RK.UNIVERSITY

SCHOOL OF PHYSIOTHERAPY RK.UNIVERSITY

Volume XII Issue I

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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 2023.

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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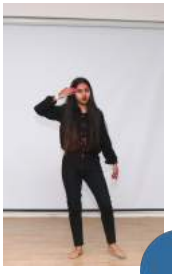




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INTERNATIONAL DAY OF ACTION FOR WOMEN'S HEALTH 28/5/2022

On the occasion of International day of action for women's health, School of Physiotherapy conducted a free post natal camp for women on 28/5/2022 at RK Physiotherapy and Rehabilitation center. With the Prenatal Physiotherapy Camp under supervision of Dr. Namrata Desai, best solutions were provided to patients with postpartum Postural back pain, muscular imbalance, Urinary incontinence, excess weight gain, dietary advice for postpartum constipation and also guided them to maintain good posture while giving proper baby care and breastfeeding.





INTERNATIONAL DAY OF YOGA


INTERNATIONAL WOMEN'S DAY

WORLD HEALTH DAY

The School of Physiotherapy celebrated World Health Day on 7th April to spread awareness about health and wellness amongst people of Rajkot. Keeping the focal theme "Our Planet Our Health''. School of physiotherapy, RK University organized 3 Parallel events by conducting multiple Health camps. Events:

1. Health Camp of Digital Spirometry Lung Function Test (LFT) with report and physiotherapy advice for Civilians.
2. Health Camp of Child Fitness Checkup (Vitals, Fitness & Foot Evaluation) at various schools.
3. Physiotherapy Health Checkup Camp by Evaluation of vitals, posture, fitness and Digital Spirometry LFT for staff of police department. Hands on Training for Cardiopulmonary resuscitation (CPR) by Basic Life Support (BLS) Certified Trainer.

CELEBRATION OF WORLD ALZHEIMER'S DAY 2022

On the occasion of world Alzheimer's day, School of Physiotherapy, Rk University, arranged one seminar in association with the lion's club on the focal theme of "power of knowledge" on 21st September 2022. Expert in Neurology, Dr. Kaumil Kothari gave an expert talk on Alzheimer's Disease.

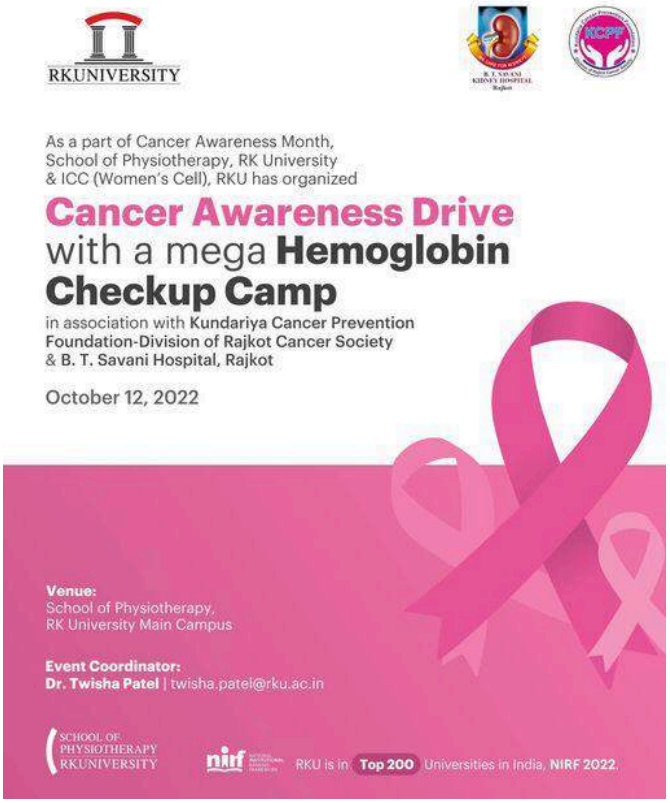
MENTAL HEALTH DAY

On the occasion of World Mental Health Day, School of Physiotherapy, RK University and Aatman Centre of Psychology jointly organized an awareness seminar on Mental Health on October 10, 2022.

CANCER AWARENESS AND HEMOGLOBIN CHECKUP CAMP

On 12th october 2022, B T Savani and School of physiotherapy organized a camp for testing levels of hemoglobin in association with Kundariya cancer prevention foundation for all Students and Staff members of RK University.

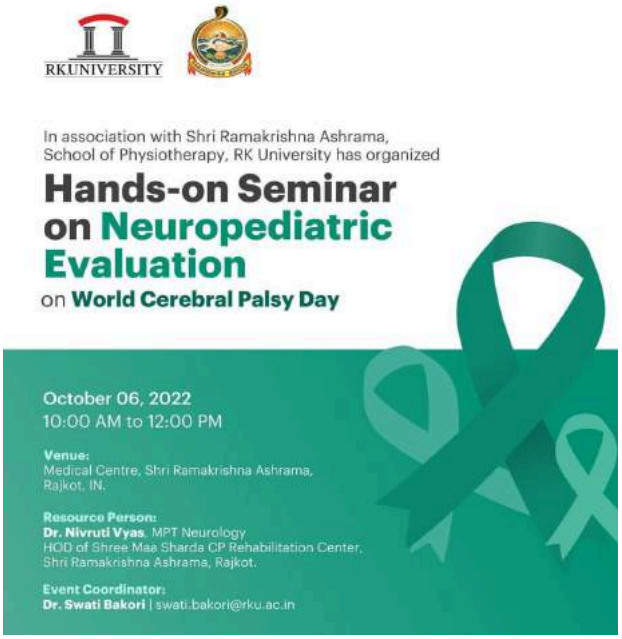
Around 500 people took advantage of the camp and got aware about the importance of iron levels and hemoglobin in our body. Medications and required consultation was provided to people who had lower levels of hemoglobin.



WORLD CEREBRAL PALSY DAY

School of Physiotherapy, RK. University organized Hands-on seminar on Neuropediatric Evolution on world cerebral palsy day on 6 th October 2022 with Ramakrishna ashrama at medical Centre, shri Ramakrishna Ashrama Rajkot.

Dr. Nivruti Vyas (MPT Neurology, HOD of Shree Maa Sharda CP Rehabilitation Centre) conducted a seminar and gave insights regarding how to evaluate neuro-pediatric patients and rehabilitation goals according to the condition of the patients.. This seminar was Coordinated by Dr. Swati Bakori. Approx. 30 PG and Intern students attended the seminar.



WORLD ASTHMA DAY

World Asthma Day was celebrated on 2nd May 2023 on the theme of 'Asthma Care for All' In context to this, The School of Physiotherapy, R.K. University organized an onsite visit to Radheshyam Spinning Mill PVT. LTD., Shemala, Gondal, Rajkot.

