include: Elevation and pulling back the shoulders, Stretching the upper chest, Stretching the back muscle, Stretching the lower chest.

CONCLUSION: RMSG and conventional chest physiotherapy are effective and may give significant result in patient with COPD to improve PEFR and chest expansion.

KEYWORDS

Chronic obstructive pulmonary diseases, Respiratory muscle stretch gymnastic, Peak expiratory flow rate, chest expansion

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a major cause of morbidity and mortality in the modern world. According to the World Health Organization, 65 million people suffer from moderate to severe COPD, and at least 90% of COPD related deaths occur in developing countries.[1] Pathophysiology

for people with COPD starts with damage to the airways and tiny air sacs in the lungs. These airways become thick and inflamed, which destroys the tissues where oxygen is exchanged. The flow of air in and out of the lungs is decreased, which lowers the amount of oxygen reaching the body tissues. Further, getting rid of the waste gas carbon dioxide becomes difficult.[2]

Respiratory impairment and physical disability resulting from COPD are the major concerns for chest physical therapy (CPT). When it comes to the respiratory system, the natural process of ageing includes muscle imbalances, structural changes in the musculoskeletal system due to geometric modification of the rib cage along with reduction in chest wall compliance.[3] Guidelines for pulmonary rehabilitation programs only recommend strengthening the respiratory muscles but not improving muscle length. A previous study has shown that respiratory muscles can be stretched during chest passive recoiling, via respiratory muscle training. When a muscle loses its normal flexibility, the length-tension relationship is altered. This prevents the muscle from reaching sufficient peak tension leading to muscle weakness and retraction[4] Muscle stretching is a resource that is widely used in rehabilitation programs, since it can prevent injuries and increase flexibility. Thus, stretching exercises of the respiratory muscles may improve respiratory muscle functions in the elderly group of population.[5] RMSG is a combination of stretching and breathing used simultaneously, which is proven to be beneficial in improving the function of respiratory muscles in the elderly and patients with COPD.

Peak expiratory flow rate is a maximum rate of air achieved during the process of expiration and continued with maximum inspiration. It is an important parameter of pulmonary function test and it reflects mainly the calibre of the bronchi and larger bronchioles, which are subjected to reflex broncho constriction. It is a good indicator of respiratory efficiency as it denotes the expiratory flow rate during the peak of forced vital capacity (FVC).[6] Stretching stimulates muscle spindles and due to alpha-gamma linkage, the sensitivity of muscle spindles is increased during contraction.[7] Thus, stretching the contracting muscle is a powerful stimulus for the muscle spindles. Kanamaru et al. recorded electromyographic activity from respiratory muscles and reported that activity during RMSG is greater than that during deep breathing alone, indicating that RMSG stimulates muscle spindles.[8] Thus increased the force generated during respiration by the muscles, Gulderen Sahin et al reported that the stretch receptor reflex decreased the tracheal smooth muscle tone.[9] This in turn leads to decreased airway resistance and increase airway calibre, increasing the PEFR.

Hyperinflation of the lungs leads to a remodelling of the inspiratory muscles that causes postural deformities and more laboured breathing. Postural changes include elevated, protracted, or abducted scapula with medially rotated humerus, and kyphosis that leads to further tightening of respiratory muscles. Kyphotic curvature of the spine increases with Age which increases AP Diameter of thorax & Shoulder Quadrant muscle undergoes Shortening due to which Pump Handle & Bucket Handle Movement do not Occur Properly ultimately reduces thoracic Mobility. (Crowe et al., 2005) As the severity of the disease progresses, use of the upper limbs for functional tasks becomes difficult due to

muscle stiffness. This restricts the mobility of the rib cage and increases the breathing related energy expenditure. This leads to increased fatigue and thus again the pulmonary function is compromised. COPD can significantly reduce a person's ability to do everyday activities. If RMSG can improve chest expansion and airflow (peak expiratory flow rate), this could help people with COPD breathe easier and be more active. RMSG is a simple and safe technique that doesn't require any special equipment. If it proves effective, it could offer a non-invasive and potentially cost-effective way to manage COPD symptoms. A narrative review can analyse existing studies to see if there's a trend towards RMSG improving lung function. This can help design future studies to investigate how and why RMSG might work. Overall, this type of study is needed to see if a simple exercise technique like RMSG can provide measurable benefits for people with COPD.

METHODOLOGY

A search for relevant articles was carried out using key words RMSG, COPD and using search engines google scholar, Pub-med, Science-direct and Research-gate. Search terms would be combined strategically using Boolean operators (AND, OR, NOT). The review focused on recent studies (e.g., past 5-10 years). The established criteria for including studies in the review involve factors like diagnosed with COPD. Studies investigating the effects of RMSG on COPD patients Studies measuring chest expansion While randomized controlled trials (RCTs) Studies were selected from year 2013 to 2023 with eligibility criteria of article published in indexed journals, article published in English language, studies that available in full text, interventional study on chest expansion and PEFR among COPD, geriatric population. 16 studies were screened and 4 studies were eligible. Table 1 shows details of all studies.

Table 1. Details of included studies

AUTHOR/ TITLE	INTERVENTION	OUTCOME	CONCLUSION
Ashma Rehman Jyoti Ganai (2020) Effect of Passive Stretching of Respiratory Muscles on Chest Expansion and 6-Minute Walk Distance in COPD Patients [10]	Hot pack followed by stretching of the respiratory muscles and relaxed passive movements of the shoulder joints	Chest expansion and 6-min walk distance	Chest expansion at the level of the axilla was significantly higher in the experimental group, while there was no difference in chest expansion at the level of the xiphisternum between experimental and control groups. The 6MWD was also significantly higher in the experimental group.
Mistry Hetal (2020) Respiratory Muscle Stretch Gymnastic in Elderly: Impact on Maximum Breathing	RMSG exercises for 4 weeks	maximum breathing capacity, peak expiratory flow rate, exercise capacity, rate	After the practice of Respiratory Muscle Stretch Gymnastic (RMSG) program for 4 weeks by the elderly subjects of 60-70

Capacity, Peak Expiratory Flow Rate and Exercise Capacity [11]		of perceived exertion and posture	years; there was a significant improvement in all the parameters in this study
S Mahfud Hidayat, Ali Multaza M (2020) The Effectiveness of Gymnastic Respiratory Muscle Stretch and Buteyko Breathing Exercise on Peak Expiratory Flows in Older Population [12]	3 weeks of RMSG	Peak expiratory flow rate	There is an effect of a gymnastic respiratory muscle stretch exercises and Buteyko breathing exercises to increase the peak expiratory flows
Mianti Nurrizky Sutejo1, Virginia Eka Putri A. Baharudin2, Dhea Pritasya Nanda Melip (2023) The Effectiveness of Combined Breathing Exercises with Respiratory Muscle Stretching Exercises to Increase Chest Expansion in the Elderly [13]	RMSG for 4 weeks	Chest expansion	The provision of respiratory muscle stretching in the elderly to increase thoracic expansion has very good results.

DISCUSSION

The potential benefits of RMSG for individuals with COPD, focusing on improvements in chest expansion and peak expiratory flow rate (PEFR). Possible benefits of RMSG for COPD are improving chest expansion, increasing PEFR and reducing dyspnoea. RMSG exercises might target chest wall muscles, increasing their flexibility and allowing for greater chest expansion during breathing. This could lead to a deeper breath and potentially improve lung function. RMSG might help improve airflow by loosening tight muscles and increasing the efficiency of exhalation. Studies suggest RMSG may improve symptoms of Dyspnea in COPD patients; This could be due to the improvement in lung function and increase in oxygen intake. Overall, the review discusses the potential of RMSG as a safe and effective intervention for managing COPD. By discussing these aspects, the narrative review can provide valuable insights into the potential of RMSG for improving quality of life in individuals with COPD.

CONCLUSION

Based on the analysis of the potential effects of Respiratory Muscle Stretch Gymnastics (RMSG) on Chronic Obstructive Pulmonary Disease (COPD), it appears to be a promising intervention with several potential benefits. RMSG might improve chest expansion and lung function, leading to easier breathing. Increase in PEFR; signifying better airflow during exhalation. Reduction in dyspnea, improving quality of life for COPD patients. It's also important to consider RMSG as part of a comprehensive COPD management plan, potentially alongside pulmonary rehabilitation programs. Safety considerations for individual patients, especially those with severe COPD, should be addressed by a healthcare professional.

Limitations of the study

The review might explore the dosage and duration of RMSG programs that have shown positive effects. It's important to consider if RMSG is more beneficial as a standalone therapy or as part of a broader pulmonary rehabilitation program. Safety considerations for RMSG in COPD patients, especially those with severe cases, might also be addressed.

Future Research Directions

More studies with larger and more diverse patient groups are needed to solidify the evidence for RMSG in COPD management. Exclamation Research on the long-term effects of RMSG on COPD progression would be valuable. Studies comparing RMSG to other respiratory therapies for COPD could help determine its relative effectiveness.

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"Effectiveness of Maitland Mobilization and Static Stretching on Range of Motion and Pain in Frozen Shoulder Patients: A Randomized Controlled Trial"

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- **Co-Author -** Anushil Lakhani

Abstract

Background: Frozen shoulder is a prevalent condition among individuals aged 35 to 65 years. It is characterized by capsular stiffness, leading to restricted range of motion and increased pain during activities of daily living (ADL). Maitland mobilization and static stretching are commonly employed to reduce pain and enhance range of motion, but their relative effectiveness remains unclear.

Aim of the study: This study aims to compare the effectiveness of Maitland mobilization and static stretching in increasing range of motion and alleviating pain in frozen shoulder patients.

Need of the study: Despite various treatment options, the optimal approach for improving range of motion and pain alleviation in frozen shoulder patients remains uncertain. This study addresses this knowledge gap by comparing two commonly used interventions: Maitland mobilization and static stretching.

Material and Method: A goniometer was used for measurement. A pilot randomized controlled trial was conducted with 10 participants selected based on specific inclusion criteria. Participants were randomly assigned to one of two groups. The first group received Maitland mobilization, while the second group received static stretching along with conventional treatment, including short wave diathermy, pendular exercises, scapular strengthening exercises, capsular stretching, and active assisted shoulder exercises.

Statistical Analysis: SPSS 26 was used for analysis, Paired t test used, graph created in excel

Results: The study found that Maitland mobilization significantly reduced pain and increased the range of motion in patients with frozen shoulder.

Conclusion: Maitland mobilization was useful in pain reduction and gaining the ROM

Keywords: Frozen shoulder, Maitland mobilization, static stretch.

INTRODUCTION

Frozen shoulder involves painful restrictions in both passive and active shoulder movements due to joint issues. Joint mobilization targets altered joint mechanics to improve range of motion and reduce pain. Static stretching extends a restricted joint slightly beyond its range to stretch shortened muscle-tendon units and periarticular tissue.[2,3]

Materials and Methods

Range of motion was measured with a goniometer before and after the study. Participants consented and recorded pre-treatment pain ratings. They were split into two groups: static stretching with conventional treatment and Maitland mobilization with conventional treatment, including shoulder exercises and shortwave diathermy, for four weeks. Independent Sample t-tests and Paired t-tests analyzed data, using mean and standard deviation.

Results

	Pre flexion	Pre abduction	Pre IR	Pre ER	Pre NPRS
Mean(Mobilization)	104.0909	82.8182	20.5455	18.1818	6.7273
SD(Mobilization)	18.41442	12.7029	7.76355	4.62208	1.48936
Mean(Static stretching)	96.8182	93.6364	17.2727	12.7273	6.6364
SD(Static Stretching)	13.2802	17.33362	5.17863	9.7169	1.36182

	Post flexion	Post abduction	Post IR	Post ER	Post NPRS
Mean(Mobilization)	125.5455	103.7273	31.0909	33	4
SD(Mobilization)	19.70464	23.36275	8.06789	9.43398	1.34164
Mean(Static stretching)	104.4545	100.1818	23.6364	23	5.7273
SD(Static Stretching)	13.0028	16.43666	5.74931	8.06226	1.27208

After undergoing Maitland mobilization, the study demonstrates a substantial increase in the ranges of external and internal rotation as well as a reduction in discomfort (because p=<0.05).

DISCUSSION

Maitland mobilization and static stretching improve range of motion and reduce pain in frozen shoulder. Maitland mobilization was more comfortable and slightly more effective. Significant improvements in shoulder rotation and pain reduction were confirmed with a p-value below 0.05.

CONCLUSION

This study concludes that Maitland mobilization was found more efficient in increasing rotational ranges of shoulder and reduction of pain.

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TITLE: "Impact of a Home-Based Exercise Program Targeting Extrinsic and Intrinsic Foot Muscles on Pain, Functionality, Balance, and Foot Morphology in Women with Heel Pain: An Interventional Study"

Author: Dr. Ankita Jadav

Co-author: Dr. Amit Sharma

ABSTRACT:

INTRODUCTION:

Heel pain is a general term used to describe pain and discomfort experienced anywhere in or around the rear of the foot. Indian Prevalence has been reported that 26% of housewife/homemaker females experience painful feet, with 22.5% specifically experiencing heel pain.

METHOD:

This Study has Divided Into 2 Phases. In First Phase, To Make a Home-Based Exercise Protocol with Combined Extrinsic and Intrinsic Muscles Exercise Through Google Form Survey and Literature. In Second Phase, To Check The Result of This Protocol.88 Patients was Selected According to the Criteria, They was Randomly Divided Into 2 Groups, Group A(Experimental Group) and Group B(Control Group).In Group A, Physiotherapist Teach The All of The This Protocol's Exercises. In Group B, They Was No Given Any Exercises, They Were Given Only It Self Treatment. In Both Groups, Check Pre and Post Measurements Like Numerical Pain Rating Scale, Foot and Ankle Disability Index, Navicular Drop Test and Y Balance Test.

RESULT:

The Result was Analysed by Using SPSS Software and Microsoft Excel. In Group A, Significant Improvement In NPRS, FADI, NDT and Y Balance Test. In Group B, Not Significant Improvement in NPRS, NDT, FADI and Y Balance Test.

CONCLUSION:

The Study Highlights the Potential Benefits of a Home-Based Exercise Protocol Targeting Extrinsic and Intrinsic Foot Muscles for Improving Functionality, Balance, Morphological Changes, Reducing Pain in Females with Heel Pain. Adherence May Have Been Enabled Due the Ease of Integrating the Short Duration Exercises Into Daily Routine Without Requiring Supervised Sessions.

KEYWORDS: Heel Pain, Extrinsic Muscles Strengthening Exercise, Intrinsic Muscles Strengthening Exercise, Females, Foot Pain. Heel Pain Physiotherapy Treatment, Foot

Introduction

Physical activity is an important aspect of modern lifestyle as it fulfills our biologically conditioned need to engage in movement activities[1]. Unfortunately, many people lead sedentary lifestyles due to the convenience of labour-saving devices and transportation, as well as the fast pace of modern life[2].A sedentary lifestyle increases the risk of various health problems such as obesity[3] .Walking is a highly popular form of physical activity that usually takes place in neighbourhood environments[4].Regular walking helps to maintain body weight, increase fitness and improve health[5].During walking, the feet play the most important role[6].

The human foot is a unique and complex structure, consisting of 26 bones, 33 joints, and 19 muscles[7] In addition to ligaments, aponeurosis, and bony forms, the arch is supported by intrinsic and extrinsic plantar muscles[7,8].These muscles work together to maintain the foot's structure and provide strength for movements such as walking, running, and jumping[8].Extrinsic plantar muscles that play a role in dynamic arch support include Tibialis posterior, tibialis anterior, peroneus longus, flexor digitorum longus, and peroneus tertius During walking, the plantar intrinsic muscles, including the abductor hallucis, flexor hallucis brevis, flexor digitorum brevis, abductor digiti minimi, and dorsal interossei, are active[8] Each footstep is controlled by intrinsic muscles that manage the degree and velocity of arch deformation[9] Normal foot function is provided by foot core which includes active, passive and neural subsystem[10]. If these muscles are not functioning correctly, the base becomes unsteady and misaligned, leading to foot problems[9] Most foot disorders are characterized by heel pain as a common symptom[11]. Symptoms associated with heel pain in females are plantar fasciitis, Achilles tendonitis, calcaneal spurs, bursitis, calcaneal stress fractures, nerve entrapment, and heel pad syndrome[12,13]. Heel pain can be a common issue that may limit physical activity for some individuals[14].Now a days, Due to a sedentary lifestyle and lack of physical activity, body weight increases and can lead to obesity and Obesity can be a contributing factor to heel pain[3,14,15].

Heel pain is a general term that refers to pain around the heel bone[14].It is most commonly felt underneath the heel or behind it[14]. The biomechanical factors that can cause heel pain include wearing high heels, ill-fitting shoes, obesity, standing for prolonged periods, and experiencing strains or trauma[16] Heel pain is not uncommon in pregnant mothers because as the pregnancy progresses there is weight gain and this extra weight puts more stress on the heel[14].Indian Prevalence has been reported that 26% of housewife or homemaker females experience painful feet, with 22.5% specifically experiencing heel pain[17,18].

There are several reasons why people tend to overlook foot pain[12].These include a lack of knowledge and understanding about foot disorders, inadequate awareness of the potential long-term consequences and complications, insufficient knowledge about appropriate footwear, financial barriers to accessing healthcare, and a general ignorance about the impact of heel pain on daily life[11].

The home-based treatment regimen primarily involves modalities such as cold and hot fomentation therapy[21].Additionally, supportive measures include the use of orthopaedic footwear, acupressure

devices, and the application of local agents such as diclofenac gel and anti-inflammatory sprays[6,19-21].Pharmacological interventions, including analgesics and painkillers[20].

Need of study

Prevalence has been reported that 26% of housewife or homemaker females experience painful feet, with 22.5% specifically experiencing heel pain.Prevalence of heel pain is high among housewife or homemakers mainly due to overwork or underwork(sedentary lifestyle).Heel pain most of the females do not seek any medical advice neither medical or physiotherapy treatment, but constant heel pain reduce the physical activity as it reduce or limit the walking and standing time, which also make them prone to other systemic disorders or even OA of knee and hip. If any Females are doing physiotherapy treatment, they will be more focused on the extrinsic muscles exercises and home advice like a toe curls exercise, Picking up small objects with the toes, etc. Now, Recent research has shown that for flexible flat feet both extrinsic and intrinsic muscles are responsible but physiotherapists doing only extrinsic muscles exercise. Females are not very keen to go for physiotherapy treatment every day. So, it's a need to make a home-based exercise protocol with combined extrinsic and intrinsic muscles exercise. In this study, to make home-based exercise protocol and this protocol specially for the heel pain and which will address extrinsic foot muscles and intrinsic foot muscles. Protocol is short and easy to understand.

Materials:

Pen,paper,laptop,Assessment form,Consent form,Ruler scale,full circle protractor,towel,weight-like filled bottle,small objects,stool,stole,rubber band

Methodology:

- **STUDY DESIGN:** An Interventional Study
- **SAMPLING TECHNIQUE:** Purposive Sampling Technique
- **STUDY SETTING:** Rajkot City and Jamnagar City
- **SOURCE OF DATA COLLECTION:** Residential Area(Apartment, Society)
- **STUDY DURATION:** 6 Months
- **STUDY POPULATION:** Housemaker Females with heel pain
- **SAMPLESIZE:** 88 Housemaker female patients with heel pain
- **OUTCOME MEASURES:** NPRS(Numeric Pain Rating Scale),FADI(Foot and Ankle Disability Index),NDT(Navicular Drop Test),Y Balance Test

Criteria for Selection: [23,26]

Inclusion Criteria:

- Females age between 25 to 55 years.
- Report Persistent pain in the heel with gradual onset over 3 months.

- Report pain that is most noticeable with initial steps following a period of inactivity, and also worsened with prolonged weight bearing.
- NPRS is more than 3.

Exclusion Criteria:

- Diabetes.
- Recent Foot Injury.
- Previous Foot Surgery.
- Working females.

Procedure:

- This Study has 2 Phases,
- 1)To Make a Home-Based Exercise Protocol for Heel Pain in Female Patients.
- 2)To Check the Result of This Home-Based Exercise Protocol in Female Patients With Heel Pain.

Phase 1

- To Make a Google Form.
- This is a Link of Google Form.
- https://forms.gle/2xu8TS8FybhS4zs9A
- Google Form Shared with Physiotherapists.
- To Find the Literatures.
- To Make a Home-Based Exercise Protocol for Heel Pain in Female Patients Through the Google Form Survey and Literatures.
- Protocol:[9,22,24-28]
- Home-Based Exercise Protocol for Heel Pain
- 3-week protocol Of Extrinsic muscle
- (Exercise performed in morning time)
- 1)Warm-Up Exercises
- (Each walking for 45 seconds)
- a)walking on the heel
- b)walking on the forefoot
- c)walking on the medial border of the foot
- d)walking on the lateral border of the foot
- Conditioning exercises
- 2)Toe curling exercise (5 reps)
- 3)Pick up small objects (10 reps)

- 4)Sit to stand exercise (5 reps,1-3 sets)
- 5)Single leg raise (5-10 sec hold,10 reps)
- 6)Heel raise exercise (2 sec up,2 sec down,8-12 reps,1-3 sets)
- 7)Heel down exercise (2sec up,2 sec down,8-12 reps,1-3 sets)
- 8)Isometric exercises (10 sec hold,10 reps)
  - a)Dorsiflexion
  - b)Plantar flexion
  - c)Inversion
  - d)Eversion
- 9)Resistance exercises (5 sec hold,10 reps,1-3 sets)
  - a)Dorsiflexion
  - b)Plantar flexion
  - c)Inversion
  - d)Eversion
- Cool down exercise
- 10)Calf stretching (30 sec hold,5 reps)
- 11)Plantar fascia stretching (30 sec hold,5 reps)
- 3-week protocol of intrinsic foot muscle
- (exercises performed in evening time daily)
- 12)WARM-UP EXERCISES
- (Each Walking for 45 Seconds)
- a)walking on the heel
- b)walking on the forefoot
- c)walking on the medial border of the foot
- d)walking on the lateral border of the foot

- Conditioning exercises
- 13)short foot exercise (10 reps,2-3 sets)
- 14)Toe spreading exercise (10 reps,2-3 sets)
- 15)Great toe extension exercise (10 reps,1-3 sets)
- 16)Lesser toe extension exercise (10 reps,2-3 sets)
- 17)Great toe abduction exercise (10 reps,2-3 sets)
- 18)Long toe push exercise (2 sec push, 2 sec release,8-12 reps,1-3 sets)

- Cool down exercise
- 19)Calf stretching (30 sec hold,5 reps)
- 20)Plantar fascia stretching (30 sec hold,5 reps)

Home Advices:

- Wear Shoes That Fit Properly
- Orthopedic Foot Wear
- Hot Pack (10-15 Min,2 Times Per Day)
- Lose The Body Weight
- Avoid Prolong Standing Position
- Gait Training
- Avoid Bare Foot Walking

The Study Proposal Was Granted Approval by The Ethical Committee of The School of Physiotherapy, RK University, Rajkot. The Clinical Trials Registry-India (CTRI) Has This Study Listed. The REF/2023/10/074416 Registration Number Is It.