WORLD OBESITY DAY

WORLD HYPERTENSION DAY

RURAL COMMUNITY VISIT BY PG SCHOLARS

On 5th July 2022, Students of 1st semester MPT visited Community Health Care (CHC) Center, Jasdan to learn about functions of rural health mission (RHM) for health promotion.

Besides the need for Health Promotion and Prevention, Professional Communication and Behaviour of Physiotherapists remain the essential fragment. Thanks to Dr. Patel and Dr. Urvi Madam, Medical officers, Primary Health Center (PHC), Gadhaka for enlightening activities of Rural Health Mission (RHM)

WORLD HEART DAY 2022

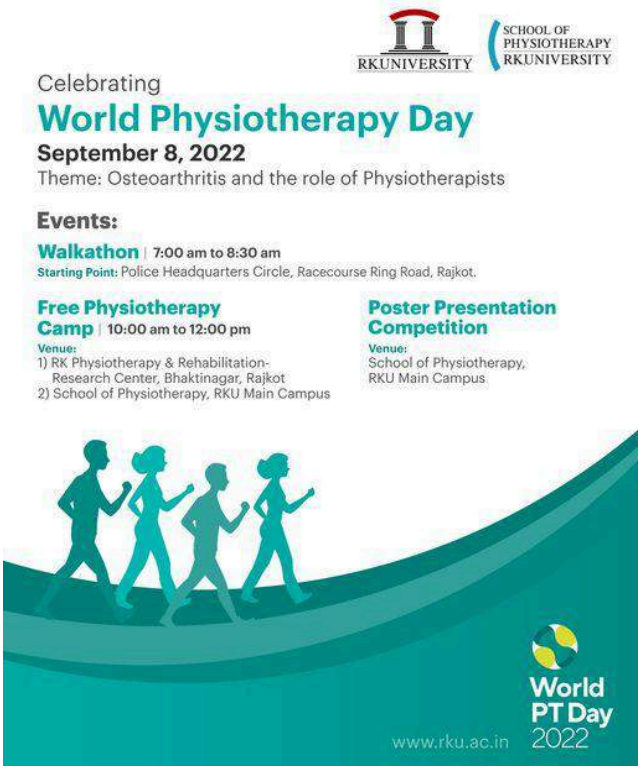
On 29th September, 2022 camp for Basic Life Support (BLS)- Cardiopulmonary Resuscitation (CPR)Training was conducted for Aircraft Staff by an American Heart Association (AHA) approved instructor to support the focal theme of World Heart Day at 'Rajkot Airport'.

The entire camp was organized by Dr. Nidhi Ved and Dr.Amit Sharma. Total 50 airport staff were trained and were given the certificate of training.

WORLD PHYSIOTHERAPY DAY 2022

Theme: Osteoarthritis and the Role of Physiotherapists

As a part of World Physiotherapy Day celebration 'Walkathon' was organized at and around Race course ring road in the morning time from 7:00 AM till 8:30 AM as a part of public awareness about Osteoarthritis and Physiotherapy role. Event was inaugurated by Rajkot Municipal Deputy Commissioner, Shree Chetan Nandani and Deputy collector Rajkot city, Shri Sandeep Kumar Varma and by Dr. Sailesh Kagathara, President Rajkot Physiotherapy Association. Other physiotherapy college staff and students also joined the event along with approx. 300 students.



More than 40 patients benefited from the Multi-centric 'Free Physiotherapy camp' which was organized at the Physiotherapy Rehabilitation center at RK university campus and the Urban Physiotherapy center, RK Physiotherapy, Rehabilitation and Research Center at Bhakti Nagar.

The ' Digital Poster Presentation competition' was organized at the School of Physiotherapy. 2nd, 4th and 6th semester students in undergraduate and postgraduate students participated during the event.

School of Physiotherapy RK University is thankful to Rajkot Municipal Corporation, Police commissioner office for giving NOC to hold the Walkathon and we also extend our thanks to the member of Rajkot physiotherapy association for their presence.


Walkathon


Walkathon


Walkathon


Walkathon


Walkathon


Walkathon

19SPT Batch CHP list 22-23

Camp 1: "Examination Of Accumulation Of Fat Level In The Body" & Camp 2: "Camp Regarding Premenstrual Problems And It's Management", Guided By Dr. Nidhi Ved With Students Fofandi Vanshita, Jakhaniya Niyati, Kasvala Krina, Rawat Jyoti, Tanna Bhavisha, Thakkar Maitry

Camp 1: Sports Agility Test And Sports Injury Prevention Ergonimc Advice Camp For School Going Sports Players & Camp 2: Functional Rehabilitation Camp For Females, Guided By Dr. Harsh Badrakia With Students Parmar Preeti, Vyas Daksh, Zala Raxit, Shah Shashwat, Drashti Jethva

Camp 1: "Camp To Evaluate And Manage The Early Arthritic Changes In Knee Joint For Perimenopausal Women With Perimenopausal Symptomes." & Camp 2: "Assessment Of Physical Fitness In Scholl Going Students", Guided By Dr. Urvi Pithwa With Students Deepa Mosat, Shreya Parekh, Mahesh Nandaniya, Vishnu Vithalani, Dixita Khanpara, Charmi Upadhyay

Camp 1: Wellness Session Focused on Promoting Physical And Functional Wellbeing. & Camp 2: Ankle And Foot Assessment Camp: Unlocking Potential , Guided By Dr. Priyanshu Rathod With Students Karmur Pooja, Vikani Param, Sadiya Anita, Pandey Kunal, Hadiya Mayur, Madhvani Apeksha

Camp 1: Community Camp For Geriatric Peoples & Camp 2: Physiotherapy Camp For Taxt Nack Syndrome For School Going Children., Guided By Dr. Chirag Solanki With Students Shreya Vibhani, Selesty Valani, Kartik Patel, Paras Tank, Ishita Tank, Fency Zapadiya

Camp 1: "Evaluation Of Cardiovascular Fitness Among Workers Of Pharmaceutical Company" & Camp 2: Evaluation Of Body Mass Index (Bmi), Flatfoot & Reaction Time Testing By Agility Testing In School Going Children, Guided By Dr. Komal Doshi With Students Devangee Unaliya, Dharti Patel, Vidhi Parmar, Urvi Raval, Nevi Parsaniya, Mansi Raghavani

Camp 1: "Assessment And Management Of Foot And Ankle In Kathak Dancers" & Camp 2: Free Physiotherapy Camp For Stress Assessment In School Going Students., Guided By Dr. Namrata Desai With Students Priyanshi Shingala, Janvi Sapovadiya, Isha Shobhasana, Mitanshee Rokad, Indrani Sen, Pushti Gokani

Camp 1: "Evaluation Of Pulmonary Function Among Population Of Morbi" & Camp 2: Foot Evaluation Camp , Guided By Dr. Amit Sharma With Students Jeni Fultariya, Feni Kalathiya, Bansi Thumar, Manisha Kavad, Kervi Padariya

Camp 1: Free Camp On Postural Assessment And Ergonomic Advice In School Going Children & Camp 2: Free Camp On Assessment Of Joint Related And Other Pain And Physiotherapy In Community , Guided By Dr. Parthkumar Devmurari With Students Mansi Sabhaya, Megha Bhalodiya, Kishan Parmar, Satish Dhoriyaa, Khushbu Bhatt, Divya Sonagra

Camp 1: "Awareness For Prevention And Mangement Of Asthma Among Cotton Industrial Workers'' & Camp 2: 'evaluation And Management Of Cardio-Respiratory Fitness In School Children'', Guided By Dr. Kajal Pokar With Students Pranali More, Dhruvi Bhatt, Priya Fultariya, Vixita Aghara, Jinal Padhariya, Mitali Viradiya

Camp 1: "An Evaluation Camp Of Pes Planus(Flat Ffot) For School Going Children'' & Camp 2: "Physiotherapy Consultation Camp For Knee Joint In Geriatric Population'', Guided By Dr. Shrikant Savaniya With Students Sonak Chudasama, Pinal Gandhi, Mehta Vishwa, Nakum Kishan, Parmar Disha, Parmar Namarata

Camp 1: "Assessment And Management Of Knee And Back Pain For Elderly People" & Camp 2: "Evaluation Of Health Related Fitness Camp On School Going Children", Guided By Dr. Swati Dhrangu With Students Vrushti Kamdar, Satya Makwana, Vishva Khakhkhar, Isha Dahiya, Isha Parmar, Drity Bosmaiya

Camp 1: Generalized Screening And Exercise Camp For Geriatric People & Camp 2: Free Physiotherapy Camp For Stress Management In School Going Students., Guided By Dr. Twisha Patel With Students Tirth Thacker, Dharmik Pedhadiya, Nand Sharma, Rahil Sumra, Rahul Malakiya, Shyam Nakum

Camp 1: Free Camp On Evaluating Lung Strength And Bmi On School Going Children & Camp 2: Free Camp On Foot Assessment For Female Police Professionals, Guided By Dr. Parthkumar Devmurari With Students Pandya Priya, Pandya Priyanka, Pala Kinnari, Nandini Sharma, Pankita Parikh, Ranpara Dhruvi

Camp 1: Free Physiotherapy Camp For Evaluation And Management Of Back Pain & Camp 2: Ergonomics For School Going Students, Guided By Dr. Namrata Sojitra With Students Riddhika Hodar, Mayuri Makvana, Chetna Maru, Yashvi Pandya, Parth Bavarva, Drashti Patel

Camp 1: Awareness Of Woman's Health And Hygiene During Menstuation Days & Camp 2: Free Physiotherapy Camp For Muscles And Joint Pain., Guided By Dr. Krupa Tank With Students Ransariya Yashvi, Varmora Bansi, Kasundra Denisha, Jethloja Nensi, Chavada Bhavika

List of Projects accepted for SSIP 2.0 |

Project Name: Designing and development of pulse tech devices for measuring pulse strength- A multiphasic study
Students: Nandini , Dhruvi, Priya, Priyanka, Kinnari, Pankita. Amount Received: 21000

Project Name: Designing and testing a electro mobilizer device to decrease soft tissues related pain and improve joint range of motion (JROM)
Student: Rashi Soni, Amount Received: 26500

Project Name: Designing and testing of spinal mobilization device
Students: Kunal, Apeksha, Param, Mayur, Anita, Pooja. Amount Received: 20000

Project Name: Designing and testing blood pressure controlling device: An explorative study
Student: Reema Boghra. Amount Received: 26500

Project Name: Designing and testing compression vibratory combination device for lower limb lymphedema: An explorative study
Student: Denisha Radadia. Amount Received: 26500

Project Name: To develop a medical device prototype foot muscle training to improve foot functions
Students: Devanshi Sutaria, Amount Received: 29000

1st Quarter (Oct-2022 to March 2023)

Project Name: Designing and testing a predictive model for Bell`s palsy recovery- An exploratory study
Student: Priyanka Parsana. Amount Received: 21000

Project Name: Designing and developing an innovative audio-visual biofeedback device to evaluate bridging function- A multiphasic exploratory study
Student: Ritu Padalia. Amount Received: 14000

Project Name: Designing and testing of innovative objective tool to measure range of motion of different body joints- An exploratory study
Student: Chandani Shukla. Amount Received: 24000

Project Name: Designing and developing a wearable device for breathing retraining- A multiphasic study
Student: Urvashiben Nimavat. Amount Received: 25000

Project Name: Designing and developing a handheld device for bronchial hygiene for pediatric population: A multiphasic study
Student: Neha Meriya. Amount Received: 26500

Under Startup Srujan Seed Support (S4) Programme a total grant of INR 2,50,000/- has been provisionally sanctioned for our PG Student Dr. Rashi Soni's innovation - Therapeutic Electromobility. Gujarat Student Startup & Innovation Hub (i-Hub) provides best support through various flagship programs and support systems.

Parkinson's Disease Support Group (PDSG)