Phase 2

- According To the Inclusion and Exclusion Criteria, 88 Patients Were Selected. They are Randomly Divided Into 2 Groups. Group A (Experimental Group) And Group B (Control Group).

Group A (Experimental Group)

- To Ensure That The 44 Patients Understood Treatment Procedure, A Written Consent Form Was Signed Passively by Each Patient.
- All Patients Were Assessed Pre-Treatment and Using A Navicular Drop Test To Evaluate Foot Morphology, NPRS To Measure Pain, Y Balance Test For Balance Assessment, And Foot Disability Index To Assess Functionality.
- Physiotherapist Teach Each Patient in all of the This Protocol's Exercises.
- Patients Are Provided Video Recording, Protocol Pamphlet and Small Objects. It Can Help to Do Exercises at Home.
- Randomly Any 2 Patients Call Daily to Check The they are Doing Or Not Doing Exercises At Home.
- After 3 weeks Check the Post Treatment Using A Navicular Drop Test, NPRS, Y Balance Test, Foot And Ankle Disability Index.

Group B (Control Group)

- The 44 Patients, A Written Consent Form Was Signed Passively By Each Patient. 44 Patients Were Blinding About the Treatment Protocol and They Are Doing It Self-Treatment. They Were No Given Any Exercise and Advices.
- All Patients Were Assessed Pre-Treatment and Using A Navicular Drop Test To Evaluate Foot Morphology, NPRS To Measure Pain, Y Balance Test For Balance Assessment, And Foot And Ankle Disability Index To Assess Functionality.
- After 3-Week Check the Post Treatment and Using A NPRS, NDT, FADI and Y Balance Test.

RESULT:

Statistical Software:

Statistical Analysis Was Done Using SPSS (Statistical Package for the Social Sciences) Statistical Software Version 21. Microsoft Excel Version 2204 was Used to Generate Graphs and Tables.

Statistical Analysis:

Firstly, Normality of Data was Checked with Using Shapiro-wilk Test. Level of Significance was Set at 0.05(p-value).

The Data was Not Normal Distribution of NPRS(Numeric Pain Rating Scale), FADI(Foot and Ankle Disability Index) & NDT in both Group. In, Y Balance Test, Data was Normal Distribution in Both Group.

The Data was the Non-Parametric Type of Data for NPRS, FADI & NDT in both Group. In, Y Balance Test, Data was Parametric in Both Group.

Analysis Of Group-A:

Analysis of NPRS:

NPRS		**Before intervention**				**After intervention**				**Test statistics Wilcoxon sign rank test**	
		Mean	**SD**	**Median**	**IQR**	**Mean**	**SD**	**Median**	**IQR**	**Z value**	**p value**
Right Foot	During Activity	6.75	1.27	7	2	3.13	1.28	3	2	-5.64	<0.01
	At Rest	0.66	1.09	0	1	0	0	0	0	-3.4	<0.01
Left Foot	During Activity	6.63	1.31	6.5	2	3.09	1.32	3	2	-5.23	<0.01
	At Rest	0.66	1.09	0	1	0	0	0	0	-3.3	<0.01

After The 3-Week Exercise Program, There Were Statistically Highly Significant Reductions in Pain Scores Compared To Baseline.

Analysis of NDT:

Navicular Drop Test	Before intervention (mm)				After intervention (mm)				Test statistics Wilcoxon sign rank test	
	Mean	SD	Median	IQR	Mean	SD	Median	IQR	Z value	p value
Right foot	10.52	1.95	10	0	10.2	1.33	10	0	-2.08	<0.05
Left foot	10.39	1.84	10	0	10.14	0.95	10	0	-1.65	0.09

After the 3-week exercise program, there was a reduction in navicular drop values compared to before the intervention, indicative of improved arch morphology.The reduction was statistically significant on the right side ($p<0.05$) but not on the left ($p=0.09$). The Z value of -2.08 indicates moderately significant pre-post differences in navicular drop on the right foot.

Analysis of FADI:

FADI Scores	Before intervention				After intervention				Test statistics Wilcoxon sign rank test	
	Mean	SD	Median	IQR	Mean	SD	Median	IQR	Z value	p value
FADI Scores	73.64	9.04	76	1	96.27	7.79	100	1	-5.79	0.00

There were statistically significant improvements in FADI scores in all activities after compared to before the exercise intervention. The large Z values (>4.81) and $p<0.01$ indicate strongly statistically significant pre-post intervention differences in all FADI parameters.

Analysis of Y Balance Test:

Side	Foot	Before intervention (cm)		After intervention (cm)		Test statistics T test	
		Mean	SD	Mean	SD	t value	p value
Anterior Side	Right Foot	76.7	7.6	86	8.25	-23.91	<0.01

	Left Foot	76.52	7.81	85.7	8.5	-22.23	<0.01
Posteromedial side	Right Foot	74.16	7.63	83.41	8.14	-28.72	<0.01
	Left Foot	74.02	7.6	82.98	8.31	-25.04	<0.01
Posterolateral side	Right Foot	75.91	7.16	85.05	7.78	-25.38	<0.01
	Left Foot	75.75	7.38	84.7	7.95	-24.54	<0.01

After the intervention, there were statistically highly significant improvements in reach distances in all 3 directions and on both sides compared to before the intervention.

Analysis Of Group-B:

Analysis of NPRS:

NPRS		**Before intervention**				**After intervention**				**Test statistics Wilcoxon sign rank test**	
		Mean	**SD**	**Median**	**IQR**	**Mean**	**SD**	**Median**	**IQR**	**Z value**	**p value**
Right Foot	During Activity	6.73	1.15	7	2	6.73	1.34	7	2	0.00	>0.05
	At Rest	0.36	0.75	0	1	0.36	0.75	0	1	0.00	>0.05
Left Foot	During Activity	6.05	2.43	7	2	6.07	2.52	7	2	-0.27	>0.05
	At Rest	0.36	0.75	0	1	0.36	0.75	0	1	0.00	>0.05

After 3-week, there were p value is more then 0.05 . there were Not statistically significant reductions in pain scores compared to baseline. After 3-week, there were all most similar value was seen and not reduced the pain such as.

Analysis of NDT:

Navicular Drop Test	**Before intervention (mm)**				**After intervention (mm)**				**Test statistics Wilcoxon sign rank test**	
	Mean	**SD**	**Median**	**IQR**	**Mean**	**SD**	**Median**	**IQR**	**Z value**	**p value**

Right foot	9.79	1.64	10	0	9.79	1.64	10	0	-1.34	>0.05
Left foot	9.79	1.64	10	0	9.79	1.64	10	0	-1.34	>0.05

After the 3-week, there was a similar in navicular drop values compared to before the intervention, indicative of not improved arch morphology. After 3-week, there were p value is more than 0.05. there were Not statistically significant improved foot morphology.

Analysis of FADI:

FADI Scores	**Before intervention**				**After intervention**				**Test statistics Wilcoxon sign rank test**	
	Mean	**SD**	**Median**	**IQR**	**Mean**	**SD**	**Median**	**IQR**	**Z value**	**p value**
FADI Scores	73.52	7.96	76	1	73.59	7.99	76	1	-1.34	>0.05

After 3 week,There were Not statistically significant improvements in FADI scores in all activities after compared to before the intervention. p >0.05 indicate Not statistically significant pre-post intervention differences in all FADI parameters.

Analysis of Y Balance Test:

Side	**Time (Second)**	**Before intervention (cm)**		**After intervention (cm)**		**Test statistics T test**	
		Mean	**SD**	**Mean**	**SD**	**t value**	**p value**
Anterior Side	Right Foot	77	6.56	77	6.56	-0.72	>0.05
	Left Foot	77	6.47	77	6.47	-0.92	>0.05
Posteromedial side	Right Foot	76	7.09	76	7.09	-1.53	>0.05
	Left Foot	76	6.43	77	6.43	-2.33	>0.05
Posterolateral side	Right Foot	76	7.26	76	7.26	-0.06	>0.05
	Left Foot	76	7.09	76	7.09	-0.36	>0.05

After the intervention, there were Not statistically significant improvements in reach distances in all 3 directions and on both sides compared to before the intervention.

Discussion

The study observed several positive effects of targeted foot exercises, including:

- **Pain Reduction:** Significant decrease in heel pain, likely due to reduced pressure on affected tissues like those in plantar fasciitis or Achilles tendinopathy.
- **Functionality Improvement:** Enhanced foot mechanics and increased strength in foot muscles led to better mobility and performance in daily activities and sports.
- **Balance Enhancement:** Improved proprioception and neuromuscular control from strengthened foot muscles reduced fall risk and enhanced stability.
- **Morphological Changes:** Positive changes in foot structure, potentially from muscle, tendon, or arch adaptations
- While previous studies have focused on strengthening the short plantar musculature, which is considered useful in addressing pathologies caused by excessive pronation of the foot and Although The Literature Indicates That Women Generally Have Slightly More Pronated Feet Than Men.[28], Our results suggest that working with both extrinsic and intrinsic foot muscles could lead to improvements in foot morphology and provide significant benefits for lower limb neuromuscular patterns.
- In a previous study, three different exercise protocols improved pain, function, and dynamic stability of the lower limbs. However, an eight-week program of strengthening and stretching exercises did not yield better results and protocol is clinical Setting.The New Protocol, Which Is Entirely Home-Based, Showed Greater Improvements In Pain, Function, And Balance.[89,95,97]

Limitations

- The Long-Term Efficacy Beyond 3 Weeks Remains Unclear.
- In This Study Using Only Housemaker Females.
- The Study Only Focuses On Treating Heel Pain And Does Not Address Back Pain Or Knee Pain.
- There Might Be Some Placebo Effects Contributing To Subjective Pain And Function Improvements.
- Further Studies Must Address These Limitations.

Conclusion

"The study aimed to evaluate the effects of a 3-week home-based exercise protocol on housemaker females with heel pain. The exercise program significantly reduced heel pain during activity and rest, improved foot function, enhanced balance, and resulted in improved foot morphology. The findings establish the effectiveness of the exercise program for improving symptoms and function in this population."

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" TO FIND OUT THE IMMEDIATE EFFECT OF MULLIGAN BENT LEG RAISE TECHNIQUE VERSUS INSTRUMENT ASSISTED SOFT TISSUE MOBILIZATION ON HAMSTRING MUSCLE TIGHTNESS IN RUNNERS: A COMPARATIVE STUDY".

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Co- Author: Dr. Komal Doshi

ABSTRACT

Background: Hamstring strain injury (HSI) remains the most common muscle injury in high-intensity running in humans. The Mulligan Bent Leg Raise (BLR) technique is one of the means of improving range of Straight Leg Raise (SLR) in subjects with hamstring tightness. Instrument Assisted Soft Tissue Mobilization (IASTM) is a soft-tissue treatment technique where a tool is used to stimulate and mobilize the affected scar tissue and myofascial adhesions. **Aim:** To find out the immediate effect of Mulligan Bent Leg Raise technique versus Instrument Assisted Soft Tissue Mobilization on hamstring muscle tightness in runners. **Methodology:** 60 subjects was selected by lottery method and random sampling was done according to inclusion and exclusion criteria and was divided into two groups with each group having 30 subjects. Mulligan Bent Leg Raise (BLR) technique was given to Group-A, and Instrument Assisted Soft Tissue Mobilization (IASTM) technique was given to Group-B. Pre and post analysis of hamstring muscle tightness was done by Active Knee Extension Test (AKET). **Result:** Result have shown significant difference between pre and post measurements in both between and within groups, but here BLR treatment was more effective than IASTM. **Conclusion:** the patients who had received Mulligan Bent Leg Raise Technique(BLR) and Instrument Assisted Soft Tissue Mobilization(IASTM) were found to have beneficial effect in reducing hamstring muscle tightness but according to statistical analysis , BLR treatment was more effective in improving the Range Of Motion of knee extension in AKET(Active Knee Extension Test) in runners.

Keywords: Bent leg raise, Instrument Assisted Soft Tissue Mobilization, Runners, Hamstring Muscle Tightness, active knee extension test.

INTRODUCTION:

The hamstring muscles are the primary muscles responsible for flexion of the knee, resides in the posterior compartment of the thigh and consists of the semitendinosus, semimembranosus, and biceps femoris muscles[1]. Prevalence of Hamstring muscle tightness is 96.7% in middle age group.[2] Hamstring strain injuries (HSI) are the most common muscle injuries in intense running, often occurring in the proximal region of the long head of the biceps femoris muscle. There are some factors predisposing to

HSI, including muscle-tendon architecture, fiber type, and innervation differences, which may explain why some individuals are more prone to these injuries during running [3]. The Mulligan concept is a popular intervention for hamstring tightness, with techniques like the Bent Leg Raise (BLR) improving range of motion. BLR can reduce hamstring impairment. Instrument Assisted Soft Tissue Mobilization (IASTM) uses tools to mobilize scar tissue and myofascial adhesions for soft tissue treatment.[4] IASTM is a modern technique using specialized tools to detect and treat soft tissue issues. It's a form of myofascial release that enhances range of motion and reduces pain by targeting restrictions more precisely. Need of Study: The need of study is to use of instruments offers clinicians greater depth and accuracy while minimizing strain on their hands. [5].

METHODOLOGY:

60 subjects was selected by convenient sampling according to inclusion and exclusion criteria and was divided in to two groups with each group having 30 subjects by simple random
sampling. Before the application of technique, hamstring tightness was checked with help of Active Knee Extension Test (AKET). After the examination, for the treatment purpose, Mulligan Bent Leg Raise (BLR) technique was given to Group - A and Instrument Assisted Soft Tissue Mobilization technique (IASTM) was given to Group - B.Hamstring tightness was assessed again after the application of techniques for both groups.

A comparative study was done with convenient sampling method in which runners were selected from Samrth Vyayam Mandir Akhada and Ahir boarding.school and training center,Amreli. The study took 6 months to complete.

Materials used for study were Assessment form, Consent form, Paper, Pen, Ultrasonic Gel or Petroleum Jelly, Goniometer, IASTM Toolkit.

Criteria for Selection:

Healthy Male individuals between the age group of 18-40 years, individuals having hamstring muscle tightness after running were included in this study.

Individuals with past history of major spinal or lower limb surgery, Individuals with fracture, dislocation, joint instability, muscle and ligament injury at lower limb, Individuals with skin, systemic illness, traumatic injury to the knee joint and lumbar spine, Non consent and non- cooperative individuals were excluded from the study.

Results:

Interpretation: the mean and SD of value of difference of BLR i.e. 6.73±1.337 for group A and value of difference IASTM 1.e.3.87±0.776 for group B. an analysis of difference between Mulligans Bent Leg Raise Technique and Instrument Assisted Soft Tissue Mobilization shows significant difference ($p<0.05$,$t=10.155$). These above findings suggest that there was statistically significant difference of Range Of Motion (ROM) between Mulligan Bent Leg Raise Technique (BLR) and Instrument Assisted Soft

Tissue Mobilization (IASTM). There was significant difference between Mulligans Bent Leg Raise Technique (BLR) and Instrument Assisted Soft Tissue Mobilization (IASTM).

GROUP B	Mean	SD	p-Value	t-value	Result
PRE IASTM ROM	147.57	4.854	0.00	-27.289	Significant
POST IASTM ROM	151.43	4.629			

GROUP A	Mean	SD	p-Value	t-value	Result
PRE BLR ROM	147.77	5.418	0.00	-27.577	Significant
POST BLR ROM	154.50	5.191			

Discussions:

The study compared Mulligan's Bent Leg Raise (BLR) and Instrument Assisted Soft Tissue Mobilization (IASTM) for reducing hamstring tightness. Both techniques were equally effective in improving knee extension range of motion. BLR technique might release the adhesion between them stretching of the gluteus maximus and adductor magnus part of hamstring (as knee is kept in flexed position) helps in breaking the adhesion between these muscle and sciatic nerve . Hence, mobilization of sciatic nerve will occur in relation to these muscles without the nerve getting stretched. While IASTM promotes healing by triggering an inflammatory response, stimulating collagen production, and reducing scar tissue. It delivers controlled micro-trauma to initiate the healing process and, when combined with stretching and therapeutic exercises, restores soft tissue function. It also increases fibroblast proliferation and remodels collagen fibers at the cellular level. Fibroblasts act as mechanotransducers, sensing physical strain and producing a chemical response. With IASTM, mechanical stimulation inhibits pain receptors and triggers the release of natural opioids, providing analgesic effects.[6][7]

Conclusion:

Study concluded that the patients who had received Mulligan Bent Leg Raise Technique(BLR) and Instrument Assisted Soft Tissue Mobilization(IASTM) were found to have beneficial effect in reducing

hamstring muscle tightness but according to statistical analysis , BLR treatment was more effective in improving the Range Of Motion of knee extension in AKET(Active Knee Extension Test) in runners.

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Utilizing OPEP devices, reduce post-operative complications related to pulmonary function following Coronary artery bypass graft surgery: evidence-based study.

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ABSTRACT:

BACKGROUND: Patients receiving CABG have a high risk of developing post-operative pulmonary problems. Members of the oscillatory positive expiratory pressure [OPEP] family may benefit from this treatment. **OBJECTIVE:** The purpose of this literature review is to enhance knowledge regarding the function of OPEP devices and their relationship to post-operative pulmonary complications following CABG. **METHOD:** Relevant keywords will be employed for the research using the electronic databases PubMed, Medline and Google Scholar. Bibliographic information and associated research materials were managed using Zotero, an open-source reference management programmed. **RESULT:** databases including PubMed, Medline, and Google Scholar, where 12 studies that initially passed the inclusion criteria were examined and included. A total of 27,689 citations were evaluated between January 2009 and December 2023. Following the application of inclusion/exclusion criteria, 27,677 articles were discarded throughout the data extraction process. **CONCLUSION:** Research has demonstrated the effectiveness of OPEP devices in treating a variety of respiratory illnesses; however, less research has been done on the use of OPEP devices in patients after heart surgery. Thus, the study's objective is to assess the accuracy, desired outcome, and necessary knowledge of OPEP devices as well as their efficacy.

KEY WORDS: CABG, OPEP devices, pulmonary complications

INTRODUCTION:

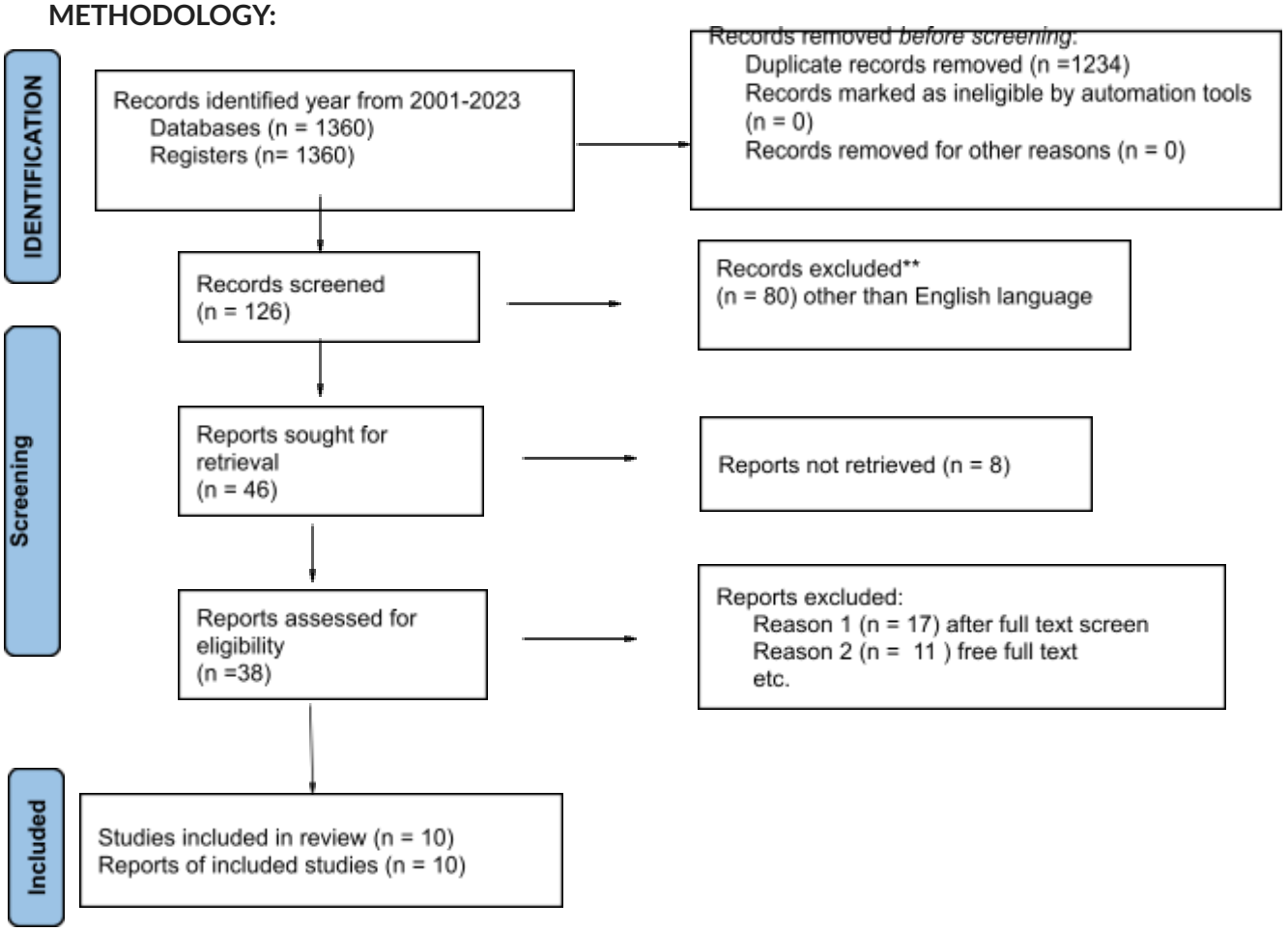
Following heart, chest, and abdominal procedures, postoperative pulmonary complications (PPCs) are a common occurrence. After CABG surgery, PPCs are common and occur in between 30 and 60 percent of cases [1]. Atelectasis, pleural effusion, pulmonary oedema, pulmonary infections such pneumonia and bronchitis, and respiratory insufficiency are some of these consequences. Pain and anxiety after surgery that stems from altered lung mechanics make it difficult to execute effective coughing and periodic deep inspiration, which leads to secretion buildup, alveolar collapse, and altered gas exchange [2].