Rajkot Knee Club

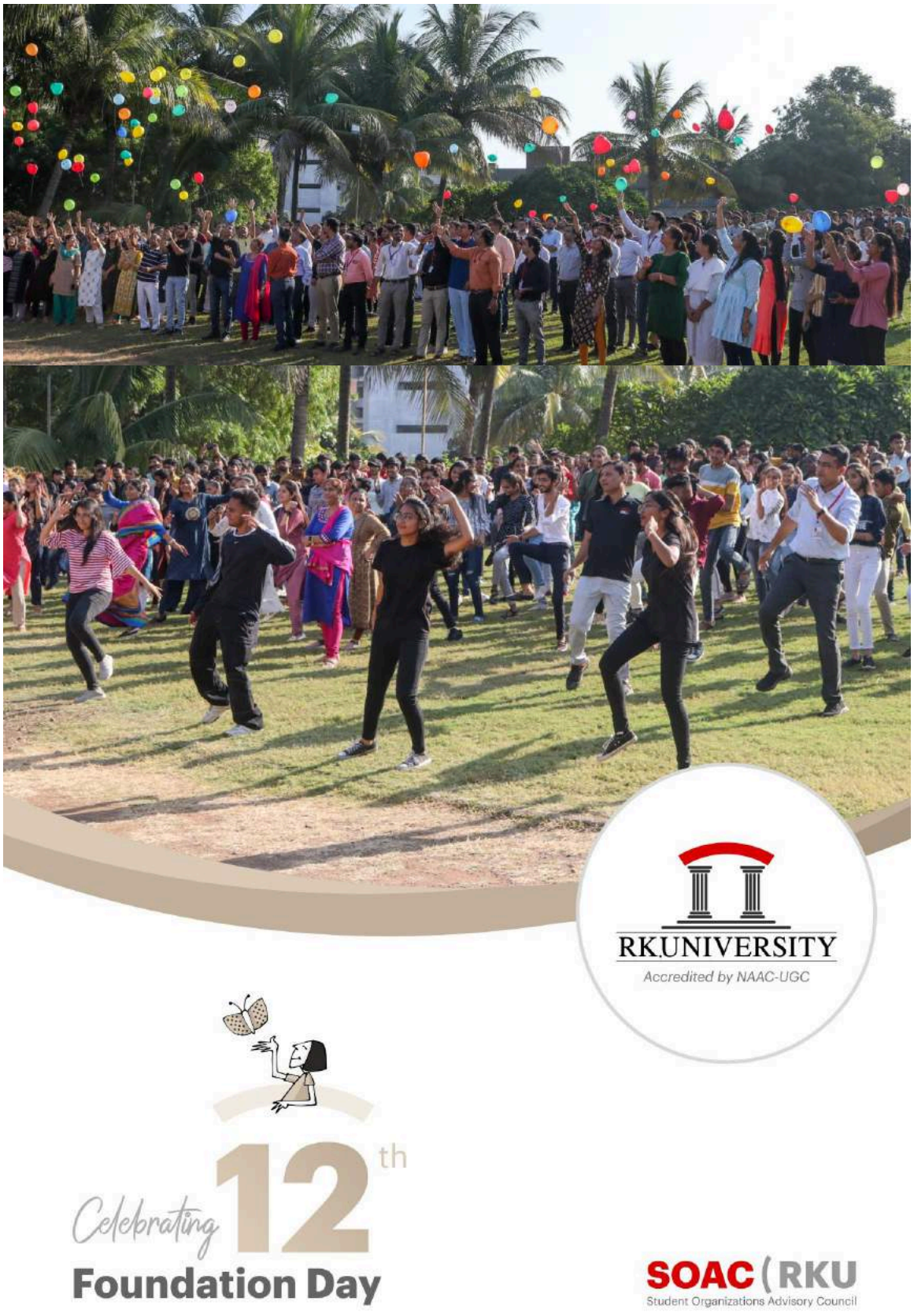
Meeting Venue: RK Physiotherapy & Rehabilitation Research Center,
Opp. Meghani Rang Bhavan, Bhakti Nagar Circle, 80ft Road, Rajkot.

Alumni Meet

The Alumni Meet was a heartwarming event that brought together graduates, each with their unique journey since leaving RKU.

Highlights of the Union:
Campus Tour: walking down memory lane.
Alumni Success Stories: Distinguished alumni, now leaders in their respective fields, shared their inspiring stories and insights.
Networking Opportunities: Alumni got opportunity to get in touch with fellow alumni, exchange ideas, and explore potential collaborations. The Alumni Meet concluded with a sense of fulfillment and gratitude. It was a day to celebrate the accomplishments of former students and to honor the role School of Physiotherapy, RK University played in their journeys.

FOUNDATION DAY



RASOTSAV 2022

SHINING ALUMNI

DR. VIRAL BHUVA

Clinic: 1)HealthPlus Rehab centre,
BRAMPTON, Ontario

2)HealthCare Rehabilitation centre,
BRAMPTON, Ontario

DR. NIHAR JOSHI

Working as a Sports Physiotherapist at
High-Performance Centre,
Sports Authority of Gujarat,
Nadiad, Gujarat

GALORE 2023

CELEBRATING DIVERSITY THROUGH SPORTS AND CULTURE

Galore, the captivating sports and cultural event hosted by RK University, is a vibrant celebration that seamlessly weaves together the realms of athleticism and artistic expression. The campus transforms into a bustling arena of activities that cater to every taste and inclination, A HOLISTIC EDUCATIONAL PHILOSOPHY.

GALORE 2023

RKUNIVERSITY
Accredited by NAAC-UGC

Congratulations

Bhagirath Pokar
on being awarded as
Student of the Year 2022
School of Physiotherapy, RKU
in recognition of his outstanding achievements in academics and co-curricular activities throughout the year.

GALORE 2023

www.rku.ac.in

Faculty Achievement

DR. PRIYANSHU V RATHOD

Secured funding of 5000/- from ks patel center for Entrepreneurship

DR. AMIT SHARMA

Secured 1st rank in national conference of IAP at ahmedabad for innovation

DR. NIDHI VED

15,000/- rupees received from HDFC Bank in Association with KS PATEL Centre for Entrepreneur as a First Prize 🏆 winner for Research titled " Biofeedback integrated Thoracic Expansion Measuring Device"

Received 6.5 Lakhs Rupees funding from Government of India Under Nidhi Prayas Scheme for research titled "Developing Prototype : Biofeedback Integrated Thoracic Expansion Measuring Device"

PHYSIOTHERAPY CAMP

KALEIDOSCOPE

36th NATIONAL GAMES

On October 2nd 2022, Government of India organised the **36th National Games** in Gujarat. Where two games were played in Rajkot District: Swimming and Hockey. Along with other institutes, RK University provided our Physiotherapy Sports expert team who had given remarkable service during the tenure.

Dr. Nihar Joshi & Dr Kamlesh Vadher, PG scholars were placed in the swimming competition. Other eight Musculoskeletal and Sports Science Expert physiotherapists were allocated as on field medical team in Dhyanchand Hockey Ground, Race course, Rajkot.

HOME HEALTH CARE

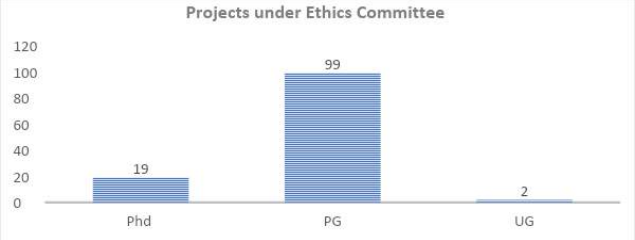
Institutional Ethics Committee Approved by CDSCO

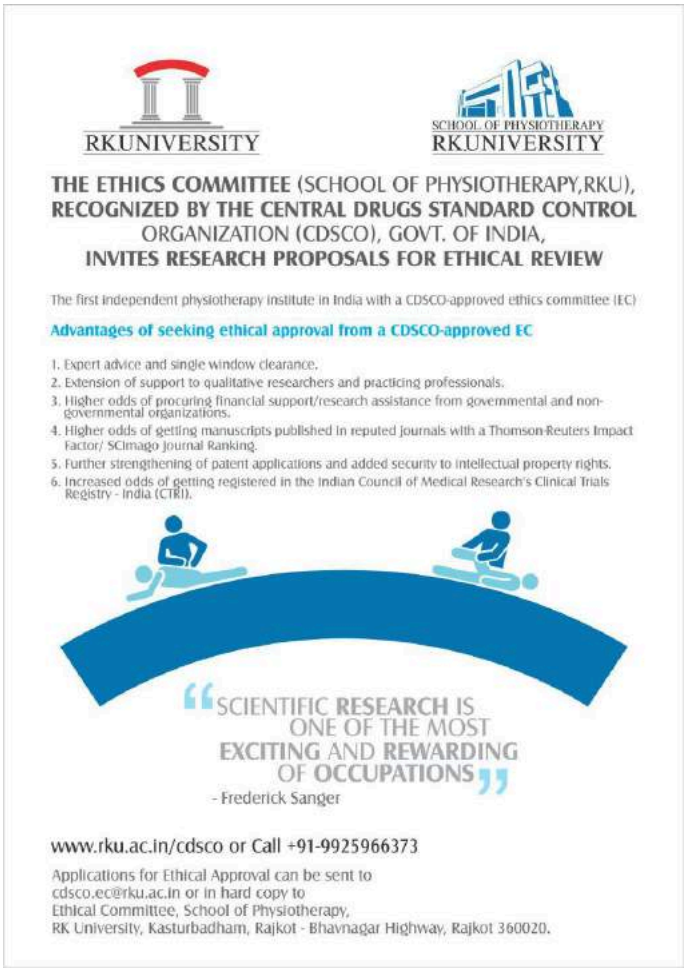
Year of Registration	2016
Year of Reregistration	2021
Number of meetings yearly	3

Members of Ethical Committee

#	Name of Members	Designation in Ethics committee	Qualification
1	Dr. Kiran G. Piparva	Basic Medical Scientist	MD, Pharmacology
2	Dr. Bhavesh Kanabar	Clinician	MD PSM
3	Dr. Ankur Parekh	Chairperson	MPT
4	Mr. Sabir Lokhandawala	Legal Adviser	B.com LLB
5	Dr. Priyanshu Rathod	Member	PhD
6	Dr. Amit Sharma	Subject Expert	PhD
7	Dr. Shweta Rakholiya	Member	MPT
8	Dr. Parthkumar Devmurari	Member secretary	MPT
9	Mr. Arvind Sorathiya	Lay Person from Community	Self Employed (stationers) BA

Ethical Committee at SPT

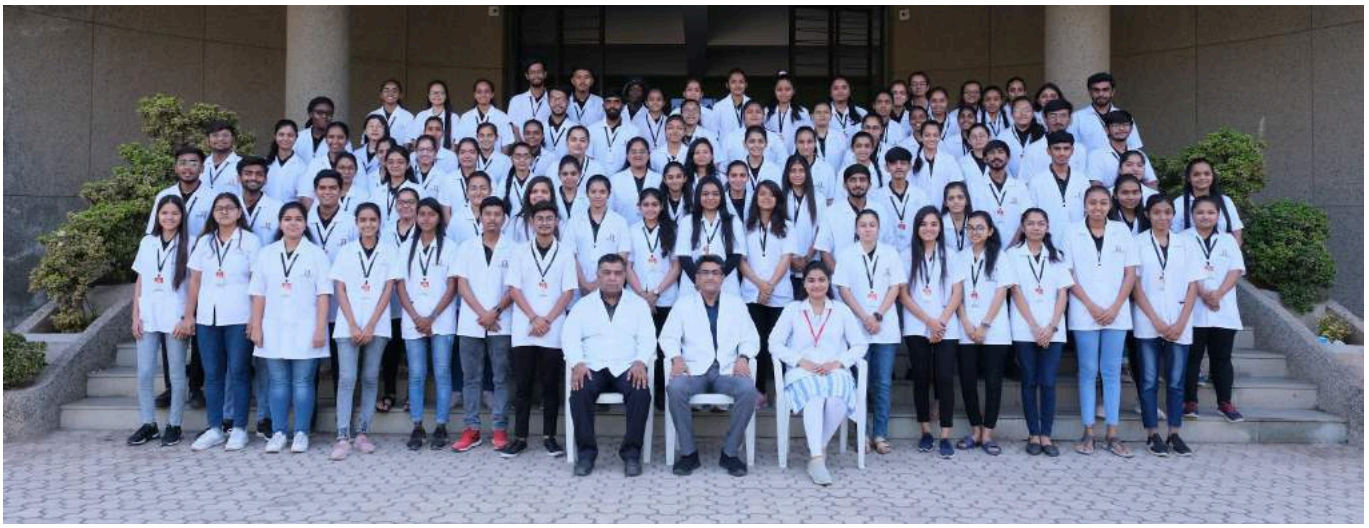




Batch Brigade of SPT

BPT BATCH 2022-2026

BPT BATCH 2020-2024



BPT BATCH 2021-2025

MPT BATCH 2022-24

MPT BATCH 2023-2025

SPT Faculty Members

Faculty Corner

Cranial Electrical Stimulation

Introduction

Cranial electrotherapy stimulation (CES) is a neuromodulation tool used for treating several clinical disorders, including insomnia, anxiety, depression and various neurophysiological conditions. Cranial electrotherapy stimulation (CES) involves delivering low-intensity (50 μA to 4 mA) electrical current via a pair of electrodes attached to bilateral anatomical positions around the head (e.g., eyelids, earlobes, mastoids, temples), with the intent of acutely modulating central and/or peripheral nervous system activity. In clinical populations, CES has been used as an adjunctive treatment for several neurological disorders. CES effects on clinical disorders remain elusive, proposed effects include modulation of central and peripheral nervous systems, altering resting state and limbic system activity, increasing cortical alpha-band activity, and modulating the release of neurotransmitters and downstream hormones including catecholamines and glucocorticoids.

CES DEVICE

CES has predominantly been used for the relief of symptoms accompanying three clinical disorders: insomnia, anxiety, and depression. CES modulates brain function by applying pulsatile low-intensity current through the earlobes or scalp. This device produced efficacy via giving direct current flow or pulsed magnetic field to the specific brain region (left dorsolateral prefrontal cortex most frequently targeted), inducing neuron excitatory or inhibitory effects.
CES is a portable device that patients can use alone at home. Therefore, CES is more accessible, time-saving, and affordable.

Dr. Hiral Luv Mehta
(MPT In Neuromuscular Science)
(Assistant Professor)
(GPC - 2099)

Student Corner

Integrating Physiotherapy in Diabetes Management: A Conceptual Perspective

Introduction:

Diabetes is a chronic metabolic disorder that affects millions of people worldwide. Its prevalence has been steadily rising, making it a global health concern. While medication, diet, and lifestyle modifications are commonly prescribed for diabetes management, the role of physiotherapy in the comprehensive treatment plan is often overlooked. However, physiotherapy can play a significant role in improving the overall health and well-being of individuals living with diabetes. This article explores the various ways in which physiotherapy can positively impact the lives of people with diabetes, promoting optimal health outcomes.