Following CABG surgery, postoperative breathing exercises in conjunction with physical therapy have been shown to be just as beneficial in lowering the risk of pneumonia, atelectasis, and other pulmonary complications as physical therapy alone, including early mobilization [3]. Furthermore, the therapist must expend a great deal of effort and time using these strategies. Over the past 20 to 25 years, OPEP therapy devices have gained popularity as an adjunct to fixed PEP treatment[3,4]. When a patient exhales into the

device, they work through a number of mechanisms that produce a sequence of brief flow occlusions. When the patient actively exhales through the device and inhales a little larger-than-normal tidal volume, a series of oscillatory airway pressure fluctuations are produced [5].

This study aims to give clinicians enough knowledge to assess the qualities and effectiveness of the many different mechanical mobilization methods available, with an emphasis on OPEP devices. Nonetheless, its potential may help patients who have had heart surgery with their post-operative pulmonary problems.

METHODOLOGY:



RESULT AND DISCUSSION:

In the screening process 1,360 studies with potential relevance were initially identified. Following a preliminary review of titles and abstracts 1,234 articles were excluded, leaving 126 articles. Subsequently 80 articles are other than English language, 11 articles underwent payment, and 17 articles were then excluded based on full text articles criteria, resulting in the inclusion of 10 articles in this study.

Ten of the six reports were RCT parallel group trials, two were comparative study and two were experimental; the studies were published between 2001 and 2023. TWO studies were characterized by excellent methodological quality, while the remaining EIGHT exhibited good quality based on Pedro criteria.

The Ten included studies comprised a total of 522 patients with CABG and the duration of intervention was first day after surgery to seventh day. A range of comparisons were used including conventional therapy (eg, CABG medication regimen) and OPEPE devices like acapella, flutter and quake. Nine studies found that OPEP devices demonstrated greater effectiveness compared to a control group receiving alternative or conventional treatments or combined treatment. Additionally, one study concluded that Carrying out PEEP therapy after coronary artery bypass surgery with EzPAP incentive spirometer allows the restoration of volumetric and velocity respiratory values.

There are several reports that alternative types of vibration and oscillation can facilitate air removal and improve lung function in various clinical settings. So far, no clinical studies have evaluated the effect of positive vasodilator pressure with Acapella (Smiths Medical Inc, Carlsbad, California) in patients undergoing coronary artery bypass grafting.

Sabnam Kapadia et al. came to the conclusion that Flutter device should be amalgamated as a routine practice along with other CPT techniques in CABG patients which can have positive results in airway clearance and thereby improving PEFR [4,5].

Ahmed Gamal Fouad Amin et al. observed enhancement in ABG values in the present research might be attributed to using the Quake device, which falls under the oscillating positive expiratory pressure devices. This device generates robust vibratory pulses during exhale and inhalation, inducing powerful percussive pulses.

CONCLUSION:

The current study came to the conclusion that using OPEP devices may help reduce post-pulmonary complications following CABG. It also provided insight into how OPEP-based therapies may eventually fit more broadly into the range of ACTs that clinicians can use to treat pulmonary complications by highlighting noteworthy advancements in device attributes and performance, including important clinical evaluations.

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A Study To Find Out The Impact Of Yoga On Kyphosis Amongst Adults: An Interventional Study.

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ABSTRACT

BACKGROUND: Kyphosis is a common disorder that is normally described as a backward deviation of the thoracic spine. The condition likely reduces ability of balance control and mobility, restricts pulmonary functions, and induces back pain which decreases quality of life. Clinical assessment tools for Kyphosis are radiographic Cobb's method, Flexi curve and the Occiput-wall distance. This study evaluated the impact of Yoga on Kyphosis in adults. **AIM:** To find out the impact of Yoga on Kyphosis in adults. **METHOD** The volunteers were made to stand straight against the wall and PRE- Occiput Wall Distance was measured. Following which the subjects underwent three Yogasanas Bhujangasana, Dhanurasana, Bitilasana with 30 sec hold and 5 to 10 repetations were done for 4 weeks. After the intervention Post- Occiput Wall Distance readings of the individuals were measured. The Pre- Occiput Wall Distance and Post- Occiput Wall Distance readings were analyzed. **RESULTS:**. The Mean PRE Occiput wall distance of the individuals was 3.46 cm dropped to 2.96 as the mean Post Occiput Wall Distance. The level of significance, P = 0.00 indicates that there is statistical significant impact of yoga on kyphosis amongst adults. **CONCLUSION:** Study concluded that there was significant drop in the Occiput-Wall Distance after yoga intervention. There was reduction in Kyphosis for most of the individuals except for individuals who had high Pre Occiput Wall Distance readings which indicated severe Kyphosis.

KEYWORDS: Occiput-Wall Distance, Yoga, Kyphosis, Deformity.

INTRODUCTION:

Kyphosis is a common disorder that is normally described as a backward deviation of the thoracic spine. According to Cramer, a normal Kyphosis can be anywhere between 10 to 40 degrees with 25 degrees being the average. The term is from Greek κυφός *kyphos*, a hump. Kyphosis can occur at any age, but is common during adolescence. Possible complications include inflammation of the soft tissue or deep inflammatory processes, breathing impairments, bleeding, and nerve injuries.[1] The symptoms of Kyphosis include: Neck Pain, Spinal Deformity, Stoop, Fast Fatigue, Backache, Chest Deformity, Disorders of Internal Organs. [2] The condition likely reduces ability of balance control and mobility, restricts pulmonary functions, and induces back pain and digestive problems. These consequences lead to the loss of independence and decrease quality of life of individuals. Yoga as an exercise is a physical

activity consisting mainly of postures, often connected by flowing sequences, sometimes accompanied by breathing exercises, and frequently ending with relaxation and lying down. Yoga in this form has become familiar across the world. [3]Yoga exercises have also been used for correction of spinal curvatures. The term "yoga" in the Western world often denotes a modern form of hatha yoga and a posture-based physical fitness, stress-relief and relaxation technique, consisting largely of the asanas. In Occiput Wall Distance technique the patient is asked to stand against a wall in relaxed posture, then using the measuring tape the distance between the wall and the measure the distance between the wall and the Occiput of the individual.[4]

Materials: Measuring tape, Pen, Paper, Yoga mat, Laptop

METHODOLOGY:

40 individuals mainly college students were selected randomly based on inclusion and exclusion criteria. After taking written consent The individuals were made to stand upright as tall as possible with heels, sacrum, and back against the wall and PRE- Occiput Wall Distance was measured. Following which the individuals underwent three Yogasana Bhujangasana, Dhanurasana, Bitilasana with 30 sec hold and 5 to 10 repetations were done for 4 weeks. After the intervention Post- Occiput Wall Distance readings of the individuals were measured. The Pre- Occiput Wall Distance and Post- Occiput Wall Distance readings were analyzed. **Study Design:** Interventional study. **Study Population:** Adults (Male and Female). **Sampling Technique:** Convenient Sampling. **Sample Size:** 40. **Study Duration:** 6 Months

Criteria for Selection:

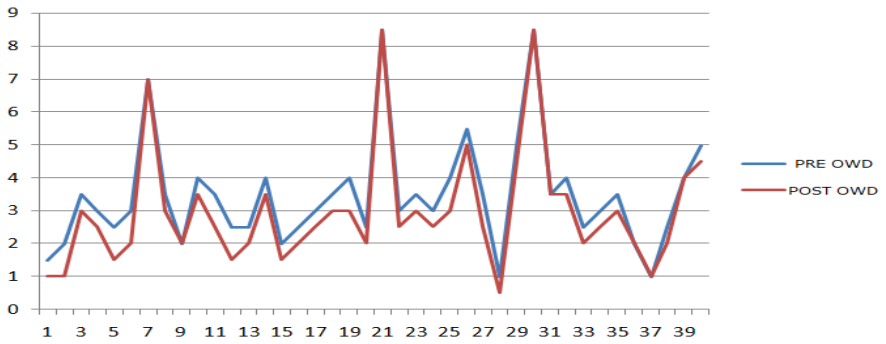
Inclusion Criteria: Adults from the age of 18 to 26 years, both Male and Female.

Exclusion Criteria: Adults underwent any kind of back surgeries in the past three months, Adults those who are bedridden due to any medical conditions, Adults with any kind of neurological disorder.

Results:

The aim of the study is to find out impact of yoga on Kyphosis amongst adults. In the present study Occiput Wall Distance was used to measure Kyphosis. The individuals stood upright along the wall with heels touching the wall, and then the perpendicular distance between Occiput and the wall were measured. In the Study 40 Individuals were involved out of which 24 were males and 16 were females. After they were assessed for Kyphosis, they underwent a Yoga intervention programme for 3 weeks. The statistical analysis of their Occiput Wall Distance value showed that the mean Occiput Wall Distance value prior to intervention was 3.46 cm and the mean Occiput Wall Distance value post intervention dropped to 2.96 showing reduction in Kyphosis. The Value of Significance (P) after performing a Paired Sample T test showed, P = 0.00; which states that the intervention was of good significance i.e. There is a Statistical significant impact of yoga on Kyphosis.

Mean Age	22.85 yrs
Standard Deviation of Age	7.82 yrs
Mean Pre OWD	3.46 cm
Standard deviation of Pre OWD	1.65 cm
Mean Post OWD	2.96 cm
Standard deviation of Post OWD	1.76 cm



Discussions:

Kyphosis as a postural deformity has increased amongst our population in recent years due to a poor lifestyle consisting of poor postural habits, sedentary activities and nutritional deficiencies. The aim of the study is to find out the impact of yoga on Kyphosis amongst adults. In the present study Occiput Wall Distance was used to measure Kyphosis. In the Study 40 Individuals were involved out of which 24 were males and 16 were females. After they were assessed for Kyphosis, they underwent a Yoga intervention programme for 4 weeks. The statistical analysis of their Occiput Wall Distance value showed that the mean Occiput Wall Distance value prior to intervention was 3.46 cm and the mean Occiput Wall Distance value post intervention dropped to 2.96 showing reduction in Kyphosis. The Value of Significance (P) after performing a Paired Sample T test showed, P = 0.00; which states that the intervention was of good significance i.e. There is a Statistical significant impact of yoga on Kyphosis. Yoga helped the subjects ease out their taut spinal structure. It helped to strengthen their spinal muscles.

It helped to stretch the pectoral muscles thus relieving them of Kyphosis. Further this study can be done in other age groups with a large number of population.

Conclusion:

Study concluded that there was a significant drop in the Occiput Wall Distance after the individuals underwent yoga intervention. The Pre mean Occiput Wall Distance value was 3.46 cm which dropped to 2.96 cm. The level of Significance of both Pre and Post reading is, P = 0.00 indicating there is a statistical significant impact of yoga on Kyphosis. Poor lifestyle consisting of bad postural habits, poor nutrition, sedentary lifestyle are some of the causes that resulted in occurrence of Kyphosis in the majority of the population.

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Inflammatory Dermatomyositis – A Case Study

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ABSTRACT

Background -

Dermatomyositis is a rare, acquired immune-mediated muscle disease characterized by muscle weakness and skin rash. Also, it can affect other organ systems such as the pulmonary, cardiovascular, and gastrointestinal systems.

Aim -

To throw some light on the clinical picture, course of treatment and recovery in case of inflammatory dermatomyositis.

Discussion -

Case study here discusses physiotherapy assessment & role of physiotherapy in inflammatory dermatomyositis.

Conclusion -

Patients suffering with inflammatory dermatomyositis can be benefited with a holistic approach of medicines & physiotherapy treatment.

KEY WORDS

Inflammatory dermatomyositis, Muscular weakness, Skin rash, swelling, antibody.

INTRODUCTION

Dermatomyositis is a rare acquired immune-mediated muscle disease characterized by muscle weakness and skin rash. It is classified as one of the idiopathic inflammatory myopathies (IIM).Dermatomyositis presents with characteristic skin findings and symmetric proximal skeletal muscle weakness. Also, it can affect other organ systems such as the pulmonary, cardiovascular, and gastrointestinal systems.[1]

Although the disorder is rare, with a prevalence of one to 10 cases per million in adults and one to 3.2 cases per million in children. The average age at diagnosis is 40, and almost twice as many women are affected as men. The average age of onset in juvenile dermatomyositis is between five and 14 years.[1]

The cause of dermatomyositis is unknown, however several genetic, immunologic, and environmental factors are implicated in this condition.

- **Genetic:** there are studies suggested that there are particular human leukocyte antigen (HLA) types considered a risk factor for dermatomyositis. In addition autoantibodies were also detected in patients.

- **Infection:** Viruses like Coxsackie B, enterovirus, and parvovirus are suspected triggers for dermatomyositis.
- Certain drugs that including antineoplastic medications like hydroxyurea and cyclophosphamide, anti-infectious agents such as penicillin, sulfonamides, and isoniazid.
- NSAIDS drugs like diclofenac and phenylbutazone, as well as D- penicillamine, statins, and certain vaccines can trigger.[1,2]

Clinical features

- Classically presents with a symmetrical proximal myopathy with associated dermatological changes including, dusky-red rash over the face, arms, hands, legs and other features.
- Other features include dysphagia, myalgia, and fever and weight loss.
- **Muscular weakness -**This results in difficulties with everyday activities like standing up, climbing stairs, or lifting objects. Severe cases can lead to head drop, difficulty swallowing and speaking, and weakened breathing muscle.
- key skin features may include:
- Gottron's papules
- Gottron's sign
- **Heliotrope rash:** Purple eyelid erythema with swelling and tiny blood vessels (telangiectasia),
- Sometimes subtle in darker skin.
- Erythematous patches in sun-exposed and non-sun-exposed areas.

- **Malar erythema**: Redness across cheeks, extending to the nose and nasolabial folds.
- **Shawl sign:** Erythema on the upper back, neck, and shoulders, possibly extending to the arms.
- **"V" sign:** Confluent redness on the lower neck and upper chest.
- Scalp involvement and skin issues on the lower back and lateral thighs (Holster sign)
- There is a six fold increased risk of malignancy in dermatomyositis [3,4]

The treatment regimen must be instituted early and requires a team approach between the physical therapist, dermatologist and family physician. The first-line treatment of muscle disease in dermatomyositis is systemic glucocorticoids with or without immunosuppressant.

CASE REPORT

Reported case here of, A 33 year old female who had sudden onset of fever, weakness, redness on hand, neck and on face without any definite cause in November,22.She consulted a rheumatologist in Rajkot , after some diagnostic tests and other investigations she was diagnosed as Inflammatory Dermatomyositis.

She was given pharmacological management (Glucocorticoids, onmnacortil,predilsone etc.) and advised for physiotherapy treatment. Continuing with this both she was getting recovery well.

After some travel history she again started these symptoms even with more intensity in June, 23 .This time they went to APOLLO hospital Ahmedabad. She was asked to admit for 5 days, and she was given IGG injection and other needful treatment inside the hospital.

After discharge she was advised for physiotherapy at home. At this point they consulted physiotherapist and we started home based physiotherapy sessions gradually according to her strength and requirement.

Physiotherapy Assessment shows,

- **Chief complains-** Difficult to walk independently, pain in whole body, overall weakness and tiredness after some work only, difficulty in chewing and swallowing, increased coughing etc.
- Gross pain in whole body joints, redness over the face, knuckles, neck, scalp, feet, elbow etc. Swelling over face, neck, hands and feet.

- Muscle power assessed by MRC grading system – Reduced muscular strength of shoulder joint and hip joint muscles , abdominals , neck extensors were significantly reduced.
- Weak Facial muscles and respiratory muscles.
- Balance was impaired.
- Sensory component was intact.

Physiotherapy management

- Assisted ROM exe. For all joints
- Isometric exe. for core muscles of spine
- Bridging
- Curl up
- Sit to stand
- Facial exercise
- Gait training
- Stair climbing
- Breathing exercises

Progressively increasing with strengthening exercise, Aerobic exercises, Neck extension exercises, Close chain exercises and Training for ADL activities

DISCUSSION

Inflammatory dermatomyositis being a rare condition with many times idiopathic or unknown cause might consult to physiotherapist directly.

Physical therapists therefore, need to recognize signs and symptoms that may be indicative of disease and warrants a referral to the appropriate medical care provider.

This case clearly emphasizes the importance of critical thinking, observation and examination skills which would have great impact on patient's recovery.

This case shows significant role of physiotherapy to regain independent ambulation, ADL work, and mainly return to the society.

CONCLUSION

Present case study is showing improvement with holistic approach of medicines & physiotherapy. Consistent religious physiotherapy treatment with standardized protocol needs to be followed by therapist and patient.

Thus appropriate well planned physical therapy would help to get faster and normal recovery in patients suffering with inflammatory dermatomyositis.

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"A COMPREHENSIVE EXERCISE PROTOCOL BASED ON BIOMECHANICAL CONSIDERATIONS ON FOOT POSTURE AND ARCH HEIGHT IN INDIVIDUALS WITH FLEXIBLE FLAT FEET- A RANDOMIZED CONTROL TRIAL"

ABSTRACT

BACKGROUND: The foot is the weight bearing structure of the whole body and the arches of it helps in absorbing impact forces. Flexible Flat Feet is the condition which is related to the falling of the Medial Longitudinal arch (MLA) of the foot. With the collapse of the MLA the navicular bone shifts downwards and reverts. In order to compensate for the postural change of foot changes occur in intrinsic and extrinsic elements of the foot complex. This sequence of change follows a biomechanical chain of the whole lower limb. There are alot of studies done on flat feet with main emphasis on intrinsic muscle strength and in some cases few extrinsic muscle strength. No study has focused on the biomechanical chain of the lower limb even though it is leading to postural abnormalities that impact not only the foot but the entire lower limb. So here the need of the present study was to formulate a protocol which can inculcate the biomechanical implication and help to correct flat feet.

AIM: To formulate a comprehensive exercise protocol based on biomechanical considerations on foot posture and arch height in individuals with flexible flat feet

METHODOLOGY: Total 60 subjects were assessed for Flexible Flat Feet. Subjects were screened for flat foot by visual observation of the MLA lowering and then assessed for inclusion and exclusion criteria. Using the lottery chit approach, a simple random sampling procedure was used to divide the subjects into two groups. It was a single blinded study (participants- were not aware of group allocation). Group A (N=30) received a Comprehensive exercise protocol and Group B (N=30) received Conventional exercise protocol. The outcome measures Foot Posture Index-6 and Navicular Drop Test were assessed pre and post intervention. The exercise protocol was given for 5 days/ week for a period of 4 weeks.

RESULTS AND DISCUSSION: Both the groups showed significant reduction in NDT and FPI-6 ($p<0.05$). However, the reduction in NDT and FPI-6 was slightly more in Group-A ($p<0.05$) where subjects were given Comprehensive Exercise protocol and improvement was seen mainly on the Right foot.

CONCLUSION: From this study it can be concluded that a Comprehensive Exercise protocol is more effective as compared to conventional exercise protocol in improving Navicular Drop and Foot Posture in individuals with Flexible Flat feet.

KEYWORDS: Intrinsic and extrinsic foot muscles strengthening, Biomechanics, Foot Posture Index-6, Navicular Drop Test.

INTRODUCTION

The foot being the most vital sense organs in the human body and is essential for walking. [1] Three arches are formed by the arrangement of the foot's 26 bones, 10 major extrinsic tendons, over 30 joints, large number of intrinsic myotendinous units and ligaments. [2,3] In order to maintain weight in standing position, absorb impact, store and release energy, and adjust to changing loads during exercise, these structures must cooperate throughout the lifespan.[4] The foot arches can stretch and revert somewhat in response to pressure from above, allowing for flexibility. Two arches run longitudinally and one runs transversely. The scaphoid, third cuneiform, and inner three metatarsals are attached to the longitudinal arch, which originates at the calcaneal tuberosity. Five metatarsals, three cuneiform cuboid from the tarsus, and the scaphoid are where the transverse arch is attached. The foot is made up of several interconnected networks of neural, active, and passive systems that work together to form the foot core system. Plantar aponeurosis and ligaments make up the passive subsystems.The plantar calcaneonavicular ligament, as well as the long and short plantar ligaments, provide the ligamentous support. The foot muscles, both intrinsic and extrinsic, comprise the active subsystem. The muscles that own their sites of connection

inside the foot are known as the intrinsic foot muscles. While the tendons of the extrinsic foot muscles insert directly into the bones and ligaments, These muscles' muscular bellies are found on the outside of the foot complex. [12]

METHODOLOGY

- Total 60 subjects were assessed for Flexible Flat feet. Subjects were screened for flat foot by visual observation of the MLA lowering and then assessed for inclusion and exclusion criteria. Using the lottery chit approach, a simple random sampling procedure was used to divide the subjects into two groups. It was a single blinded study (Participants- were not aware of group allocation).
- The outcome measures Foot Posture Index-6 and Navicular Drop Test were assessed pre and post intervention.
- Group A had received Comprehensive exercise protocol with biomechanical considerations. Group B had received Conventional exercise protocol which was a control group. Written Informed consent was taken from all the subjects. The exercise protocol was given for 5 days/ week for a period of 4 weeks.

Navicular Drop Test (Non weight Bearing and Weight Bearing)

- Comprehensive Exercise Protocol [37, 38, 39, 40, 41]

1. Flexor Hallucis Longus and Flexor Digitorum Longus-Towel Toe Curl exercise
2. Abductor Hallucis- Short Foot exercise
3. Flexor Digitorum Brevis- Toe spread out exercise
4. Gluteus Maximus- Bilateral Squat exercise
5. Tibialis Anterior- Resisted ankle dorsiflexion exercise
6. Tibialis Posterior- Resisted plantar flexion and inversion exercise
7. Peroneus Longus- Resisted Eversion of foot exercise
8. Vastus Medialis- Knee extension exercise

- Conventional Exercise Protocol [39]

1. Flexor Hallucis Longus and Flexor Digitorum Longus-Towel Toe Curl exercise
2. Abductor Hallucis- Short Foot exercise
3. Flexor Digitorum Brevis- Toe spread out exercise

All the exercises were administered for 10 repetitions, 5 times a week, for 4 weeks.

RESULTS

In intragroup analysis the results of NDT, The navicular bone height increased from 6.93 mm to 9.83 mm in Right side, 7.00 mm to 9.87 mm on the Left side in Group A and increased from 6.70 mm to 7.83 mm on the Right side, 6.57 mm to 7.40 mm on the Left side in Group B after intervention and that indicates a significant improvement in both groups. FPI-6 also improved in both groups from 9.07 to 6.07 on the Right side, 7.83 to 5.40 on the Left side in Group A and 7.23 to 5.43 on the Right side, 6.73 to 5.07 on the Left side in Group B. The result showed statistical improvement ($p<0.05$) in NDT, and FPI-6 and also showed statistically significant results as compared to pre and post value in both groups, which suggested that a Comprehensive exercise protocol and Conventional exercise protocol both are effective. The current study's findings gave us information that a Comprehensive exercise protocol was more beneficial in improving the navicular drop and foot posture mainly in the Right foot.

DISCUSSION

The current study's findings give us information that a Comprehensive exercise protocol is more effective in improving the navicular drop and Foot Posture index-6 mainly in the Right foot. Thus the current study's findings reject the Null hypothesis (H_0) and accept Experimental Hypothesis (H_a). There are three subsytems - Active, Passive and Neural systems which work in coordination. Several types of exercise have been proposed to increase muscle activation with a focus on the active contribution of medial longitudinal arch. This training aids as a potential rehabilitation protocol. [42]

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Prevalence of Upper Cross Syndrome in Tailors – An Observational Study

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ABSTRACT:

Background: Upper Cross Syndrome can be defined as altered posture along with altered movement patterns. Upper Crossed Syndrome significantly shows forward head posture, hunching of the thoracic spine, rounded shoulders, winging of the scapula, and decreased mobility of the thoracic spine. In the tailoring profession, it involves continuous, repetitive tasks like cutting, assembling materials, pressing and finishing. These works are performed in a sitting posture with the head bent towards the sewing machine. Working in this faulty posture for a long time, it may lead to an alteration in posture. As a result, it may develop upper cross syndrome. **Aim of the study:** To find the prevalence of upper cross syndrome in tailors. **Materials and Methods:** In this observational study, 60 tailors were selected according to inclusion and exclusion criteria. Craniovertebral angle was measured using Kinovia software. Tightness of pectoralis major and minor muscles were assessed using a length test and flexibility of lateral flexion of cervical spine was assessed using a goniometer. Strength of lower trapezius and Deep neck flexor were measured by using a dynamometer. **Statistical Analysis**: The data was analysed in SPSS Statistics software. The percentage method was used to find out the prevalence. Result: 13% tailors had Upper Cross Syndrome. 20% tailors had pectoral muscles tightness and 50% had levator scapulae and upper trapezius tightness. Conclusion: Upper cross syndrome is found to be prevalent in tailors.

Keywords: Upper cross syndrome; Hand held dynamometer; Tailors; Craniovertebral angle

INTRODUCTION:

Upper trapezius and levator scapula tightness on the dorsal side crosses with pectoralis major and minor tightness is known as Upper Cross Syndrome (UCS). Weakening of the middle and lower trapezius transfers over into weakening of the ventral deep cervical flexors. Those who sit still for extended periods of time frequently get UCS.[1]

The primary cause of the syndrome is typically a muscular imbalance between the tonic and phasic muscles. Tonic muscles are those that are frequently tight or over-facilitated, while phasic muscles are those that are less activated, or more inclined to developing inhibition.[2]

In the tailoring profession, it involves continuous, repetitive tasks like cutting, assembling materials, pressing, and finishing. These works are performed in a sitting posture with the upper back curved forward and the head bent towards the sewing machine. Working in this faulty posture for a long time may cause pain in the upper back area, which may lead to an alteration in posture. As a result, maintaining improper posture for a prolonged period of time can lead to muscular imbalance and cause pain. Therefore, it may develop upper cross syndrome. Thus, the assessment of upper cross syndrome in tailors becomes extremely crucial if these problems are to be dealt efficiently.

MATERIALS AND METHOD:

An observational study was conducted, a total of 60 female tailors were included from different parts of Ahmedabad city. Ethical clearance was taken. Random sampling technique was used. All the volunteers signed written consent and were informed about purpose, nature, possible risks, and benefits of the present study.

INCLUSION CRITERIA: 1) Age range: 25-45 years.2) Tailors, who frequent or constantly had neck pain and shoulder pain more than 1 month. 3) Tailors had at least 3 years of work experience and more than 5 working hours.

EXCLUSION CRITERIA: cervical spine surgery, severe kyphosis or scoliosis, any pathology related to cervical spine, vertebral artery insufficiency, malignancy and with any neuromuscular disorders were excluded from the study.

To assess participants' posture alignment Craniovertebral angle (CVA):-

Starting position – stand-up or sitting .Photo was taken from 1 meter distance from the participant than measure the angle in Kinovia software. The line that is horizontal with C7 and the line that is connected with tragus makes an angle. This angle meets with CVA as shown in figure 1.[3]

Fig 1. CVA

Pectoralis Major Tightness: Participant position: Supine, with hands clasped together behind head; cervical spine should not flex any more than necessary to place clasped hands behind head.**Tape measure**: Using tape measure or ruler, measure distance (inches or centimeters) between olecranon process of humerus and supported surface as shown in fig.2.[4]

Fig 2. Pectoralis major length test

Pectoralis minor length test: Participant position: Supine, with arms at side; shoulders laterally rotated; forearm supinated (palms up); lumbar spine should be flat against support surface. **Tape measure alignment:** Palpate posterior acromial border using tape measure or ruler, measure distance (inches or centimeters) between posterior border of acromion process and support surface.[4]

Fig.3 Pectoralis minor length test

Fig 5. Deep neck flexors muscles strength test

Fig 4. Lower trapezius strength test

Lower trapezius strength test- hand held dynamometer: - Test position – prone with upper extremity diagonally overhead, in line with fibers of lower trapezius muscle. All participants were able to attain the test position against gravity. The handheld dynamometer force sensor was applied to the distal one third of the participant's radial forearm, and force will applied by the examiner in a downward direction, toward the floor, until the participant's maximal muscular effort was overcome. The maximum handheld dynamometer force reading will recorded. Two trials will be record consecutively on each upper extremity, with a 30-second rest between trials.[5]

Deep neck flexors muscles strength test- hand held dynamometer:-Testing position: Supine lying position on examining table. Hand held dynamometer was placed on the mandible. Participants are

instructed to nod their head such that their jaw pushed down onto the handheld dynamometer and to hold the resistance in the cranio-cervical flexion direction against the handheld dynamometer. Maximum force generated by the subject at that point was noted down. The process was repeated for 2 times & average of 2 repetitions was used for analysis.[6]

Range of motion of lateral flexion of cervical spine:- Participant position: Sitting erect. Goniometer alignment: Palpate the following landmarks and align goniometer accordingly Stationary arm: Perpendicular to floor. Axis: Spinous process of C7 vertebra. Moving arm: Posterior midline of skull. Read scale of goniometer. Patient/Examiner action: Patient performs active lateral cervical flexion. Examiner ensures that patient's shoulders do not elevate during movement.[4]

RESULT:

CONDITIONS	PREVALANCE
UPPER CROSS SYNDROME (DIAGONAL PATTERN pectoralis minor tight OR Neck flexors and scapular retractors weak)	13%
Pectoralis minor tightness Pectoralis major tightness	15% 20%
Lower trapezius weakness	26%
Upper trapezius and levater scapulae tightness	50%
Deep neck flexors weakness	16%

DISCUSSION:

In this study, the prevalence was found to be 13% among tailors, who had reduced CVA. Also, 50% of tailors had tightness in the upper trapezius and levator scapulae therefore they were more likely to develop upper cross syndrome.

The study titled "Prevalence of Upper Cross Syndrome in Laundry Workers" The Upper Crossed Syndrome (UCS) has been found to have a prevalence of 28% among laundry workers in Karad and the surrounding rural areas. According to this study the primary risk factor associated with this syndrome is the prolonged engagement in abnormal postures during work.[7]

In other study titled "Prevalence of Upper Cross Syndrome in Different Occupations" The prevalence was found to be 21.32% among desk workers, 13.21% among drivers, 15.11% among teachers, and 16.024% among housewives.[8]

CONCLUSION :

In conclusion most of the tailors are exposed to the risk of adopting poor postures which can lead to upper cross syndromes in future. The results of this study suggesting the importance of postural awareness among tailors.

LIMITATIONS: Small sample size and only female tailors were included.

CLINICAL IMPLIMENTATIONS: If any of the muscle functions are altered, it will help in early diagnosis and prevent any further damage to the posture, and it may be helpful to give any ergonomic advice.

FUTURE RECOMMENDATIONS: It should be done with larger sample size. Similar studies should be done for male tailors.

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"A Study to Find Out the Effect of Square Stepping Exercise versus Backward Walking on Balance and Gait Analysis in Subacute Stroke Patients – A Comparative Study"

Authors: Princee Ashwinbhai Bhanderi, Hiral Luv Mehta.

Abstract

Title: "A study to find out the effect of square stepping exercise versus backward walking on balance and gait analysis in subacute stroke patients – a comparative study"

Keywords: Subacute Stroke, Balance, Gait, Square Stepping Exercise (SSE), Backward Walking (BW), Performance Oriented Mobility Assessment (POMA)

Introduction: Stroke is a significant global health issue. In India, the annual stroke incidence ranges from 105 to 152 cases per 1,00,000 individuals. The signs and symptoms of stroke include, onset of weakness or numbness in the face, arm, or leg, often on one side of the body, trouble walking, loss of balance, spasticity, etc. This study is centered around enhancing the balance and gait analysis of stroke patients.

Materials and Methods: Total 30 stroke patients were selected as per inclusion and exclusion criteria by purposive sampling from various physiotherapy centers in and around Jamnagar and Rajkot. After taking consent and assessment of all participants, they were divided into two groups. Group A square stepping exercise (n=15) and Group B backward walking (n=15). The outcome measure was taken prior to the first day of the first week and post to the last day of the third week.

Results and Discussion: The Mann Whitney U test showed no significant differences between groups ($p = 0.92$). In intragroup analysis, the Wilcoxon test showed significant improvement in both groups ($p < 0.01$).

Conclusion: This study revealed that both square stepping exercise and backward walking are equally effective on balance and gait analysis in subacute stroke patients.

Introduction

Stroke (cerebrovascular accident [CVA]) is the sudden loss of neurological function caused by an interruption of the blood flow to the brain.[1] It is a significant global health issue, being a major reason for both deaths and lasting health problems.[2]

Stroke can be categorized into two types:

- Ischemic stroke
- Hemorrhagic stroke[1]

Around 80% of stroke cases are ischemic strokes, which occurs when a clot obstructs an artery supplying blood to the brain. During hemorrhagic stroke, blood vessels rupture, and blood leaks into or around the brain.[1]

Stroke is the fourth leading cause of death and the fifth leading cause of disability.[2] Globally, the annual stroke incidence ranges from 144 to 187 cases per 1,00,000 individuals.[3] In India, the annual stroke incidence ranges from 105 to 152 cases per 1,00,000 individuals.[2]

Atherosclerosis plays a significant role in cerebrovascular disease. It involves the build-up of plaque composed of lipids, fibrin, carbohydrates, and calcium within the walls of arteries. This accumulation gradually narrows the blood vessels, restricting proper blood flow.[1]

The signs and symptoms of stroke

- Onset of weakness or numbness in the face, arm, or leg, often on one side of the body
- Trouble walking
- Loss of balance
- Lack of coordination
- Spasticity
- Trouble speaking[4]

In essence, this study is centered around enhancing the balance and gait analysis of individuals who have had a stroke.[5,6,7]

After experiencing a stroke, the most prevalent issues among individuals are limitations in walking function and difficulties with balance. These challenges significantly decrease the overall quality of life for stroke survivors. Therefore, a key aim for stroke patients is to improve balance and gait in order to regain the ability to walk independently.[7]

Square stepping exercise and backward walking are a type of rehabilitation exercises that contribute to refining the walking patterns and ensuring better stability during movement.[8,9,10]

Shigematsu and Okura developed the Square Stepping Exercise (SSE) program primarily aiming to enhance participants' balance and gait, thereby reducing the risk of falls.[8] SSE requires only low-tech equipment and minimal investment, making it accessible and cost-effective. It has been found to offer several advantages over regular walking, especially in fall prevention and improving overall health. During SSE, individuals step forward, sideways, and diagonally, following the predetermined path on the square stepping mat, it provides visual feedback as it denotes the number patterns to be followed and individuals need to follow specific stepping patterns and sequences which improves balance, coordination, concentration and gait.[9]

Action observation training includes watching and mimicking the actions performed by others. This method is believed to be crucial in helping stroke patients recover their walking function. The areas in the brain linked to the mirror neuron system, such as the premotor and parietal regions, are engaged when observing motion. Backward Walking (BW) has shown to enhance both gait and balance. Backward walking involves walking in reverse, which challenges the body's proprioceptive pathways.[10]

Performance Oriented Mobility Assessment (POMA) developed by Tinetti provides a reliable measure of both balance and gait.[14] Balance test items include sitting balance, arises, standing balance, sternal nudge, and turning 360º, etc. Gait test items include initiation of gait, step length, foot clearance, step continuity, and path, etc.[1] Total score for balance assessment is 16, total score for gait assessment is 12 and total test score is 28. 25-28 suggested low risk of fall, 19-24 suggested medium risk of fall and less than 19 suggested high risk of fall.[11]

Need of The Study

Disability is commonly experienced as a sequel among stroke survivors. Certainly, following a stroke, individuals experience various physical challenges, such as, reduced proprioception, balance impairment, gait alteration, coordination deterioration, and a high risk of falling. These disabilities can significantly impact a person's ability to perform daily activities, engage in work, maintain independence, and participate in social interactions. Physical therapy and ongoing support are crucial in addressing these disabilities to improve the individual's quality of life and functional abilities after a stroke. The study addresses a critical need for innovative and effective rehabilitation strategy that directly target balance and gait issues in stroke. Both square stepping exercise and backward walking have shown effectiveness as standalone rehabilitation strategies in enhancing balance and gait analysis among stroke patients. The study aims to determine which rehabilitation strategy is more successful in enhancing balance and gait analysis among individuals who have had a stroke.

Aim of The Study

The aim of the study is to compare the effect of square stepping exercise and backward walking on balance and gait analysis in subacute stroke patients.

Materials

- Square stepping mats
- Hard armless chair
- Consent form
- Assessment form
- Measuring tape

- Talcum powder
- Six-meter walkway
- Chalk stick
- Wristwatch
- Pillow
- Plinth
- Scale
- Armchair
- Pen

Methods

- **Study Design:** A comparative study
- **Study Setting:** Physiotherapy centers in and around Jamnagar and Rajkot
- **Sampling Technique:** Purposive sampling
- **Study Population:** Subacute stroke patients
- **Study Sample:** Minimum 30 patients
- **Study Duration:** 6 months

Selection Criteria

Inclusion Criteria

- **Age:** 35 to 70 years
- Gender: Both male and female
- Individuals with subacute stroke
- Individuals who are capable of walking independently
- Individuals who are radiologically diagnosed with stroke
- Individuals who have complete the Timed Up and Go (TUG) test in less than 20 seconds

Exclusion Criteria

- Unstable cardiovascular conditions
- Recent fracture or surgery of lower limb

- Visual, auditory and vestibular impairments
- Individuals who are unwilling to participate
- Individuals who having cognitive and perceptual impairments

Procedure

Ethical clearance was obtained from the ethics committee, School of Physiotherapy, RK University (ECR/259/Indt/GJ/2016/RR-21) and study protocol registered in Clinical Trial Registry India (CTRI/2023/10/059141).

Total 30 stroke patients were selected as per inclusion and exclusion criteria by purposive sampling from various physiotherapy centers in and around Jamnagar and Rajkot. Prior to enrolment, all the patients were explained about procedure involved in the study. The patients were also informed about the upcoming training sessions scheduled for the following three weeks. Consent form was obtained from the patients before the study who fulfilled the inclusion and exclusion criteria. After taking consent and assessment of all subjects were divided into 2 groups.

- Group A Square Stepping Exercise (n=15)
- Group B Backward Walking (n=15)

The outcome measure was taken prior to the first day of the first week and post to the last day of the third week.

Intervention

Group A - Square Stepping Exercise

The patients in group A received square stepping exercise in addition to conventional therapy with each session of 20 minutes of square stepping exercise under supervision for 5 sessions per week for 3 weeks. SSE consisted of performing multidirectional step patterns on a mat which was divided into 40 squares, each measuring 25 cm (100 x 250 cm). The patterns of SSE used in this study were elementary 1 and elementary 2 (each for 10 minutes). Individuals were instructed to step from one end of the mat to the opposite end following a specified step pattern provided to them. Once the individuals reached the end of the mat by following the step pattern, they were asked to walk off the mat in a regular manner and then prepare for the next step. Individuals repeated each step pattern 4 to 10 times to ensure that they could complete the pattern correctly.[9]

Group B - Backward Walking

The patients in group B received backward walking in addition to conventional therapy with each session of 20 minutes of backward walking under supervision for 5 sessions per week for 3 weeks. Individuals were instructed to watching and mimicking the actions demonstrated by therapist. Individuals repeated backward walking 4 to 10 times to ensure that they could complete six-meter backward walking easily.[10]

Figure 8: Subject performing TUG test

Figure 9: Subject performing POMA scale

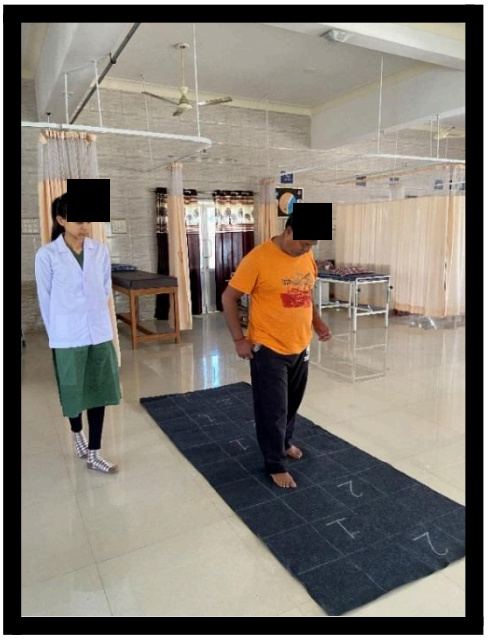

Figure 10: Subject performing SSE (elementary 1)

Figure 11: Subject performing SSE (elementary 2)

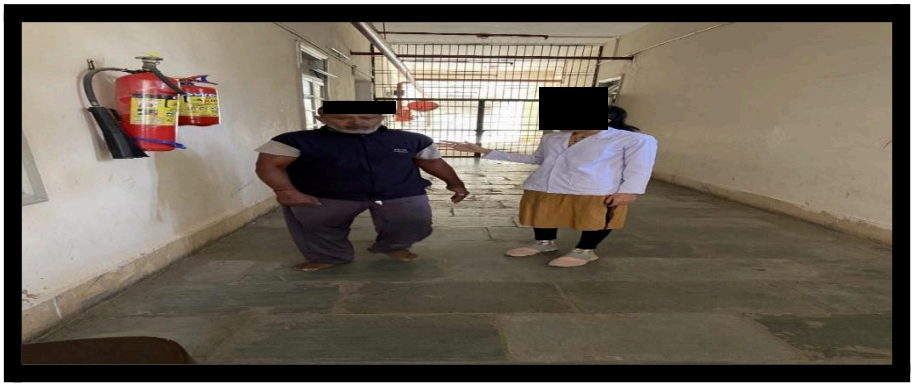

Figure 12: Subject performing backward walking

Results

SPSS version 26 for windows was used for statistical analysis. The Shapiro-Wilk test was used to determine whether the data was normal, and the results suggested that the data was non-parametric for the Performance oriented mobility assessment scale. A p-value <0.05 were considered statistically significant. The within group analysis was conducted using the Wilcoxon Signed Rank test, while the between group analysis was conducted using the Mann-Whitney U test.