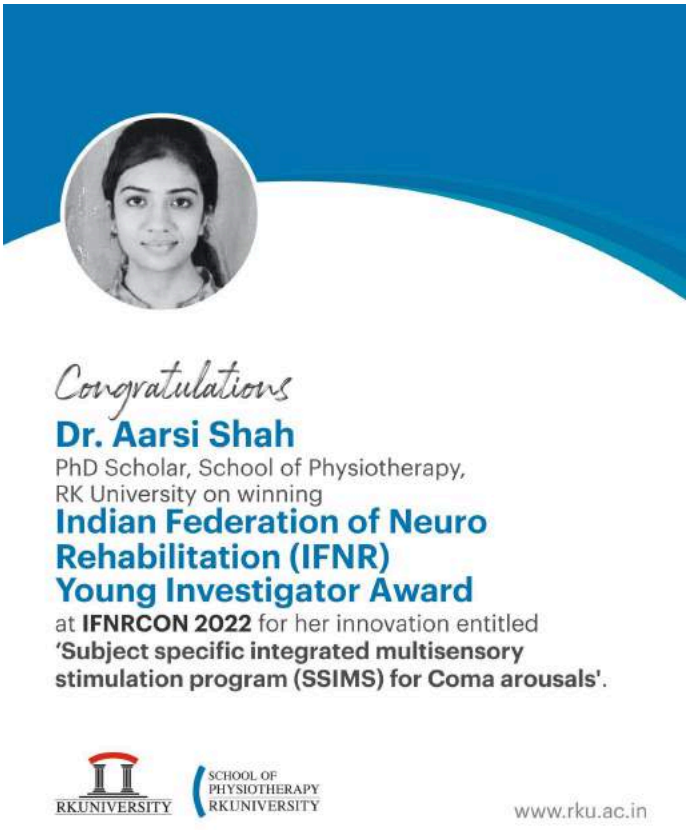
Enhancing Physical Activity:

Regular physical activity is crucial for individuals with diabetes to maintain healthy blood glucose levels, manage weight, and reduce the risk of complications. However, starting and maintaining an exercise routine can be challenging, especially for those with limited mobility or other co-existing conditions. Physiotherapists specialize in designing tailored exercise programs that suit individual needs and capabilities. They provide guidance on safe and effective exercises, gradually increasing intensity and duration to ensure optimal results…

Vatsal Bakrania
21SPTPT11006 3rd Sem BPT
FACULTY OF MEDICINE
SCHOOL OF PHYSIOTHERAPY
RK UNIVERSITY

Conferences attended by SPT faculties – Icostart, SIP Conference

Society of Indian Physiotherapy organised their 7th annual conference from April 29 to may 1 2023 in Bhubaneswar attend by the student and the faculty of school of Physiotherapy where we got a chance to showcase their innovative device in an innovation hub where all the delegates appreciated our effort and as an outcome the organisers select two of our device abstract has been published in UGC approved journals.Apart from that all the facilities got a stage to present their topic as speaker and also serve as judges and session chair in the conference.



Pre-conference Seminar

Physiofest 2022

Physiofest is an Annual National Physiotherapy Summit which aims at empowering students to enhance excellence in the field of Physiotherapy. It also serves as a platform for the Students and Therapists to learn and improve their skills in the field. Physiofest brings out the innovation and research in Students and Therapists.

Shri Shamjibhai Harjibhai Talaviya Charitable (SHTC) Trust managed School of Physiotherapy, RK University (RKU) has organized the 13th National level Physiotherapy summit to provide a platform to the students to showcase their Innovative and Entrepreneurial skills. The School of Physiotherapy constantly strives to provide quality input to students by providing them various platforms for their overall development.

Taking this effort further, Physiofest is being organized by the School of Physiotherapy, RK University every year since 2009. Taking this tradition forward we organized Physiofest 2023 on 7th January 2023 with a focus on **"Innovation, Collaboration, Rehabilitation"** in the field of Physiotherapy. The event was inaugurated in presence of Executive Vice President Mr. Denish Patel. More than 350 participants from around 15 colleges attended this summit. Delegates participated in various academic activities like Platform paper presentation, Poster presentation and Innovative model making competitions.

Key Speakers
Dr. Yagna Unmesh Shukla
Waqar M. Naqvi, PhD
Dr. Tarun Lala

This year we received more than 100 Theme specific Paper which were presented in the Physiofest 2023 and in addition to that we had also received around 45 theme specific Posters for the presentation.

Certificates were awarded to delegates and the selected papers are featured in ISBN approved annually published Physiotherapy newsletter Physioforum after fulfilling the publishable criteria.















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TREATMENT OF THE SCAPULA IN ADHESIVE CAPSULITIS-

A SYSTEMIC REVIEW

AUTHOR: DHARTI PANCHASARA

MPT SCHOLAR

SCHOOL OF PHYSIOTHERAPY, RK UNIVERSITY,

RAJKOT, GUJARAT, INDIA.

Email: dpanchasara296@rku.ac.in

ABSTRACT:

BACKGROUND: The Term “Adhesive capsulitis” refers to common shoulder condition characterized by the global restriction in the shoulder range of motion in a capsular pattern. Adhesive capsulitis common occurs in age group of 40 – 60 years of age and prevalence rate is 3-5% in general population. Scapula plays important role in the production of smooth, coordinated movement of shoulder girdle and also provides Dynamic Stability and base for muscle attachment. This systemic review attempt to how many study are available for treating scapula in adhesive capsulitis. **METHOD:** A systemic review based on PRISMA guideline. The databases used for selection of literature were PubMed, Google Scholar and Elsevier. Years from 2009 to 2022 published article were included. Total 8 articles were selected based on eligibility criteria. **Inclusion criteria** were (1) full text English article (2) Article were treating scapula in adhesive capsulitis (3) Male and female both. Pedro score <6 And Duplicate article were excluded. Based on search articles there are many treatment are available for treatment of adhesive capsulitis but treating scapula is needed for adhesive capsulitis. **KEYWORDS:** Adhesive capsulitis, scapular mobilization exercise, Range of motion, numeric pain rating scale.