The study included a total of 30 subacute stroke patients, with 15 patients in Group A receiving square stepping exercise and 15 patients in Group B receiving backward walking.

Statistical Analysis

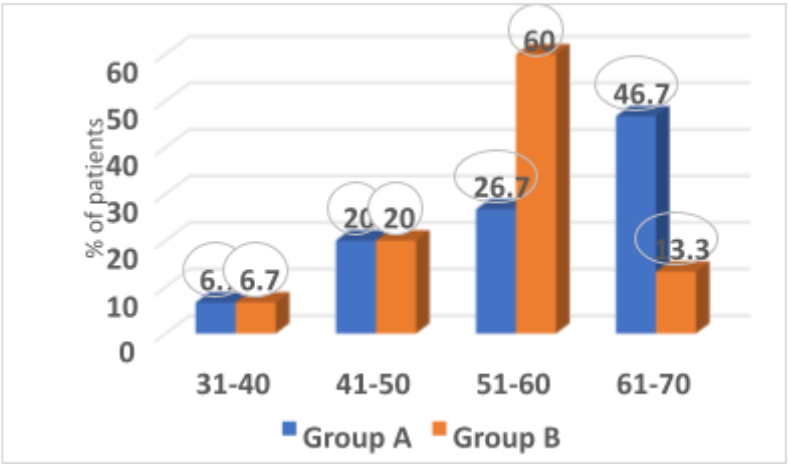

Figure 13: Age group wise distribution of patients (N=30)

Figure 13 show that, the age range of patients in both groups was from 31 to 70 years. The majority of patients in Group A (46.7%) belonged to the 61-70 years age group, followed by 26.7% in the 51-60 years age group. In contrast, Group B had the highest proportion of patients (60%) in the 51-60 years age group, with only 13.3% in the 61-70 years age group.

In summary, while there were some variations in the age group proportions between the two study groups, the overall age distributions were comparable, with no statistically significant differences. This suggests that the two groups were well-matched in terms of age, allowing for a fair comparison of the interventions' effects on balance and gait analysis.

Figure 14: Gender wise distribution of patients (N=30)

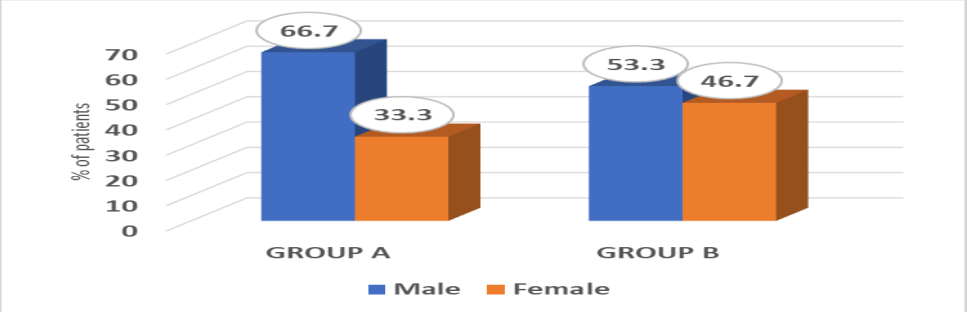

Figure 14 show that, In Group A, 66.7% (10 out of 15) of the patients were male, while 33.3% (5 out of 15) were female. In Group B, the gender distribution was more balanced, with 53.3% (8 out of 15) being male and 46.7% (7 out of 15) being female.

The Chi-Square test was used to assess if there was a significant difference in the gender distribution between the two groups. The test statistic ($\chi 2 = 0.55$, df = 1) and the corresponding p-value (p = 0.45) indicate that the difference in gender distribution between Group A and Group B was not statistically significant.

In summary, while there was a slightly higher proportion of male patients in Group A compared to Group B, the overall gender distribution between the two groups was not significantly different. This suggests that the two groups were well-matched in terms of gender, which is an important consideration when comparing the effects of interventions between groups.

Table 1: Comparison of Performance Oriented Mobility Assessment scale within group (N=30)

Group	Performance Oriented Mobility Assessment Scale								Test Statistics Wilcoxon Signed Rank Test	
	Before Intervention				After Intervention					
	Median	IQR (Q1-Q3)	Mean	SD	Median	IQR (Q1-Q3)	Mean	SD	Z value	p value
GROUP A (n=15)	22	20-22	21.47	1.45	25	24-26	24.93	1.16	-3.47	<0.01

Square Stepping Exercise										
GROUP B (n=15) Backward Walking	21	20-22	20.73	1.33	24	23-25	24.27	1.43	-3.49	<0.01

Group A (Square Stepping Exercise)

- The Wilcoxon Signed Rank test showed a statistically significant improvement in POMA scores within Group A after the square stepping exercise intervention ($Z = -3.47$, $p < 0.01$).

Group B (Backward Walking)

- The Wilcoxon Signed Rank test also showed a statistically significant improvement in POMA scores within Group B after the backward walking intervention ($Z = -3.49$, $p < 0.01$).

This suggests that both interventions were effective in improving balance and gait in subacute stroke patients, as measured by the POMA scale.

Table 2: Comparison of difference in Performance Oriented Mobility Assessment scale between groups (N=30)

Group	**Groups**				**Test Statistics Mann Whitney U test**	
	GROUP A (n=15) Square Stepping Exercise		**GROUP B (n=15) Backward Walking**			
	Median	**IQR (Q1-Q3)**	**Median**	**IQR (Q1-Q3)**	**Z value**	**p value**
Difference in Performance Oriented Mobility Assessment Scale after intervention	4	3-4	3	3-4	-0.09	0.92

Table 2 show that, in Group A, the median difference in POMA scores after the intervention was 4, with an IQR of 3-4. In Group B, the median difference in POMA scores after the intervention was also 3, with an IQR of 3-4.

The Mann-Whitney U test was used to assess if there was a significant difference in the POMA score differences between the two groups. The test statistic (Z = -0.09) and the corresponding p-value (p = 0.92) indicate that the difference in POMA score improvements between Group A and Group B was not statistically significant.

In summary, while both interventions led to improvements in POMA scores within their respective groups (as shown in Table 1), the extent of improvement was not significantly different between the square stepping exercise (Group A) and backward walking (Group B) interventions. This suggests that both interventions were similarly effective in improving balance and gait, as measured by the POMA scale, in subacute stroke patients.

Discussion

In this study, balance and gait has improved in both group but results suggested that there is no significant difference between these two groups. So, the alternative hypothesis is rejected and null hypothesis is accepted which suggest that there is no significant difference in the effect of square stepping exercise and backward walking on balance and gait analysis in subacute stroke patients.

Effectiveness of Square Stepping Exercise

According to Cha HJ et al (2022), SSE involves repetitive stepping movements that can improve lower extremity strength, endurance, and coordination.[12] These factors are essential for improving balance and gait abilities, as stroke often results in muscle weakness, decreased endurance, and impaired motor control.

According to Nokham R et al (2017), the varying step lengths and directions required in SSE promote weight-shifting, which is crucial for maintaining balance during functional activities.[13]

According to Shigematsu et al (2008), SSE requires only low-tech equipment and minimal investment, making it accessible and cost-effective. While performing SSE on the square stepping mat, it provides visual feedback as it denotes the number patterns to be followed and individuals need to follow specific stepping patterns and sequences which improves balance, coordination, concentration, and gait.[9]

Effectiveness of Backward Walking

According to Bansal K et al (2023), backward walking involves a greater activation of lower extremity muscles, particularly the hip extensors and ankle plantar flexors, compared to forward walking. This increased muscle activation can contribute to improvements in lower extremity strength, endurance, and coordination, which are crucial for balance and gait abilities.[14]

According to Yiyeop MOON et al (2022), among the various methods of gait training, backward walking training is an important and feasible approach used in stroke rehabilitation to improve balance and gait. Backward walking involves walking in reverse, which challenges the body's proprioceptive pathways and improve gait as well as static and dynamic balance. The areas in the brain linked to the mirror neuron system, such as the premotor and parietal regions, are engaged when observing motion. Action observation is related to understanding the actions and intentions of others, along with motor learning.[10]

Additionally, both interventions incorporate elements that can improve lower extremity strength, endurance, and coordination, which are crucial for balance and gait abilities. The combination of these factors may have contributed to the similar effectiveness of the interventions in improving balance and gait, as measured by the POMA scale.

Limitations	**Further Recommendations**
Small sample size	Study can be done in other neurological disorders.
Shorter study duration	Study can be done in acute or chronic stroke patients.

Conclusion

The results of the comparative study concluded that there is no significant difference between group A (square stepping exercise) and group B (backward walking) on balance and gait analysis in subacute stroke patients. Therefore, both square stepping exercise and backward walking are equally effective on balance and gait analysis in subacute stroke patients.

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"Impact of Neuropathic Complications on Musculoskeletal Health in Type 1 And Type 2 Diabetes Patients: Observational Study"

Ruchi Bhuva, Mansi Kotecha, Krupa Tank

ABSTRACT

BACKGROUND: Diabetes mellitus, marked by chronic hyperglycemia due to insulin-related defects, disrupts metabolism. Symptoms include increased urine frequency, thirst, weight loss, hunger, and blurred vision, with growth issues and infection susceptibility. Short-term complications include life-threatening hyperglycemia consequences. Long-term complications involve nephropathy, peripheral neuropathy, amputations, Charcot joints, autonomic neuropathy, and retinopathy. Diabetic patients face elevated risks of cardiovascular diseases, hypertension, and abnormalities in lipoprotein metabolism. Diabetic neuropathy, mainly chronic distal symmetric polyneuropathy (DSPN), constitutes about 75% of cases. **AIMS:** To find out the musculoskeletal changes in the person with diabetic neuropathy suffering from IDDM or NIDDM type of diabetes mellitus. **OBJECTIVE:** 1) To find out the prevalence of musculoskeletal disorders in diabetes mellitus. 2) To find out the prevalence of musculoskeletal disorders in IDDM and NIDDM. 3) To find out the musculoskeletal changes in context to the chronicity of DM. M**ETHODOLOGY:** In this study, 100 diabetic patients were taken by purposive sampling method which was examined for peripheral diabetic neuropathy through the MNSI scale. The MNSI identified individuals with a score greater than 2, indicating potential chronicity of diabetes and peripheral neuropathy. Subsequently, these individuals were further assessed for musculoskeletal disorders using the Nordic musculoskeletal questionnaire, revealing the severity of diabetic neuropathy based on age and the prevalence of musculoskeletal disorders by region. **RESULT:** We examined 100 subjects to investigate musculoskeletal disorders and the impact of neuropathy in both IDDM and NIDDM, employing the MNSI and Nordic scales. The larger prevalence of musculoskeletal disorder in shoulder joint which is 17.7%. Followed by knee 16.8%, lower back 14.5%, ankle 11.9%, neck 11.3%, upper back 8.4%, wrist 7.1%, hip 6.8% and elbow 5.5% respectively. **CONCLUSION:** The Prevalence of diabetic neuropathy increases with both age and duration of diabetes, among them few are having musculoskeletal disorders. It has also shown that the prevalence of diabetic neuropathy and musculoskeletal disorder both are more common in type 2 DM than in type 1 DM.

KEYWORDS: Diabetic neuropathy, musculoskeletal disorder, type 1 and type 2 diabetes mellitus.

INTRODUCTION:

Diabetes mellitus is characterized by chronic hyperglycemia with disturbance of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both. The two broad categories of diabetes are designated as insulin dependent and non-dependent. IDDM is the result of complete or near total insulin deficiency. NIDDM is heterogeneous group of disorders characterized by varying degrees of insulin resistance, impaired insulin secretion, and increased glucose production.[1]

Diabetes is associated with numerous musculoskeletal disorders and inefficient control of diabetes may cause persistent musculoskeletal pain over time. Neuropathic joints are commonly observed in the foot and ankle of patients. Diabetic polyneuropathy, rheumatoid arthritis (RA)-associated pain are other complications. In diabetic patients with osteoarthritis (OA) involving even non-weight bearing joints in patients with type 2 diabetes, indicating a common pathophysiologic mechanism connecting these two clinical conditions.[2] Factors including advanced glycation end-stage products (AGEs) and markers of oxidative stress could contribute to pain associated with low-grade inflammation.[3] The development of periarticular thickening of skin on the hands and limited joint mobility is associated with diabetes and can lead to significant disability.[4]

METHOD:

100 Subjects were selected in this study according to the inclusion and exclusion criteria. Before that conformed diagnosis of diabetes has been carried out by laboratory testing. All the individuals with chronic diabetes mellitus are included in this study. We have taken 100 subjects from M.D.C and Apex Diabetes Hospital. All the subjects were thoroughly explained about the study.

METHOD OF COLLECTION OF DATA:

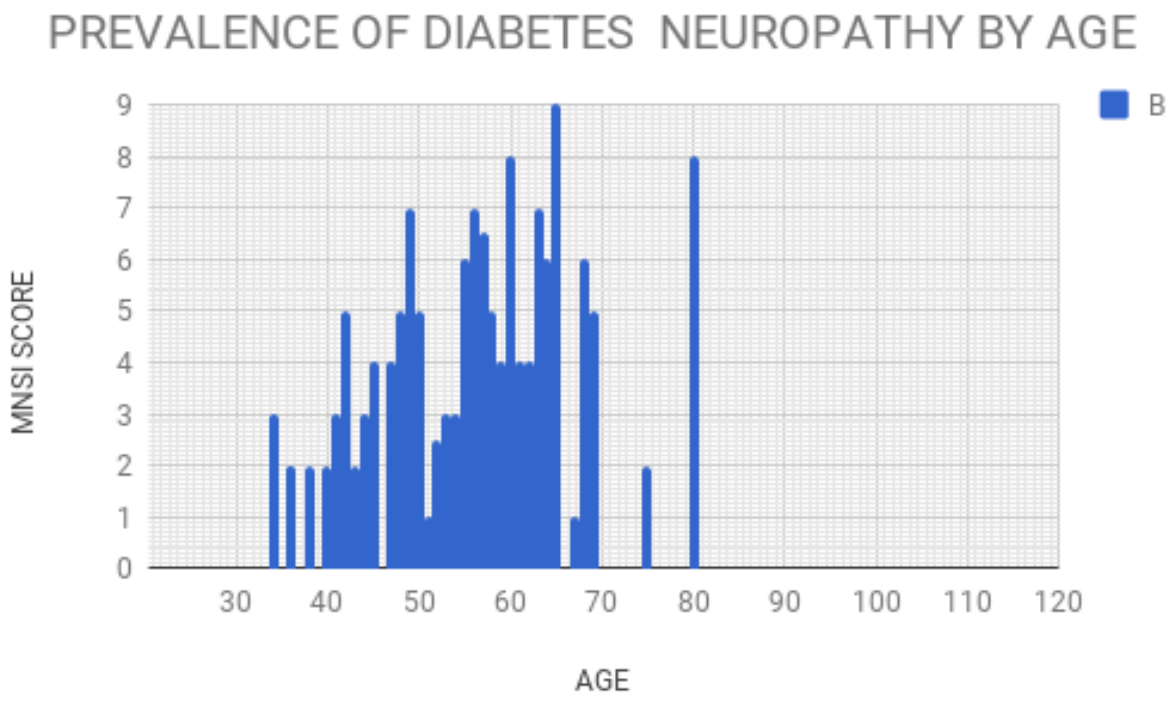
The data collection method employed for this study was an observational approach conducted at the Mori Diabetes Center and the Apex Diabetes Hospital, both located in Rajkot city. The study population consisted of 100 diabetic patients from Rajkot, and the data collection spanned over a period of 6 months. Purposive sampling technique was utilized to select participants for inclusion in the study.

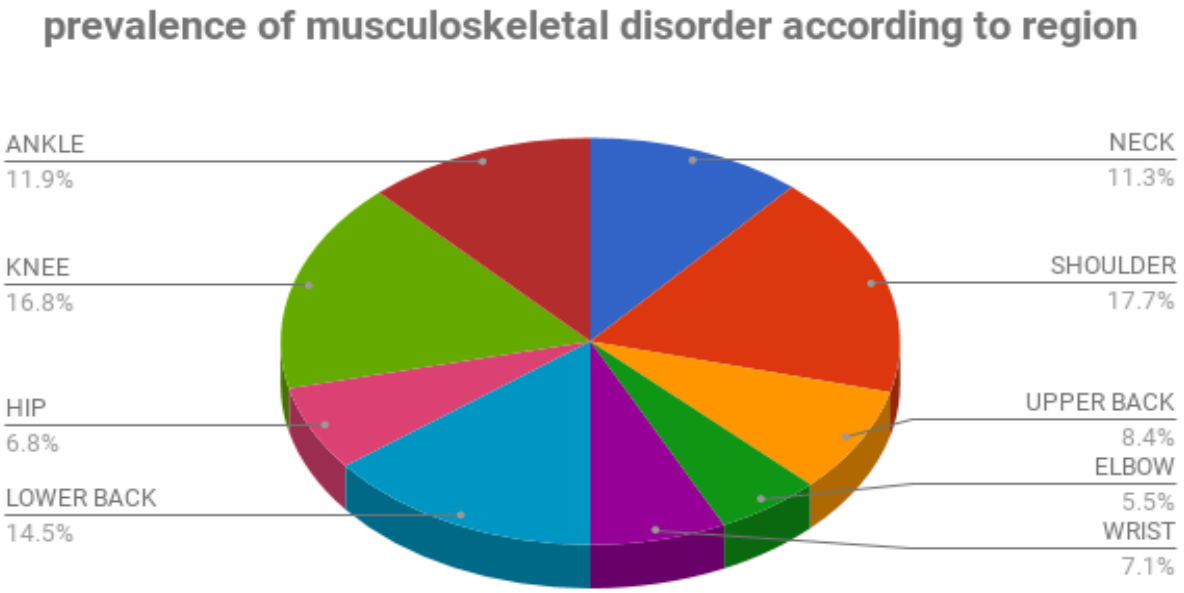
The study's criteria for selection were delineated into inclusion and exclusion categories. Patients meeting the inclusion criteria had either Insulin-Dependent Diabetes Mellitus (IDDM) or Non-Insulin Dependent Diabetes Mellitus (NIDDM), confirmed diabetic neuropathy, and a Michigan Neuropathy Screening Instrument (MNSI) score exceeding 3. Conversely, those excluded from the study were individuals with gestational diabetes, under the age of 20, chronic alcoholics, or those with peripheral neuropathy stemming from other identifiable causes.

RESULTS:

Diabetic neuropathy is found to be most prevalent among the diabetic patient. To find out the prevalence of musculoskeletal disorder and impact of diabetic neuropathy in IDDM and NIDDM we were taken 100 subjects for the study. Method is used to observe the prevalence of musculoskeletal disorder and impact of diabetic neuropathy in IDDM and NIDDM. For that we have taken two scales, MNSI and Nordic. The purpose of taking MNSI was to get knowledge about chronicity of Diabetes Mellitus causing peripheral neuropathy in a particular individual. After taking MNSI all the individuals scoring greater than 2 were further examined for musculoskeletal disorders by Nordic musculoskeletal questionnaire. The result shows the severity of diabetic neuropathy according to age and prevalence of musculoskeletal disorder according to region.

SR. NO.	AGE GROUP	NO. OF PATIENTs
1	21-25	2
2	26-30	3
3	31-35	3
4	36-40	8
5	41-45	11
6	46-50	9
7	51-55	13
8	56-60	16
9	61-65	16
10	66-70	11
11	71-75	5
12	76-80	2
13	81-85	1





The graph shows larger prevalence of musculoskeletal disorder in shoulder joint which is 17.7% followed by knee, 16.8% further adding on lower back has 14.5%. Apart from that ankle joint, neck, upper back, wrist, hip, elbow has 11.9%, 11.3%, 8.4%, 7.1%, 6.8% and 5.5% respectively.

Discussion:

The research investigating the correlation between diabetic neuropathy and musculoskeletal disorders among a diverse demographic of diabetic patients provides valuable insights into the complex interplay between diabetes mellitus and its associated complications. By encompassing individuals aged 18 to 90, including both genders and those with Insulin Dependent Diabetes Mellitus (IDDM) and Non-Insulin Dependent Diabetes Mellitus (NIDDM), this study aimed to elucidate the prevalence and distribution of musculoskeletal disorders induced by diabetic neuropathy. Utilizing established assessment tools such as the Michigan Neuropathy Screening Instrument (MNSI) and the NORDIC Musculoskeletal Questionnaire facilitated a comprehensive evaluation of the patients' conditions.

The findings of this study, derived from observing and assessing 100 chronic diabetic patients, reveal a significant prevalence of musculoskeletal disorders across various anatomical regions. Notably, the shoulder joint emerged as the most affected area, with a prevalence rate of 17.7%. This aligns with previous research highlighting the vulnerability of diabetic patients to shoulder-related musculoskeletal issues. Studies by Smith et al. (2014) have reported a higher incidence of adhesive capsulitis, commonly known as frozen shoulder, in diabetic individuals, underscoring the need for targeted screening and intervention strategies.[10]

Moreover, the knee joint exhibited a notable prevalence rate of 16.8%, emphasizing the impact of diabetic neuropathy on weight-bearing joints crucial for mobility and daily functioning. Consistent with these findings, research by O'Reilly et al. (2013) and Andersen et al. (2013) has elucidated the association between diabetes mellitus and knee osteoarthritis, attributing it to various factors including inflammation, altered biomechanics, and metabolic dysregulation. [9][13][14]

The lower back, with a prevalence rate of 14.5%, represents another area significantly affected by musculoskeletal disorders in diabetic patients. This finding is consistent with studies by Wai et al. (2009) and Hartvigsen et al. (2018), which have highlighted the heightened risk of lower back pain and degenerative spinal conditions in individuals with diabetes mellitus. [10] The multifactorial nature of diabetic neuropathy, encompassing vascular, neuropathic, and inflammatory mechanisms, likely contributes to the increased susceptibility to musculoskeletal issues in the lumbar spine region. [11]

While the shoulder, knee, and lower back emerged as the most prevalent sites of musculoskeletal disorders in diabetic patients, other anatomical regions also exhibited notable prevalence rates. The ankle joint, neck, upper back, wrist, hip joint, and elbow, though less affected compared to the aforementioned areas, underscore the systemic impact of diabetes mellitus on the musculoskeletal system. Research by Almurdhi et al. (2015) and Andersen et al. (2013) has documented the prevalence of peripheral neuropathy and musculoskeletal abnormalities in diabetic individuals, highlighting the need for comprehensive assessment and management strategies targeting diverse anatomical regions. [12]

The identification of shoulder problems as the most common musculoskeletal disorder among diabetic patients necessitates further investigation into the underlying mechanisms and risk factors associated with this phenomenon. Research by Smith et al. (2014) has implicated factors such as chronic hyperglycemia, insulin resistance, and microvascular complications in the pathogenesis of shoulder-related musculoskeletal issues in diabetes mellitus. [2]

In conclusion, this study contributes to our understanding of the prevalence and distribution of musculoskeletal disorders induced by diabetic neuropathy, emphasizing the need for proactive screening, early intervention, and multidisciplinary management approaches. By elucidating the complex interplay between diabetes mellitus and musculoskeletal complications, this research informs clinical practice guidelines aimed at optimizing patient outcomes and enhancing the quality of life for individuals living with diabetes.

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"Effect of Intrinsic Muscle Exercise Combined with Hamstring Stretching and Gluteus Maximus Strengthening On The Morphology, Balance, And Functionality Of The Foot With Heel Pain. An Interventional Trial"

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ABSTRACT

BACKGROUND: Lowering of medial longitudinal arch known as pes planus or flatfoot. There is research supporting that the kinematic chain with the foot and proximal segment of the body impacts functional status. Intrinsic and extrinsic foot muscles play important roles in foot function and balance. This study focused on analyzing the effect of intrinsic foot muscle exercise combined with hamstring stretching and gluteus maximus strengthening on navicular drop, foot function, hamstring tightness, and static and dynamic balance.

AIM: To check the effect of intrinsic foot muscle exercise combined with hamstring stretching and gluteus maximus strengthening in college-going students with flat foot and hamstring tightness.

METHOD: The population was college-going students. Subjects were screened based on convenient sampling. 267 students were screened with sit and reach tool for hamstring tightness and 42 students were selected according to inclusion and exclusion criteria. Informed written consent was taken from the students. Pre-treatment was assessed with a navicular drop test, foot functional index, and sense balance sense move balance mini board. Intrinsic foot muscle exercise, gluteus maximus strengthening, and hamstring stretching were taught to the subjects. Exercise was given for 6 weeks. After 6 weeks reassessment was done by the navicular drop test, foot functional index, hamstring tightness, and static and dynamic balance.

RESULT: According to that parametric data was checked by paired t-test and non-parametric data was analyzed by Wilcoxon sign rank test. Navicular drop, foot functional index, and hamstring tightness showed significant improvement after intervention but static and dynamic balance did not show statically improvement after exercise. However, the mean value of static and dynamic balance was improved in some components.

CONCLUSION: intrinsic foot muscle exercise combined with hamstring stretching and gluteus maximus strengthening improves navicular drop, foot function, and hamstring tightness. However, some component of static and dynamic balance was improved statistical.

INTRODUCTION

- The most popular type of physical activity is sports participation. The benefits of sports participation enhance mental and physical health. Additionally, aerobic capacity, muscle mass, and body fat improve in young age groups in both genders. Insufficient physical activity is a major cause of health issues[1-5]. Nowadays, the modern lifestyle plays an important role in being

physically inactive. Many chronic disorders such as coronary artery disease, stroke, type 2 diabetes, and mental illness occur due to physical inactivity[11-12]. Systematic disorders like hypertension are worse in a population with a sedentary lifestyle and the value is better in a physically active population[6].

- There are 24% of the world's population, including young people aged 10-24 years[6]. Low activity issues in young adults grow with the wealth of societies and urban developments. Obesity is a global problem affecting 300 million people in the world, the risk of death, and life expectancy have increased. It is a fact that the lower extremity especially the knee bears the body weight in static and dynamic activities[16-18].

- The knee joint is important in supporting the body and transmitting its weight. Knee joint disorders are divided into traumatic and non-traumatic injuries. Muscle imbalance, particularly involving the knee joint's quadriceps and hamstring muscle groups, is a key factor in these disorders. Weakness in the quadriceps is directly linked to knee injuries such as osteoarthritis, while hamstring tightness is observed in individuals with or without injuries[6,16].

- The prevalence of hamstring tightness is remarkable among adolescents aged 18-25 years[20]. Hamstring tightness occurs due to a restricted range of motion and other causes of tightness are related to various orthopedic conditions such as hamstring strain, plantar fasciitis, patellofemoral soreness, and patellar tendinopathy. Prolonged sitting habits can lead to a decrease in hamstring mobility. The tight hamstring affects the lumbopelvic rhythm and indirectly impacts sacroiliac joint stability. Apart from this one of the important causes of hamstring tightness is dysfunction in the planter region of the foot such as short arched foot. A planter aspect of the foot consists of two arches longitudinal and transverse. The most frequently seen foot problems include pes planus (flat foot) and pes cavus (high-arched foot).[23-28]

- The prevalence of flat feet can vary with age, gender, BMI, and many more. The characteristics of flat feet an extremely low arched foot which causes the risk of hallux valgus, hammer toe, patella-femoral pain, and other musculoskeletal disorders. The prevalence of flexible flat feet in young adults aged 18 to 21 is 13.6% with a higher prevalence in females (14.4%) than males (12.8%).[36]

- Dysfunction in the distal kinematic chain can impact proximal body segments. For instance, foot pronation can modify the biomechanics of the upper joint. Some disorders related to flat feet include foot pain, ankle arthritis, hip and knee injuries, and waist pain due to prolonged walking and movements[14,23]. Apart from this various knee disorders like genu varum and valgum are seen in many individuals. People with these deformities are at risk of patello femoral joint

damage, and tibiofemoral joint OA and compensatory changes have been seen in ankle and foot joints.[16,19]

- The arches of the foot play an important role in foot flexibility to absorb impact and pressure generated against ground reaction force, apart from that it is also important for postural stability and protecting the articular surfaces of the joints of the lower limb.[27]

NEED OF THE STUDY

- Muscular disorders like hamstring tightness and flat feet are common among young adults. While there is no specific medical treatment, the prolonged existence of these disorders can impact the performance of daily activities.
- Individuals with hamstring tightness typically engage in hamstring stretching and gluteus maximus strengthening exercises. Similarly, those with flat feet often perform exercises targeting extrinsic foot muscles.
- However, a combination of hamstring stretching with gluteus maximus strengthening and intrinsic foot muscle exercise is often neglected in individuals with flat feet. So need of the study is to check the combined effect of hamstring stretching with gluteus maximus strengthening and intrinsic and extrinsic foot muscles exercise in a person with flat feet and hamstring tightness.

Materials:

- Consent form
- Assessment form
- Pen
- Chair, towel
- Index card
- Ruler scale
- Sit and reach tool
- Pedalo Sensamove sense balance mini board
- Laptop

Methodology:

- **Study design:** Interventional study
- **Study setting:** RK University, Rajkot
- **Source of data collection:** RK University, Rajkot
- **Study population:** college students with flat foot and hamstring tightness, aged between 18 to 25 years

- **Sampling technique:** purposive sampling technique
- **Study duration:** 6 weeks
- **Sample size:** 42 subjects

Inclusion criteria:

- Participants with flexible flatfeet (unilateral/ bilateral)
- Age group 18 years to 25 years.
- Subject with hamstring tightness

Exclusion criteria:

- Recent foot injury
- Subjects with previous foot surgery
- Uncooperative subject

Procedure

The ethical committee of the School of Physiotherapy, RK University, Rajkot approved this study. The research was registered in the Clinical Trial Registry-India (CTRI) and the registration number is CTRI/2023/10/059327. 267 students were screened with sit and reach tool for hamstring tightness and 42 students were selected according to inclusion and exclusion criteria. The students gave their written consent. Pre-treatment assessed with a navicular drop test, foot functional index, NPRS and sense balance sensa move balance mini board.

Conventional exercise program

1. Short foot exercise (2 sets 20 repetitions)
2. Great toe extension (2 sets 20 repetitions)
3. Ankle plantar flexion (2 sets 20 repetitions)
4. Ankle dorsi flexion (2 sets 20 repetitions)
5. Towel curling (2 sets 20 repetitions)
6. Inversion (2 sets 20 repetitions)
7. Eversion (2 sets 20 repetitions)
8. Object pickup (2 sets of 20 repetitions)
9. Hip abduction (2 sets 20 repetitions)
10. Hamstring stretching (2 sets 3 repetitions)

- Every exercise was administered for six weeks, five times a week, twice a day. In progression, the number of exercise repetitions was increased by 15 after every two weeks.

1. **Short foot exercise:** to perform this exercise in a sitting position, subjects have to do shortening the foot by drawing in the metatarsal heads towards the heel without flexing the toes and holding an isometric contraction for 10 seconds during each repetition.

Figure 1 Short foot exercise

2. **Great toe extension:** to perform this exercise in a sitting position, subjects have to extend the great toe by pulling 1st metatarsophalangeal joint in the upward direction and holding this position for 10 seconds during each repetition.

Figure 2 Great Toe Extension

3. **Ankle plantar flexion:** to perform this exercise in the supine position, subjects have to perform flexion of the ankle joint in the plantar direction and hold it for 10 seconds in each repetition.

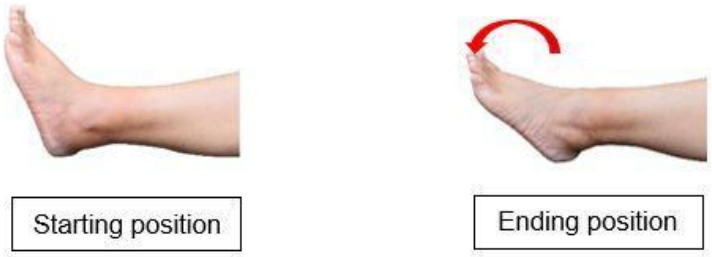

Figure 3 Ankle plantar flexion

4. **Ankle dorsi flexion:** to perform this exercise in the supine position, subjects have to perform flexion of the ankle joint opposite to the plantar direction and hold it for 10 seconds in each repetition.

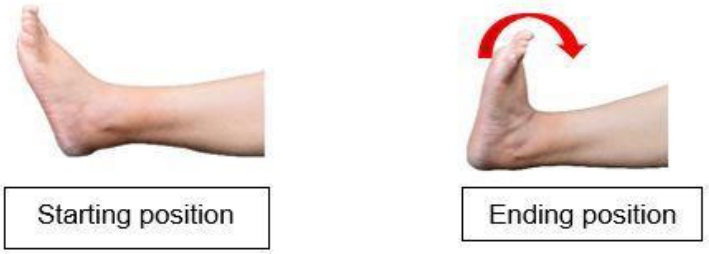

Figure 4 Ankle dorsi flexion

5. **Towel curling:** this exercise is done in a sitting position; subjects have to curl their toes on a towel. A towel was placed on a silk surface. There was a 10-second holding period between each repetition.
6. **Inversion:** to perform this exercise in the supine position, subjects have to perform rotation of the ankle joint in the inward direction and hold it for 10 seconds in each repetitions

7. **Eversion:** to perform this exercise in the supine position, subjects have to perform rotation of the ankle joint in the outward direction and hold it for 10 seconds in each repetition.

Figure 7 Eversion

8. **Object pickup:** to perform this exercise in a sitting position, subjects have to pick up a small pebble with their toe, hold it for 10 seconds, and release it.

Figure 8 Object pickup

9. **Hip abduction:** to perform this exercise, the position is side-lying. subjects have to elevate his/her hip in the upward direction. The knee should be extended while maintaining the position. Abduction should be maintained for 10 seconds.

10. **Hamstring stretching:** to perform this stretching, the exercise position is in standing, subjects have to put one limb on the stool which is placed in front of them. The knee should be extended and try to touch the toes of the same limb while the other limb should straighten on the floor. This position is maintained for the 30 seconds of 3 repetitions.

Figure 10 Hamstring stretching

RESULT

STATISTICAL SOFTWARE

Statistical analysis was done by using SPSS (statistical package for the social sciences) statistical software version 25(IBM SPSS). Graphs and tables were created using Microsoft Excel 2016.

- **Statistical test:**

To check the normality of data the Shapiro–Wilk test was used. The data of NDT (navicular drop test), FFI (foot functional index) and sensamove balance board were non-parametric types of data. Whereas sit and reach test and NPRS data were the parametric type of data.

Both parametric and non-parametric tests were used in the statistical analysis. The non-parametric Wilcoxon signed ranks test and parametric paired t-test were used. Confidence interval (CI) was considered to be 95% and the significance level was set at 0.05(p-value).

Gender	Frequency	Percent
female	29	69
male	13	31
Total	42	100

Analysis of Sit and Reach Test (N=42)

Sit and Reach Test (cm)						Test Statistics Paired T-test	
Before Intervention		After Intervention		Mean Difference	95% CI of Mean Difference		
Mean	SD	Mean	SD			t value	p-value
17.12	4.05	24.47	4.07	7.34	6.45-8.24	16.51	<0.01

Based on the paired t-test analysis, the mean difference between the sit and reach test scores before and after the intervention was 7.34 cm, which was statistically significant (p-value < 0.01).

Analysis of Navicular drop Test (N=42)

x									Test of Wilcoxon Signed Rank	
Side	Before Intervention				After Intervention					
	Median	IQR	Mean	SD	Median	IQR	Mean	SD	Z value	p-value
Right Foot	10	2	9.33	1.84	15	3	15.4	2.73	-5.59	<0.01
Left Foot	9.5	2.25	9.3	1.73	15	4	15.14	2.71	-5.6	<0.01

- The improvement in the study participants' plantar arch (i.e., reduction in flatfoot condition) is indicated by a rise of the mean and median navicular drop values following the intervention.

Analysis of Foot Functional Index (N=42)

Foot Functional Index (%)								Test Statistics Wilcoxon Signed Rank Test	
Before Intervention				After Intervention					
Median	IQR	Mean	SD	Median	IQR	Mean	SD	z value	p-value
14.47	14.05	16.59	10.59	8.23	9.86	10.02	9.34	-4.63	<0.01

Static Balance	Time (Second)	Before intervention				After intervention				Test statistics Wilcoxon sign rank test	
		Mean	SD	Median	IQR	Mean	SD	Median	IQR	Z value	p-value
CENTER	1-2	0.49	0.18	0.50	0.20	0.53	0.19	0.50	0.20	0.71	0.47
	3-4	0.42	0.16	0.40	0.20	0.41	0.18	0.40	0.20	0.18	0.85
	5-6	0.39	0.16	0.40	0.20	0.40	0.20	0.40	0.20	0.38	0.7
FRONT	1-2	0.49	0.36	0.40	0.30	0.39	0.19	0.35	0.30	1.29	0.19
	3-4	0.32	0.26	0.20	0.10	0.27	0.13	0.20	0.20	0.65	0.51
	5-6	0.23	0.14	0.20	0.20	0.22	0.15	0.20	0.20	0.05	0.95
BACK	1-2	0.53	0.35	0.40	0.33	0.53	0.31	0.40	0.40	0.38	0.71
	3-4	0.31	0.23	0.20	0.20	0.30	0.25	0.20	0.10	0.19	0.84
	5-6	0.24	0.22	0.20	0.20	0.29	0.23	0.20	0.30	1.41	0.15
LEFT	1-2	0.42	0.20	0.40	0.20	0.41	0.24	0.35	0.30	0.88	0.37
	3-4	0.30	0.18	0.30	0.20	0.34	0.29	0.30	0.20	0.91	0.36
	5-6	0.27	0.22	0.20	0.20	0.32	0.30	0.20	0.30	0.97	0.33
RIGHT	1-2	0.50	0.32	0.40	0.30	0.46	0.23	0.40	0.20	0.69	0.48
	3-4	0.30	0.22	0.25	0.10	0.26	0.16	0.20	0.10	0.82	0.40
	5-6	0.26	0.17	0.20	0.20	0.26	0.18	0.20	0.20	0.00	1

- The reduction in the research participants' mean and median Foot Functional Index scores following the intervention implies that the intervention significantly improved foot function. A lower Foot Functional Index score indicates better foot function.

Analysis of Sensamove Range of Motion (N=42)

Sensamove Range of Motion in Degree (°)									Test Statistics Wilcoxon Signed Rank Test	
	Before Intervention				After Intervention					
Side	Median	IQR	Mean	SD	Median	IQR	Mean	SD	Z value	p-value
Front	10.9	0.5	10.92	1.88	10.2	1.7	10.2	1.96	-3.11	0.002
Back	10.45	0.5	10.09	1.65	10.35	0.5	10.14	2.12	-1.46	0.14
Left	10.25	1.2	10.1	1.53	10.4	1.6	10.48	2.35	-1.005	0.31
Right	10.6	1	10.46	1.57	10.45	2.4	9.47	1.96	-1.95	0.05

- The results demonstrate that the intervention had a significant effect in reducing the range of motion for the front direction and a marginally significant effect in lowering the range of motion for the right direction. However, For the left and back directions, there were no appreciable modifications found

- For the center, front, back, left and right directions, the pre-intervention and post-intervention static balance values did not differ statistically significantly at any point in time. (p-values > 0.05).
- Overall, the results indicate that the intervention did not have a statistically significant effect on static balance in all the directions or time intervals assessed. the static balance values obtained before and after the intervention did not differ significantly, according to the results of the Wilcoxon signed-rank test.

Analysis of Proprioception (Angle Difference) (N=42)

Proprioception (Angle Difference) in Degree (°)									**Test Statistics Wilcoxon Signed Rank Test**	
Side	**Before Intervention**				**After Intervention**					
	Median	**IQR**	**Mean**	**SD**	**Median**	**IQR**	**Mean**	**SD**	**Z value**	**p-value**
Front	3.65	6.20	6.90	9.23	4.50	7.70	7.48	7.92	0.88	0.37
Back	4.35	3.50	5.73	6.47	3.70	5.40	8.70	19.98	0.32	0.74
Left	5.70	5.48	6.82	7.16	7.80	9.10	10.78	15.44	1.62	0.10
Right	6.50	9.40	8.39	8.90	5.90	10.00	9.22	9.99	0.72	0.46

The findings show that proprioception, as determined by the angle difference, was not statistically significantly affected by the intervention in any of the directions examined. The angle difference values for the front, rear, left, and right orientations did not differ significantly between the pre-intervention and post-intervention periods, according to the Wilcoxon signed-rank test.

Analysis of Proprioception (Radius Difference) (N=42)

Proprioception (Radius Difference) in Degree (°)									**Test Statistics Wilcoxon Signed Rank Test**	
Side	**Before Intervention**				**After Intervention**					
	Median	**IQR**	**Mean**	**SD**	**Median**	**IQR**	**Mean**	**SD**	**Z value**	**p-value**
Front	1.65	1.40	2.01	1.82	2.00	2.90	2.63	2.04	1.87	0.60
Back	1.55	2.00	2.94	7.00	1.80	2.20	2.33	1.93	1.37	0.17
Left	0.85	1.20	1.22	1.09	1.65	1.80	2.15	2.13	2.28	0.02
Right	1.15	1.10	1.25	0.96	1.70	1.20	1.93	1.60	2.32	0.02

- Significant improvements in proprioception were observed for the left and right sides. After the intervention, the left side's median radius difference increased from 0.85° to 1.65°, and this difference showed significantly different (Z = 2.28, p = 0.02). Similarly, the median radius difference on the right side increased significantly from 1.15° to 1.70°.

Analysis of Reaction time (N=42)

Reaction time (Seconds)									**Test Statistics Wilcoxon Signed Rank Test**	
Side	**Before Intervention**				**After Intervention**					
	Median	**IQR**	**Mean**	**SD**	**Median**	**IQR**	**Mean**	**SD**	**Z value**	**p-value**
Front	0.90	0.60	1.43	2.46	1.00	0.40	1.31	1.51	0.34	0.73
Back	1.10	0.80	1.24	0.58	1.10	0.72	1.34	0.83	0.31	0.75
Left	1.35	0.63	1.36	0.46	1.15	0.80	1.83	2.10	0.79	0.42
Right	1.15	0.80	1.26	0.69	1.10	0.55	1.46	1.55	0.64	0.52

- The study shows that none of the four sides evaluated had a significantly different reaction time as a result of the intervention.
-

Analysis of Reaction time (travel time) (N=42)

Reaction time (travel time) (Seconds)									**Test Statistics Wilcoxon Signed Rank Test**	
Side	**Before Intervention**				**After Intervention**					
	Median	**IQR**	**Mean**	**SD**	**Median**	**IQR**	**Mean**	**SD**	**Z value**	**p-value**
Front	1.80	0.90	2.39	2.70	1.70	1.10	2.41	3.33	1.59	0.11
Back	2.20	1.00	2.28	0.86	1.80	1.20	2.04	0.81	1.59	0.11
Left	1.95	0.83	2.29	0.98	1.90	0.82	2.05	0.88	1.68	0.09
Right	2.20	0.75	2.20	0.88	2.20	0.93	2.26	0.62	1.01	0.31

- In general, the study shows that none of the four sides evaluated had a substantially different reaction time (travel time) as a result of the intervention. The Wilcoxon Signed Rank Test revealed that while reductions in the median reaction time (travel time) were noted for some sides, these improvements were not statistically significant.