INTRODUCTION:

The shoulder joint is a ball and socket type joint between Scapula and humerus. The shoulder joint is a unique anatomy with an extraordinary range of motion that allows us to interact with our environment.[1,2] Shoulder joint is the major joint connecting the Upper limb to trunk; it is one of the most mobile joints in human body, at the cost of joint mobility .[3]

The Term “Adhesive capsulitis” refers to common shoulder condition characterized by the global restriction in the shoulder range of in a capsular pattern.[4] This condition is Characterized by thickening of the bursa and disappearance of axillary fold due to adhesions of the subacromial or subdeltiod bursa or adhesions of the biceps tendon, resulting in gradual and latent loss of active and passive glenohumeral joint movement.[5]

The most common terms that are synonymous to adhesive capsuitis of the shoulder are “peri - arthritis shoulder, frozen shoulder, stiff shoulder and painful shoulder “. The term “frozen shoulder” was first introduced by Codman in 1934 the same condition had already been labeled “peri - arthritis” by Dupley. “Adhesive capsulitis” term coined by Naviesar in 1945.[6] Adhesive capsulitis common occurs in age group of 40 – 60 years of age and prevalence rate is 3-5% in general population and with diabetes patients 20% and more common in women.[7] Adhesive capsulitis is characterized by painful restriction of both active and passive shoulder movement .The primary cause are directly related to shoulder joint and secondary causes are not related to shoulder such as diabetes, hyperthyroidism, cardiovascular disease with referred pain due to which keeps the joint immobile.[8]

In adhesive capsulitis common impairment of structure and function are night pain, sleep disturbed pain in movement and often at rest, decreases joint play and range of motion. In posture: possible faulty posture compensations with protracted and anterior tilt scapula, rounded shoulder and guarding the painful shoulder in position of scapula in elevation and arm adducted.[9]

Scapula plays three important roles in maintaining shoulder complex kinematics, altered scapular motion and position have been termed as scapular dyskinesia. The scapular group of muscles is serratus anterior, pectoralis minor, levator scapulae, rhomboid, teres major; rotator cuff is mainly responsible for scapular movement and dynamic stabilization of the scapula. Second role of scapula provide bases for muscle attachment. The scapular stabilizing muscle attaches to the medial border of the scapula and controls its position and the third role of the scapula is to act as a link between proximal and distal energy transfer, ensuring that the shoulder is in the most appropriate position for optimal function.[6,10]

Scapulohumeral rhythm is define as the movement relationship between the humerus and the scapula during both shoulder flexion and abduction. There is 120degree of movement that occurs at the glenohumeral joint, while 60 degree occurs at scapulothoracic joint, creating 2:1 ratio.[6,11]

Joint mobilization techniques improve normal shoulder capsule extensibility and stretch tight soft tissues thus reducing pain and increasing the range of movement and shoulder function. Scapula mobilization can break adhesion and release muscles, thereby increasing scapular movements. Improving shoulder movement may also be linked to increased scapular movements.[11]

Goniometry refers to the measurement of angles; In particular the measurement of angle creates at human joints by the bones of the body. The Universal goniometer is the instrument most commonly used to measure joint position and motion in clinical setting. The reliability of goniometry is 0.98 and validity is 0.97 – 0.98.[12] Numeric pain rating Scale (NPRS) is described as an11-point scale with scores from 0 to10 and anchors of 0-no pain and 10-worst possible pain.[13]

METHOD:

Identification of studies:

A search of PubMed, Google scholar, Elsevier. Years from 2009 to 2022 published article were included. The following search term were define: Adhesive capsulitis, scapular mobilization exercise, Range of motion(ROM), numeric pain rating scale(NPRS).

Selection of articles:

Total 14 articles selected
Google scholar 9
PubMed 3
Elsevier 2

Inclusion criteria

Full text English
Article were treating scapula in adhesive capsulitis
Male and female both

Exclusion criteria

Duplicate articles
Article was not gender specific
Not available in full text article
Pedro score <6

Total 8 articles selected

REVIEW OF LITERATURE:

SR.NO.	AUTHOR NAME, YEAR	INTERVANTION	OUTCOME MEASURE	CONCLUSION
1	Irem Duzgun et,al.,2019	Group 1 received scapular mobilization, and Group 2 received manual posterior capsule stretching	ROM,NPRS	Scapular mobilization and manual posterior capsule interventions were effective in improving the acute joint range of motion in frozen shoulder patients.
2	Arul Pragassame et,al.,2019	Group A were given capsular stretching, scapular mobilization and home exercises and Group B were given capsular stretching and home exercises.	NPRS,ROM	Both the treatment approaches are effective in reducing pain, improving ROM and functional disability in patients with frozen shoulder. However the patients who received scapular mobilization had significantly higher improvement.
3	Ahammed	Experimental	ROM,NPRS	High grade

	et,al.,2019	group- Scapular stretching with conventional physiotherapy and Control group - High grade mobilization with conventional physiotherapy group		mobilization is found more effective than Scapular stretching to increase ROM And reduce pain for the patient with Adhesive Capsulitis
4	Uma Sinha et,al.,2019	Group-A received scapular mobilization, moist hot packs and home exercise program. In Group B received Myofascial release of subscapularis	ROM,NPRS,SPADI	Both the treatment methods (i.e. scapular mobilization and MFR) were effective in improving pain, ROM & function in subjects with Chronic Frozen Shoulder.
5	Sreenivasu et,al.,2016	Group 1: Patients were given treatment End range mobilization and Scapular mobilization technique. Group 2: Patients were treated using End range mobilization	ROM,SPADI	End range mobilization with scapular mobilization is more effective in improving range and functioning as compared to end mobilization alone

		only.		
6	Lipika Boruah et,al.,2015	one group was treated with mobilization with movement and another group treated with scapular mobilization technique.	ROM,SPADI	In adhesive capsulitis mobilization with movement and scapular mobilization both are effectiveness in reduction of pain and improvement of glenohumeral range of motion
7	Jing-lan Yang et,al.,2012	scapular mobilization, Control group - standardized physical therapy	ROM	The Scapular mobilization was more effective than a standardized physical therapy program.
8	Ozgun surenkok et.al.,2009	scapular mobilization sham - treatment condition except for the hand positioning, control group -did not undergo any physiotherapy and rehabilitation program	ROM,NPRS	scapular mobilization is useful manual therapy technique to apply to participants with a painful limitation of the shoulder. Scapular mobilization increases ROM and decreases pain intensity.

DISCUSSION:

The main finding of this study is treatment of scapula in adhesive capsulitis patients. Unfortunately, the scapular musculature is often neglected in the treatment of adhesive capsulitis; This lack of attention may often lead to incomplete treatment.(Irem Duzgun) Decrease scapular mobility in adhesive capsulitis is an important factor causing a decrease range of motion f the shoulder joint. Posterior capsule is a structure that establishes the connection between the scapula and humerus. Mobilization technique are cause a series of mechanical changes in particular positive effects on the range of motion of joint include decrease adhesions, reformation of collagen and increase sliding of fibers.[14](S Arul Pragassame)Scapular mobilization improve shoulder movements ,improving the functional status of the shoulder if scapular and shoulder movements are improved.[11]

CONCLUSION:

This study has been found sufficient level of evidence for treatment of scapula in adhesive capsulitis .In particular, Scapular mobilization technique are beneficial effect on decrease pain and increase range of motion in adhesive capsuitis. This study is guide to use of Range of motion (ROM) and Numeric pain Rating scale (NPRS) as a outcome measure in adhesive capsulitis. More studies also needed for more definitive conclusions.