Analysis of Co-ordination (N=42)

Co-ordination (in Degree)									**Test Statistics Wilcoxon Signed Rank Test**	
Side	**Before Intervention**				**After Intervention**					
	Median	**IQR**	**Mean**	**SD**	**Median**	**IQR**	**Mean**	**SD**	**Z value**	**p-value**
Front Back	0.20	0.10	0.19	0.13	0.15	0.30	0.56	1.66	1.92	0.05
Left-Right	0.30	0.40	0.42	0.38	0.50	0.60	0.76	1.18	2.01	0.04

- The analysis indicates that the intervention had a significant impact on coordination for both the front-back and left sides. The front-back side's median coordination decreased while the left side's median coordination improved, both of which were statistically significant. These results could indicate that the intervention affected coordination on these two sides in distinct ways.

Analysis of normality for Numeric pain rating scale

NPRS					**Paired T test**
	Mean	**Median**	**SD**	**IQR**	**P value**
PRE_NPRS	4.83	5.00	1.96	2.25	<0.001
POST_NPRS	1.76	1.00	1.66	3.0	

- Table provides descriptive statistics, including the median, interquartile range (IQR), mean, and standard deviation (SD), for pre and post-NPRS. The value of the paired T-test was <0.001, so a statistically significant difference was seen.

DISCUSSION

The present study aimed to check the effect of Intrinsic muscle exercise combined with hamstring stretching and Gluteus maximus strengthening on the morphology, balance, and functionality of the foot with heel pain. The total number of participants was 42. They were analysed with hamstring flexibility by sit and reach test, navicular height by Navicular drop test, static and dynamic balance with Pedalo sensamove sense balance mini-board, and functional status by Foot Functional Index scale on the 1st day and after 6 weeks.

According to the results of measurement using sit and reach test, hamstring flexibility increased from 17.12 to 24.47. NDT, the navicular bone drop decreased from 15.40mm to 9.33 mm on the right side, and 15.14 mm to 9.30 mm on the left side. FFI also improved in participants from 16.59 to 10.2. The results revealed significant improvements in hamstring flexibility, plantar arch, and foot function after the intervention, as evidenced by increased sit and reach test scores and navicular drop values, in addition to decreased Foot Functional Index scores.

However, no significant changes were observed in static balance, proprioception, reaction time, and travel time. Notably, while the intervention had a significant impact on coordination for the front-back side and the left-right side, there were no notable alterations noted in the range of motion in various directions. Overall, the intervention demonstrated notable benefits for hamstring flexibility, plantar arch, and foot function, suggesting its efficacy in improving certain physical parameters.

The present study shows improvement in Hamstring flexibility after stretching exercise same result was seen in the study of London lempke et al did a similar study and concluded that static stretching is a widely used method to elongate muscle by exciting the Golgi tendon organ through autogenic inhibition.[56]

Navicular height improved after intrinsic and extrinsic muscle exercises similar result was observed in a study done by Tanya Brijwasi et al, in which short foot exercise along with extrinsic foot exercise protocol was given and concluded that, these exercises target intrinsic foot muscles such as the abductor hallucis, flexor digitorum brevis, and quadratus plantae by increasing strength. They also stabilize the medial longitudinal arch during carrying weights[35]. Also, Huang et al concluded that muscle activity of abductor hallucis was improved due to short foot exercise[57]

Similar findings were observed in the study by de Souza et al., which concentrated on the motor performance of the intrinsic foot muscles and discovered that activation of the short foot muscles enhanced the function of the foot. Foot function was better improved following the intervention.[58]

In a balance component, static balance was not improved but some components of dynamic balance show improvement after intrinsic and extrinsic foot muscle exercise. Zhen Wei et al, concluded that intrinsic foot muscle training has a significant change in dynamic postural balance[59]. Scott K. et al did a study on intrinsic foot muscle training to differentiate static and dynamic balance. In that study, the static and dynamic balances did not differ significantly.[60]

Moon D Chul et al concluded that short foot exercise helps to improve dynamic stability. This occurred because the short foot exercise stimulated the proprioceptors at the sole of the foot[61].

Foot muscle exercises such as object pickup, short foot exercises, and towel curling exercise enhances afferent stimulation by stimulating plantar proprioception. Drawing the metatarsal heads of the foot towards the calcaneus resulted in an additional increase in pressure on the bottom of the foot that contacts the floor. This action heightened the cutaneous stimulation experienced[61].

Limitations of the study

- Small sample size
- Limited protocol exercise
- Short-duration study
- Treatment does not include footwear modification

CONCLUSION

- This study concluded that the effect of Intrinsic muscle exercise combined with hamstring stretching and Gluteus maximus strengthening is more effective in improving the functional status of college-going students with flat feet.
- In terms of balance, this protocol showed improvement in some components, while foot function, navicular height, and hamstring flexibility improved after treatment.

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"THE EFFECTIVENESS OF YOGA ASANA AND AEROBIC EXERCISE ON DYSMENORRHEA IN COLLEGE GOING GIRLS: AN EXPERIMENTAL STUDY"

Kinjal solanki, shivani kumbhani, gunja jogiya , perisa jivani, hina dobariya, virali makwana, ashwini vanpariya, shweta rakholiya, chirag solanki

ABSTRACT

Background: Dysmenorrhea is a common problem among young females. It affects daily routine activities and quality of life. It is characterized by cramping of lower abdomen pain that may radiate to the lower back and upper thigh and is commonly associated with stress, headache, and diarrhoea, and thereby decreases the quality of life, interfering with school, employment, interpersonal relationships, etc. Pain appears the day before or during the first menstrual cycle day. It occupies 20%-90% of the female population in reproductive age. Many conservative treatment methods such as Yoga asana and Aerobic exercises are available to treat them, more efficient among them is not known. **Aim:** To find out the effectiveness of Yoga asana and Aerobic exercises in the management of the females with Dysmenorrhea. **Methodology:** A total of 30 females aging from 18 to 23 with Dysmenorrhea were recruited by convenient sampling, the pre-test and the post-test was measured. Recruited females with Dysmenorrhea were randomly allocated into 2 groups, Group A and Group B. Group A has received Yoga asana and Group B has received Aerobic exercises for 4 weeks. The pain score has been measured using Wong Baker Faces Scale (WBFS) and Verbal Multidimensional Scoring System (VMSS) for Dysmenorrhea will be measured at baseline and 4th week after intervention and analyses. **Result:** The statistical analysis of pre and post data of VMSS and WBFS for both Yoga asana and Aerobic exercises showed that there are significant effects of both Yoga asana and Aerobic exercises in Dysmenorrhea. However, the comparative analysis suggests that both Yoga asana and Aerobic exercises have similar effects on Dysmenorrhea. **Conclusion:** The present study reveals that both Yoga asana and Aerobic exercises have significant effects on Dysmenorrhea. However, the study suggests that both the Yoga asana and Aerobic exercises have similar effects on Dysmenorrhea.

Keywords: Dysmenorrhea, Aerobic Exercise, Yoga Asana, WBFS, VMSS.

INTRODUCTION:

When a girl matures, some physiological functions take place to develop the body to complete womanhood. There are two ovaries situated at the sides of the uterus and they begin to function by producing ova (the female sex cell) one of which matures every month. The maturing process begins between the ages of ten to fifteen years and stops between forty-five to fifty years. The endometrium becomes soft and swollen to receive an ovum. When the ovum is not fertilized and the blood is not needed for its nourishment, the swollen membrane and blood are expelled from the uterus through the vagina in the form of blood discharge. This discharge takes place once in a month and is called menstruation. [1] 75% of girls experience some problems associated with menstruation.

Dysmenorrhea is defined as painful menses in women with normal pelvic anatomy, usually beginning during adolescence [2] One of the causes of Dysmenorrhea is excessive levels of prostaglandins hormones. Prostaglandins released during menstruation and childbirth makes the uterus contract which causes pain during the menstrual cycle. [3,4]

METHOD:

- **Study design:** Experimental study
- **Study setting:** School of Physiotherapy, R.K. University
- **Sampling technique:** Convenient sampling
- **Study population:** Girls with Dysmenorrhea
- **Study sample:** 30
- **Study duration:** Training duration- 5 days per week, Total study duration- 4 week

Prior to starting the study, we have taken consent and assessment as per inclusion criteria 30 college going girls with Dysmenorrhea were included for the study. The consent was taken from everyone to conduct the study on them. The population was divided into two groups, Group A (Yoga asana) and Group B (Aerobic exercise). The Wong- Baker Face rating Scale for pain measurement and Verbal Multidimensional Scoring System scale for Dysmenorrhea was taken of everyone before starting the Yoga asana and Aerobic exercise. After that, Group A has received Yoga asana and Group B has received Aerobic exercises for 30 minutes X 5 days X 4 weeks. After receiving the Yoga asana and Aerobic Exercise protocol, the Wong- Baker Face rating scale and Verbal Multidimensional Scoring System Scale for Dysmenorrhea was taken of each individual again, to find out any changes between Pre and Post intervention.

CRITERIA FOR SELECTION

INCLUSION CRITERIA: Females aging between 18 to 23 years, Females using Non-Hormonal Contraception methods, Females without any history of joint motions, muscle and bone diseases that reduce their ability of exercise, who are not on any medication and mineral supplements during three menstrual cycles.

EXCLUSION CRITERIA: Any female who has undergone Gynaecological surgeries, Female having chronic diseases like Juvenile Diabetes, Cardiac disease, Infectious disease, Female who is pregnant, involved in other studies that require drug intake or otherwise prevent compliance with the protocol, Issue of any mental and physical disease.

RESULTS: A

SR NO.	AGE	WBFS		VMSS	
		PRE	POST	PRE	POST
1	19	6	4	2	0
2	21	7	5	2	0
3	21	4	4	3	1
4	21	6	3	2	1
5	21	5	2	1	1
6	20	6	4	2	1
7	21	4	2	1	0
8	21	2	2	2	0
9	21	8	7	2	0
10	21	9	6	3	1
11	21	4	2	2	1
12	21	7	4	2	1
13	21	5	3	3	2
14	20	5	3	2	2
15	21	5	2	2	0

YOGA ASANA

SR NO.	AGE	WBFS		VMSS	
		PRE	POST	PRE	POST
1	21	6	2	1	0
2	22	10	5	3	1
3	22	5	2	2	2
4	21	6	3	2	1
5	21	3	1	1	0
6	20	3	3	1	0
7	20	8	2	1	1
8	20	6	3	2	1
9	21	4	2	1	0
10	21	6	2	2	0
11	22	7	4	3	1
12	20	8	4	1	0
13	20	6	3	1	0
14	22	5	1	2	1
15	21	6	2	1	1

Statistical test

OUTCOME MEASURE	INTRA GROUP	INTER GROUP
Verbal multidimensional scoring system (VMSS)	Mann-Whitney U test	Wilcoxon signed rank test
Wong-baker faces scale (WBFS)	Independent T-test	Paired T test

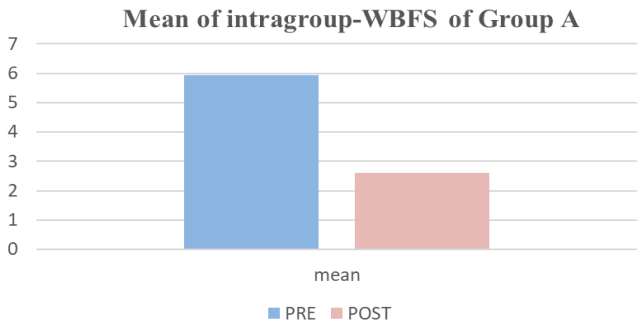
- Age distribution of females with Dysmenorrhea

AGE	GROUP A	GROUP B
MEAN	20.93	20.73
SD	0.7988	0.5936

Interpretation- The above table shows the age distribution of females with Dysmenorrhea. The mean value of age in Group A is 20.93 and Group B is 20.73.

	MEAN	SD	P-VALUE
PRE	5.93	1.86	0.007
POST	2.60	1.12	

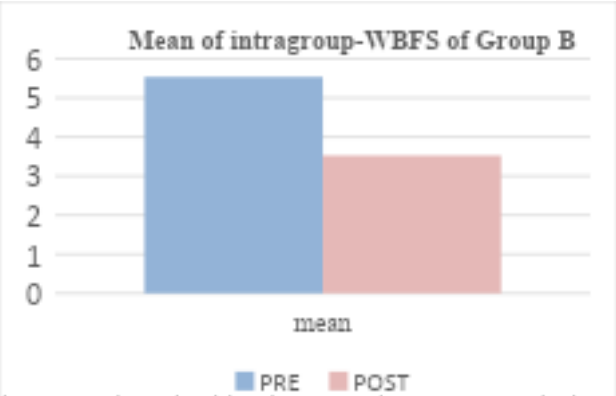
- **Intragroup analysis of WBFS of Group A**



Interpretation- The above graph and table shows an intragroup analysis of WBFS and it shows a significant difference ($p<0.05$) in group B

- **Intragroup analysis of WBFS of Group B**

	MEAN	SD	P-VALUE
PRE	5.53	1.76	0.000
POST	3.53	1.55	

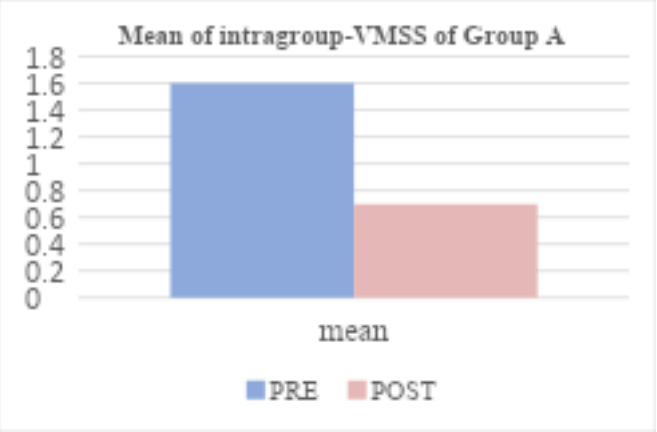


Interpretation- The above graph and table shows an intragroup analysis of WBFS and it shows a significant difference ($p<0.05$) in group B.

	MEAN	SD	P-VALUE
PRE	1.60	0.73	0.001
POST	0.60	0.63	

Interpretation- The above graph and table shows an intragroup analysis of WBFS and it shows a significant difference ($p<0.05$) in group B.

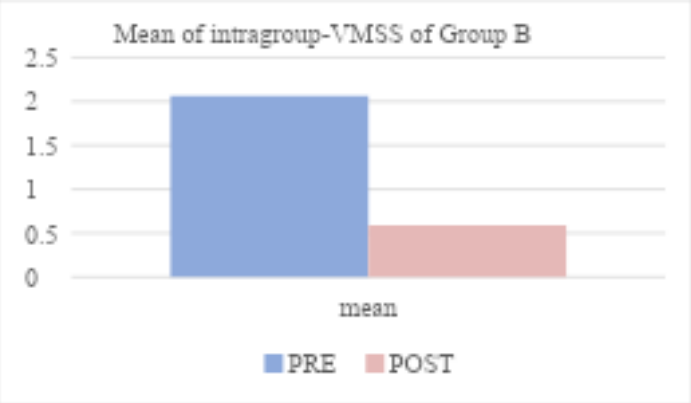
- **Intragroup analysis of VMSS of Group A**



Interpretation- The above graph and table shows an intragroup analysis of VMSS and it shows a significant difference ($p<0.05$) in group A.

- **Intragroup analysis of VMSS of Group B**

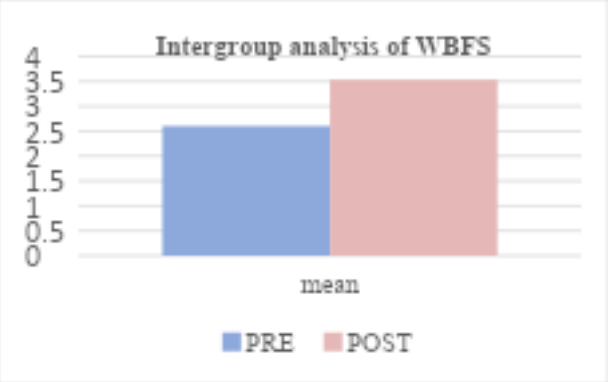
	MEAN	SD	P-VALUE
PRE	2.06	0.59	0.001
POST	0.73	0.70	



Interpretation- The above graph and table shows an intragroup analysis of VMSS and it shows a significant difference ($p<0.05$) in group B.

- **Intergroup analysis of WBFS**

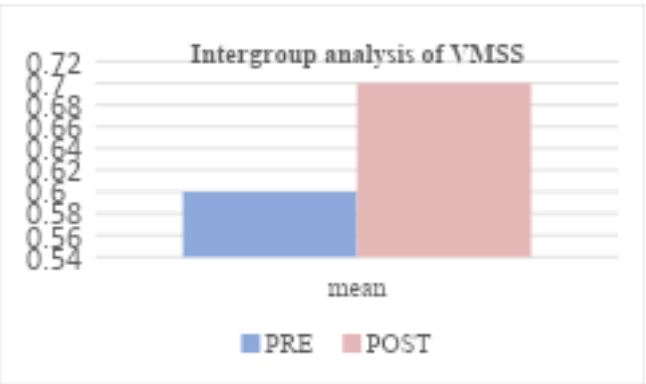
OUTCOME MEASURE	MEAN		SD		P-VALUE
	Group A	Group B	Group A	Group B	
WBFS	2.60	3.53	1.12	1.55	0.069



Interpretation- The above graph and table shows intergroup analysis of WBFS and is shows no significant difference (>0.05) between Group A and Group B.

- **Intergroup analysis of VMSS**

OUTCOME MEASURE	MEAN		SD		P-VALUE
	Group A	Group B	Group A	Group B	
VMSS	0.60	0.73	0.70	0.63	0.653



Interpretation- The above graph and table shows intergroup analysis of VMSS and is shows no significant difference (>0.05) between Group A and Group B.

DISCUSSION

Result showed a significant reduction in the symptoms of Dysmenorrhea after receiving both Yoga asana as well as Aerobic exercise. Both outcome measures VMSS and WBFS showed p<0.05 for both Group A and Group B. Thus, the null hypothesis is rejected. The comparative analysis revealed that there was no significant difference between the effectiveness of both the groups in treating Dysmenorrhea (p>0.05). Thus, there is sufficient information to accept the null hypothesis. Yoga's potential mental and physical health benefits are increasing the flow of blood in pelvic area while also releasing endorphin which have analgesic properties. Yoga reduces anxiety level and minimize the sympathetic hyper activity induced by stress. also release happy hormone serotonin and dopamine it reduces pain.[4] Aerobic exercise also improves pelvic blood flow and adjust metabolism to release opioids which acts as analgesic. Which increase pain threshold. Exercise may act as a distraction from intrusive thoughts and promote positive thoughts; reduce depression and improve mood and behavior.[5]

CONCLUSION

The present study reveals that both Yoga asana and Aerobic exercise have significant effects on Dysmenorrhea. However, the study suggests that both the Yoga asana and Aerobic exercise have similar effects on Dysmenorrhea.

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Immediate Impact of the RK Spine Mobilization Device on Individuals with Low Back Pain.

- An Experimental Study

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Co-Author: (Dr.) Priyanshu V. Rathod. Professor, PT, PhD

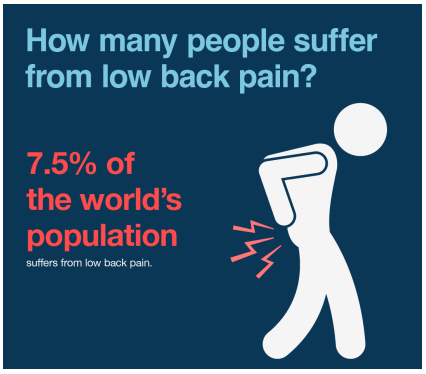
ABSTRACT

BACKGROUND: The spine is the complex anatomic structure that is the scaffolding for the entire body. It protects the spinal cord and nerves. 3 to 6 degrees of freedom at intervertebral joints of the thoracolumbar region serves as a key factor for accomplishing the functional activities at distal components and vice versa. stiffness or immobility at intervertebral joints at thoracolumbar region leads to over activities at cervical level. stiffness at thoracic vertebral level leads to overuse of cervical and lumbar level. Moreover, diminished mobility at one or more intervertebral joints leads to over activities at one joint above and below. Spinal stiffness is one of the responsible factors behind 70-75 % low back pain. It is progressive with changing lifestyle and physical inactivity. Low back pain is a common pathology which leads to pain and reduced ROM in spine. Spine mobilization is a very effective treatment in treating patients with low back pain. But overuse of thumb and hand leads to injury to thumb and hands. The RK spine mobilization device is developed in purpose to prevent the over use of hand and thumb and to accurately provide the treatment without making any error in the treatment. **AIM AND OBJECTIVES:** To study the immediate effect of RK spine mobilization device in patients with low back pain. To study the changes in ROM and NPRS scale. **METHODOLOGY: Study design:** an experimental study. **Study population:** 30 subjects. **Study duration:** 1 day. **Inclusion criteria**: stiffness, pain and reduced ROM. **Exclusion criteria:** Spondylolisthesis. Spondylolysis. Pregnancy Osteoporosis. Previous or recent back surgery. Outcome measure: ROM, VAS Scale. **RESULT:** There is improvement in ROM of the spine and improvement in pain scale. **CONCLUSION**: RK spine mobilization device is effective in mobilizing intervertebral joints and effective in decreasing the magnitude of pain and improving rom immediately in patients with low back pain.

KEYWORDS: RK spine mobilization device, LBP, ROM, Pain.

INTRODUCTION:

Low back pain (LBP) is a common health concern, with a lifetime prevalence of 75%. The spine is the complex anatomic structure that is the scaffolding for the entire body. It protects the spinal cord and nerves and has a major function to provide the structural stability for the human skeletal at center. Beyond the stability at midline, the spine does facilitate the functional mobility at distal ends with forward and backward bending, side to side bending, trunk rotation from all 33 intervertebral joints (IVJs) .3 to 6 degrees of freedom at intervertebral joints serves as a key factor for accomplishing the functional activities at distal components, But due to any changes in the biomechanics of the spine due to any pathology like muscular strain or muscle spasms or degenerative changes leads to stiffness or immobility at intervertebral joints which can further leads to over activities at one joint above and below. for example, stiffness at thoracic vertebra leads to overactivity at cervical and lumbar vertebrae. Spinal stiffness is one of the responsible factors behind 70-75 % low back pain. It is progressive with changing lifestyle and physical inactivity. Low back pain is a common pathology which leads to pain and reduced ROM in spine. Spine mobilization is a very effective treatment in treating patients with low back pain. But overuse of thumb and hand leads to injury to thumb and hands. The RK spine mobilization device is developed in purpose to prevent the over use of hand and thumb and to accurately provide the treatment without making any error.



METHOD:

- **Study Population:** Individuals with low back pain.
- **Study Duration:** 25 minutes of a session (1 session)
- **Study Design:** An Experimental Study
- **Sample Size:** 30
- **Sampling Method:** Simple random sampling
- **Source of Data Collection**: School of Physiotherapy, RK University

Care physiotherapy center.

N.M. Kanabar physiotherapy center.

- The study has been under taken on patients with low back pain for improving the spinal mobility. 30 subjects selected with age between 18 to 45 years. The written ethical informed consent taken prior to checking the pre assessment. Spinal mobility was measured from the distance taken from c7 to s1 in neutral standing position to all thoracolumbar ROM with measuring tape. Hypomobile Intervertebral joints of thoracolumbar region were mobilized with device in prone lying position.

- Each intervertebral joint was mobilized with axial downward oscillations (1-2 oscillations per sec for 1to 2 mins). Grade 1 and 2 to reduce pain and grade 3 and 4 to increase ROM. Moreover, rotational component is used to increase rotation ROM by compressing force to one above and below contralateral transverse process.

MATERIAL

MEASURE TAPE

DEVICE

MARKER

PLINTH

STEP -STOOL

PEN AND PAPER

MEASUREMENT OF SPINE ROM

FLEXION

EXTENSION

LATERAL FLEXION

ROTATION

CRITERIA FOR DATA COLLECTION

- **Inclusion criteria:** stiffness, pain and reduced ROM.
- **Exclusion criteria:**
- Spondylolysis.

- Pregnancy,
- Spondylolisthesis.
- pregnancy
- Osteoporosis.
- Previous or recent back surgery.
- **Outcome measure:** ROM, NPRS Scale.

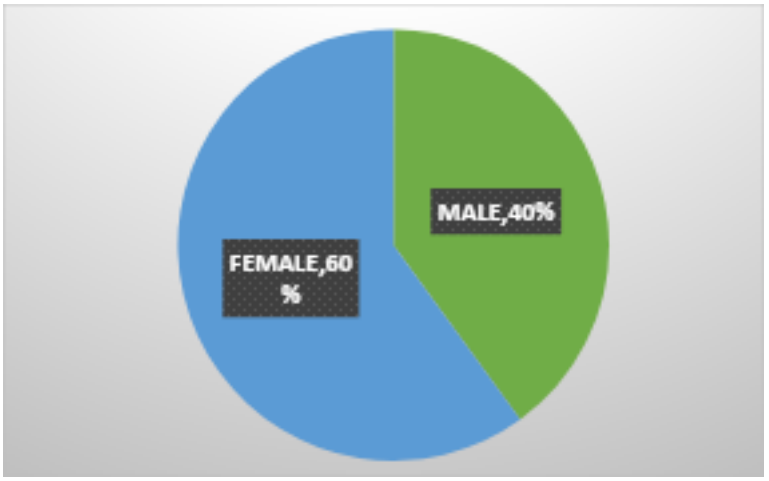
RESULTS

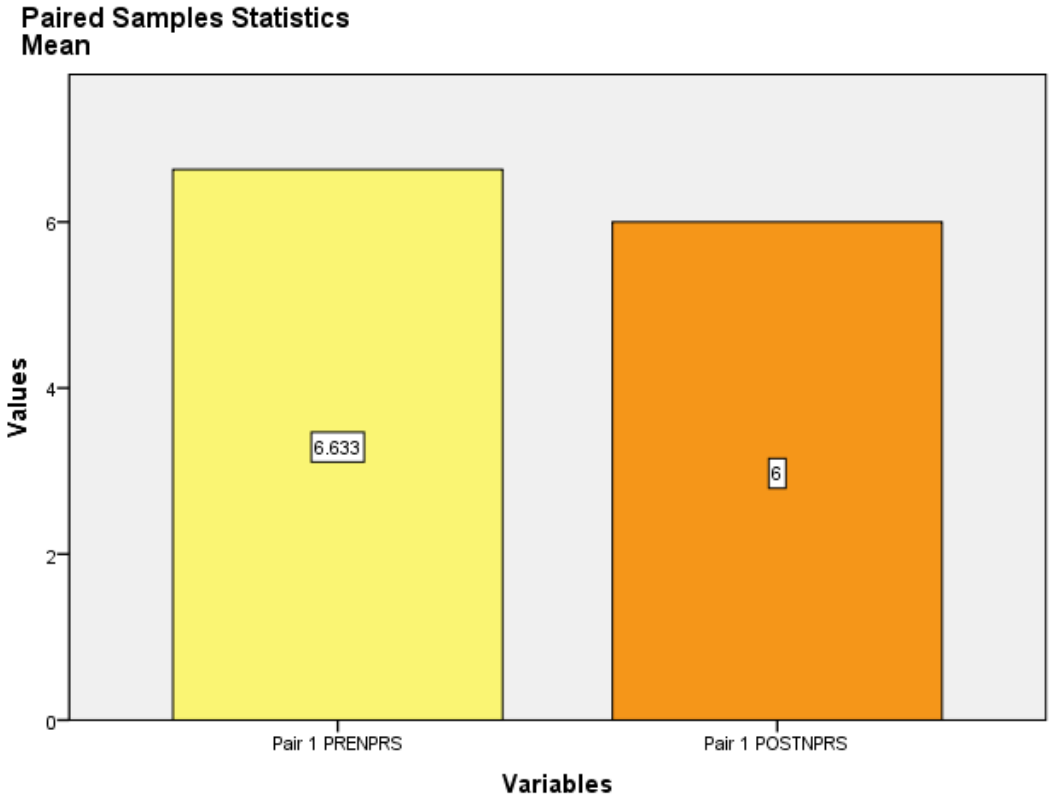
Number of subjects = 30

Male = 40%

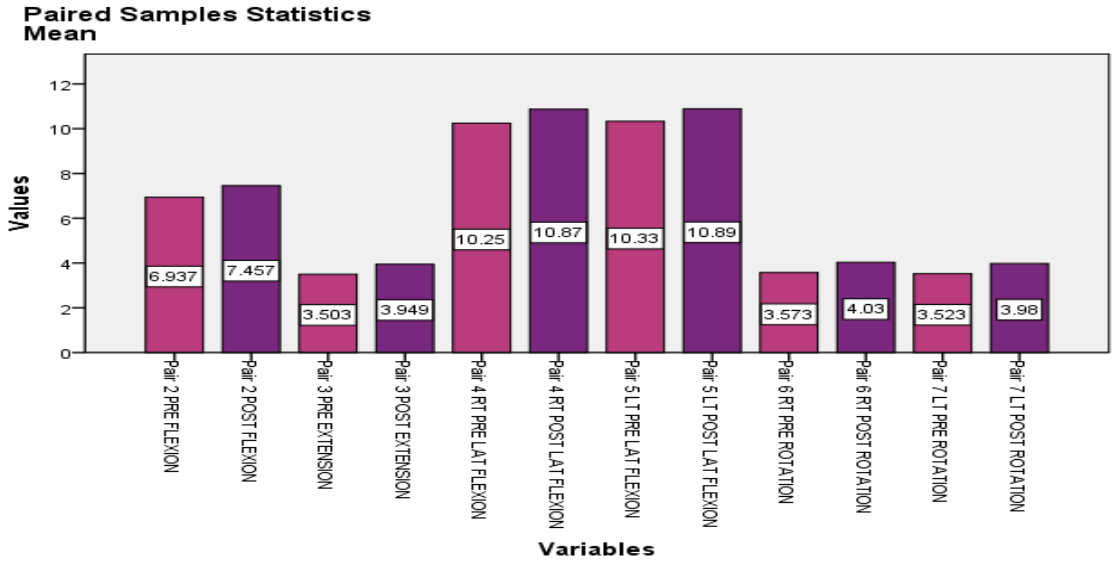
Female = 60%

STATISTICAL ANALYSIS OF PRE AND POST NPRS.





STATISTICAL ANALYSIS OF PRE AND POST ROM.



PRE AND POST CHANGES IN SPINAL JROM WITH MEAN DIFFERENCE AND EVEN CORRELATION COEFFICIENT – LOS 0.005 AND CI 95%

pairs	mean	mean difference	p value.	correlation	sig.
PRE NPRS POST NPRS	6.633 6.000	0.633	.000	.936	.000
PRE-FLEXION POST FLEXION	6.937 7.457	-0.52	.000	.934	.000
PRE-EXTENSION POST EXTENSION	3.5033 3.9487	-0.4454	.000	.893	.000
PRE RT-LATERAL FLEXION POST RT LATERAL FLEXION	10.2467 10.87	-0.6233	.000	.989	.000
PRE LT-LATERAL FLEXION POST LT LATERAL FLEXION	10.33 10.89	-0.56	.000	.987	.000
PRE RT-ROTATION POST RT ROTATION	3.5733 4.03	-0.4567	.000	.858	.000
PRE LT-ROTATION POST LT ROTATION	3.5233 3.98	-0.4567	.000	.893	.000

INTERPRETATION

- There is Highly significant changes in NPRS and ROM.

CONCLUSION AND DELIVERABLES:

- This is a patented product (Published with Indian Patent Office - IN202221059481) and no such device is available in the market.
- Spine mobilization device having immediate effect on reducing the Low Back Pain and improve the Spinal JROM however, long term effect must be analyzed for with and without chronic low back pain.
- Ergonomic design and prevent the overuse of thumb/hands in spinal mobilization.
- The device can be used for various people of age (18 to 45 years) as it has a provision to adjust the length and its ergonomic design makes it easier to hold. Physiotherapists will have a great assistant with the device for spinal mobilization at one hand and preventing overuse injurious to their thumb and fingers.

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"A study to find out the effect of telehealth physiotherapy on pain and functional Status of homemakers with chronic low back pain : An Experimental Study."

Sonu Rikhiram Bhandari, Dr. Swati Dhrangu ,Mehul Naranbhai Dabhi

Abstract:

Background: Low back pain is an emerging health problem globally, womens are more prone to low back pain and highly active in their daily life, are exposed to various stresses.This may demand them to sit, stand, bend and lift heavy weights for long periods of time. Low back pain has higher prevalence among all the musculoskeletal disorders. So this study was conducted to know the effect of Telehealth physiotherapy in women with chronic low back pain. **Aim:** To determine the effect of Telehealth physiotherapy on pain and functional status of homemakers with chronic low back pain. **Method:** A total of 15 womens were allocated with low back pain The scale used in this study is Oswestry low back pain disability Questionnaire, NPRS. Pre and Post exercise data was collected through google form. 4 weeks Home based Exercise protocol was sent through whatsapp, emails to all the participants. **Result:** According to the Pre and Post NPRS scale there was an improvement in the pain intensity of patients. **Conclusion:** This study concluded that the effect of telehealth physiotherapy on pain and functional status of homemakers with chronic low back pain has significant improvement. The NPRS scale and Oswestry low back pain disability questionnaire, which shows positive findings.

Keywords: Chronic low back pain, homemakers, Telehealth physiotherapy, NPRS scale, Oswestry low back pain disability questionnaire

Introduction:

Low back pain (LBP) is an emerging heath problem globally, where the middle aged people (35-58) years are more prone for back pain. The prevalence of LBP among women is found to be around 50% which is quite higher when compared to males and is a growing major health concern. By the time, middle age is reached, the bone strength, muscle elasticity and muscle tone starts to decline. The discs in the spine become drier and less flexible making them less able to cushion the vertebrae. This degeneration makes the spinal canal narrower leading to low back pain. Moreover lack of exercises can worsen back pain due to increased stiffness, weakened muscles, and also due to the discs becoming malnourished and degenerated. Most of it can be prevented, if few exercises are performed that helps to take the pressure off the back. The pain can be minimized by maintaining a healthy weight, correct body posture and practicing a healthy lifestyle. Patients with LBP often report issues with routine functioning and participating in daily activities, with impairments in interpersonal relations and community life being especially important for patients with LBP. 'Teleconsultation.' Ultimately, this service allows a healthcare

professional and a patient to consult when they are not able to gather face to face for a variance of reasons. As technology has progressed, the feasibility for Telehealth has progressed too, resulting in some cross disciplinary behaviour theories and models being used to guide the implementation of Telehealth. These behaviour theories help clinicians to understand the patient's motivation, efficacy and goals, and allow the clinician to deliver telehealth interventions that meet the patient's individual needs, complement the patient's behaviour and characteristics, and suits the patient's unique social. The NPRS can be administered verbally (therefore also by telephone) or graphically for self completion. As mentioned above, the respondent is asked to indicate the numeric value on the segmented scale that best describes their pain intensity. Scores range from 0-10 points, with higher scores indicating greater pain intensity.

Method:

The questionnaire used in this study is Oswestry low back pain disability questionnaire and it was sent through a google form. Eight different Home exercises provided to reduce the low back pain and it was sent through whatsapp to all the participants. We have been connected with all the participants through video chats throughout the study. It has made data collection easier for the researcher. **Exercise Protocol:** First week (Isometric of Static back, Static glueti and Prone on elbow), Second week continue with previous exercises (Partial curl ups, clamshell exercises), Third week continue with previous exercises (Bridging, Knee to Chest), Fourth week continue with previous exercises (Straight Leg Raise Unilateral/Bilateral) **Study design:** Small number of participants is used in this study and data is collected objectively. **Type of study:** Experimental study. Study site and area: Gujarat. Sample size: 15 participants. **Study duration:** 6 months

Sample selection criteria:

Inclusive criteria-Age level should be between 20-60 years. As it is the working age. Homemakers having maid servant or not both are selected. Participants with complain of chronic low back pain.

Exclusive criteria-Age level below 20 years and above 60 years. Patients with any surgical. Pregnant housewives and bedridden patients.

Material: Pen, Paper, Laptop and Mobile with Internet and Oswestry Low Back Pain Disability Questionnaire

Result:

The 4 weeks exercise protocol resulted into a great recovery from low back pain to almost all the 15 participants. A regular follow back was taken of all the patients during the 4 weeks and they were advised to perform the exercise without fail everyday and this exercises has lead a very tremendous recovery of the low back pain and participants has to perform eight different exercise in purpose of

reducing their chief complain of low back pain. Exercise Protocol: First week (Isometric of Static back, Static glueti and Prone on elbow), Second week continue with previous exercises (Partial curl ups, clamshell exercises), Third week continue with previous exercises (Bridging, Knee to Chest), Fourth week continue with previous exercises (Straight Leg Raise Unilateral/Bilateral). While this research we found the scale which can over all the components of back activities and which can be easily interpreted and easy to understand for the homemakers. So that we get the accurate result. Data comparison was done Homemakers should be noted with result to reduce pain.

Discussion:

This is the study to find out the effect of tele health physiotherapy on pain and status of homemakers with chronic low pain : An Experimental study. This study had included 15 subjects. In this study the oswestry disability scale and NPRS scale were used for chronic low back pain. The oswestry disability scale and NPRS scale was taken by google form. In this scale normal daily life activities related question was asked . Each question is scored 0-5 with the first statement being zero and indicating the least amount of disability and the last statement is score 5 indicating most severe disability. This google form was sent via mail as well as WhatsApp. The age group of the subjects was selected between 20-60 years. The population was selected by contacting relatives and neighbours. Project work based on the compare of the pre and post pain rating scale of NPRS as well as Oswestry low back pain disability scale among homemakers with the help of descriptive analysis. The conclusion was that thetelehealth physiotherapy in homemakers with chronic low back pain has its significant effect on pain and it is found that some of homemakers had felt relief in pain after following the given exercise protocol. Using static back , static glutei , prone on elbow , partial curl ups , clam , bridging , knee to chest , SLR exercise muscle started to gain mobility and reduce pain. Especially physiotherapy treatment can reduce the pain and get patient return to normal ADL activities.

Conclusion:

This study concluded that the effect of telehealth physiotherapy on pain and functional status of homemakers with chronic low back pain has significant improvement. The NPRS scale and Oswestry low back pain disability questionnaire, which shows positive findings, The telehealth physiotherapy was convenient to physiotherapist and homemakers. The telehealth physiotherapy was a great platform to improve the condition of chronic low back pain in homemakers.

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"To Find Out The Presence Of Forward Head Posture In Students - An Observational Study"

Author: Dr.Vishnu Vithalani, Dr.Swati Dhrangu

Abstract:
Context: Posture is the attitude of the body the relative arrangement of body parts, For a specific activity, or a characteristic manner of bearing one's body forward head posture is characteristics increased extension of upper cervical vertebrae which also lead to changes in the lumbar spine. Due to current circumstances and online education, student was forced to use electronic devices more than usual. This lead to increase in cases of FHP in students.

Aims: a study to find out the presence of forward head posture in students of RK University.

Settings and Design: An Observational Study

Methods and Material: Twenty college going student of the age group 18-25 years were included in this observational study. After obtaining a voluntary signed assent, the neck was exposed and colored markers were placed on C7 vertebrae and the tragus of the ear. A photograph was taken, which was then digitized to calculate the craniovertebral angle (CVA) which is used to measure FHP by using on protector.

Statistical analysis used: Mean data is analysed with Microsoft Excel.

Results: In this study , 20 students were evaluated consisting of 5 males and 15 females. mean distribution data was analyzed using Microsoft excel. The findings revealed that 16 students out of 20 students, i.e. 80 % exhibited a forward head posture abnormality. it was found that a greater percentage of female students (75%) displayed FHP compared to male students (25%).

Conclusions: The study found FHP among 18-25-year-old college students at R.K. University, Rajkot, Gujarat, but no progressive increase from 18 to 25 years. The high prevalence suggests potential musculoskeletal conditions impacting the cervical spine and shoulders.

Keywords: Forward head posture, collage going students, craniovertebral angle

Introduction:
Forward head posture (FHP) presents a significant challenge in today's digital age, characterized by increased flexion of the lower cervical spine and upper thoracic region. Prolonged use of electronic devices like computers, TVs, and mobile phones, compounded by the recent surge in online education, has exacerbated this issue. The resulting muscular imbalance and associated symptoms such as severe neck pain, fatigue, and restricted range of motion impede daily activities, underscoring the need for posture awareness and ergonomic guidance among students to address these concerns.

Studies investigating forward head posture (FHP) have highlighted its correlation with various musculoskeletal disorders, including neck and shoulder pain. FHP, defined as the protrusion of the head anterior to the trunk, is attributed to factors such as anterior translation of the head and lower cervical flexion. This postural deviation is associated with muscle shortening in the upper trapezius, posterior cervical extensor muscles, sternocleidomastoid muscle, and levator scapulae muscle, contributing to pain and functional limitations. Understanding the biomechanical relationship between head, cervical, and dentofacial structures is crucial in addressing FHP-related issues and promoting optimal musculoskeletal health.
The CVA is the angle, in degrees, of the horizontal line intersecting a line drawn from the tragus of the ear to the spinous process of C7. CVA was calculated using on protector software. A smaller CVA indicates a greater degree of forward head positioning with a CVA less than 48°- 50° defined as FHP, in this study, subjects with a CVA less than or equal to 48° were defined as having FHP. Greater than 48° of CVA angle is healthy.

Subjects and Methods:

In a six-month observational study at R.K. University, Rajkot, Gujarat, India, 20 students aged 18-25 were purposively sampled, with exclusion criteria including psychiatric illness, cervical injury, and upper limb fractures. Written informed consent was obtained from willing participants, who underwent lateral neck photo capture for craniovertebral angle (CVA) assessment using the On Protector app. A CVA ≤ 48 indicated Forward Head Posture (FHP), with subjects above this threshold considered to have a healthy angle. This method provided insights into FHP prevalence among college students, highlighting potential implications for musculoskeletal health and emphasizing the need for posture awareness and intervention strategies.

Result:

In this study , 20 students were evaluated consisting of 5 males and 15 females. mean distribution data was analyzed using Microsoft excel. The findings revealed that 16 students out of 20 students, i.e. 80 % exhibited a forward head posture abnormality. it was found that a greater percentage of female students (75%) displayed FHP compared to male students (25%).

Discussion:

The findings of the study revealed a high prevalence of ForwardHead Posture (FHP), with 80% of college students displaying this postural abnormality. Similar trends have been observed in other research studies, implicating factors such as heavy backpack usage, psychosocial stressors, and prolonged screen time in incorrect postures. Additionally, the phenomenon of "text neck" highlights the impact of frequent smartphone use on cervical spinal health.

In the observational study involving 20 college students aged 18-25, FHP was assessed through the measurement of craniovertebral angle (CVA). While backpack weight's

potential influence on FHP wasn't considered, literature suggests its role in inducing compensatory forward-leaning postures, leading to neck pain. Interestingly, a higher prevalence of FHP was observed among male students compared to females, underlining the need for further investigation and interventions targeting posture-related issues in college settings.

Conclusion:

This study identified the presence of FHP among 18-25 year-old college going students in R.K university Rajkot, Gujarat. However, the presence of FHP was not identified to progressively increase from 18 to 25 years. This high presence suggest that there is a potential for the development of musculoskeletal conditions affecting the cervical spine and shoulder. Education on the consequences of an excessive FHP, what is the correct posture, and ergonomic advice to assist the maintenance of correct posture may be beneficial in reducing this rate in the future. In this study, we have found 80% presence of forward head posture.

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