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The Impact of Different Body Positions on Peak Expiratory Flow Rate Measures Among Healthy Collegiate Students: A Comparative Study

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Abstract

The Lung capability is changed by the position of the body which accordingly is impacted by gravity. The Peak Expiratory Flow Rate that is the greatest flow delivered during a forced expiration after a maximum inspiration till the total lung capacity. The Peak expiratory flow rate shows the strength and the condition of respiratory muscles with the degree of airflow limitation in large airways. This study is attempted to compare the measures of Peak Expiratory Flow Rate in both Standing and Sitting Position. A study was conducted at the RK University, Rajkot. Total 213 subjects were taken in which 157 were included and 56 were excluded, both males and females of age between 18-25 years. The Consent form and the Basic Assessment were taken. After that, The Peak Expiratory Flow Rate was measured using Mini Wright Flow Meter in the Standing and the Sitting position. The values were noted. The Peak Expiratory Flow Rate Measures were analyzed with using SPSS version 21. Standing and Sitting Position were analyzed using parametric test. Group analysis was done using a paired- T test in the group. The postural changes have a significant effect on the Peak Expiratory Flow Rate measurements. The values of the recordings depend upon the Position of the subject. The measurements are significantly higher in Standing Position than the Sitting Position in the healthy individuals. Thus, it can be concluded that the Standing Position is much more effective than the Sitting Position to improve expiration.

Keywords: Peak Expiratory Flow Rate, Different Body Positions, Collegiate Students, Standing Position & Sitting Position.

Introduction

The Lung capability is changed by the position of the body which consequently is impacted by gravity. Gravity applies its effect on the human body and fundamentally on lung limits. The consolidated effects of gravity on the lungs, heart and peripheral circulation are fundamental to their reliant capability and laying out typical oxygen transport. [1]

The Peak expiratory flow rate shows the strength and the condition of respiratory muscles with the degree of airflow limitation in large airways. The Peak expiratory flow is the assessment of the development of air into and out of the lungs during different breathing moves. [2]

The Peak Expiratory Flow Rate is impacted by the Body Mass Index of a person. The Body Mass Index essentially affects the lung capability. A few investigations propose that the expanded Body Mass Index affects the lung capability. [3] While certain examinations likewise recommend that the people who are Underweight additionally have diminished lung capability. [4]

The Body Position influences the strength and biomechanics of the muscle as well as the lung volumes. As the aftereffect of the postural changes, the lung volume in Healthy people were notably higher in standing position. While, a few examinations recommend that in healthy person's spirometry elements are higher in the standing in correlation with the sitting position. [5] However a few examinations likewise recommend that there are no huge changes in spirometry estimates in standing, sitting and lying positions. [6]

The exactness of the Peak Expiratory Flow Rate Measures depends of the collaboration of the patient as well as the quality and precision of the instrument utilized for the measurement. The versatile Peak Expiratory Flow meters are extremely basic, reliable and modest instruments for the measurement of the Peak Expiratory Flow Rate. [7]

Peak Flow Meters come in two ranges to measure the air pushed of your lungs. A low range Peak Flow meter is for little kids, and a standard range Peak Flow meter is for

older children, teens, and adults. An adult has a lot bigger airways than a youngster and requirements the bigger range. [8]

The Peak Flow Meter which is utilized for this study is Mini Wright Peak Flow Meter (PFM2) of ChoiceMed. The Mini Wright Peak Flow Meter is intended to measure the Peak Expiratory Flow. This expects subject to breathe out as quick as convincible into the recording instrument after maximal inspiration. Maximal expiratory flow remains just for a little piece of a second and happens very early in expiration. It isn't needed for the subject to keep breathing out to remaining volume. [9]

The Peak Expiratory Flow rises from the large airways within 100-102ms from the start of a forced expiration and it stays peaked for 10ms. The normal value range for The Peak Expiratory Flow Rate is 450-550 L/min in adult males and 320-470 L/min in adult females. [10]

The lungs are allowed to move within the chest wall and therefore, susceptible to internal and external forces. For example, the gravitational impacts resulting from changes in body position modify the alignment of the diaphragm and abdominal contents, alter the resistance imposed on muscles and vary in different postures. The lung function parameters like FVC, FEV1 are affected by posture. So therefore, the purpose of the study was to determine Different Body Positions on Peak Expiratory Flow Rate measures among Collegiate Students.

AIM:

- To evaluate the impact of different Body Positions on Peak Expiratory Flow Rate measures among Collegiate Students.

OBJECTIVES:

1. To find out the Effect of the Standing Position on Peak Expiratory Flow Rate among Collegiate Students.
2. To find out the Effect of the Sitting Position on Peak Expiratory Flow Rate among Collegiate Students.
3. To find out the Comparison between the Standing & Sitting Position on Peak Expiratory Flow Rate measures among Collegiate Students.

MATERIALS:

- Pen, Paper, Chair & Table
- Consent Form
- Assessment Form
- Mini Wright Peak Flow Meter (ChoiceMed)
- Weight machine (Smart Care)
- Stadiometer

Material used in this study

METHODOLOGY

- **Study Design:** A Comparative study
- **Study Setting:** RK University, Rajkot
- **Sampling Technique:** Purposive sampling
- **Study Population**: Males and Females
- **Study Duration**: 2 Months
- **Sample Size:** 213 participants

CRITERIA FOR SELECTION

INCLUSION CRITERIA:

- Age between 18-25 years.
- Body Mass Index ranging between 18.5 - 24.9 kg/m^2

- Males and Females both are included.

EXCLUSION CRITERIA:

- Individuals who are not willing to participate.
- Individuals who are Smokers.
- Individuals with the history of any Cardiac or pulmonary diseases like Bronchial Asthma, COVID.
- Individuals with the history of Juvenile Diabetes.
- Individuals with the history of Blood Pressure fluctuation.
- Individuals who take any drug which may alter Cardio-Pulmonary function,
- Individuals who have been Hospitalized recently.
- Individuals who have BMI Category Underweight, Overweight and Obese.

PROCEDURE

The present study was conducted at the RK University, Rajkot. Total 213 subjects were taken in which 157 were included and 56 were excluded, both males and females aging between 18-25 years. Before starting the actual study, the subjects were given a brief explanation about the study. The consent and Basic assessment were taken. After taking the assessment only the subjects who fell under the inclusion criteria were selected and others were excluded. The selected subjects were explained about the procedure about measuring the Peak Expiratory Flow Rate. To measure the Peak Expiratory Flow Rate Mini Wright Peak Flow Meter of ChoiceMed was used. For the study three recordings were taken in both Standing and Siting Position. The best of the three recordings was

taken as the final value. After that, the values of the Standing and the Sitting Position were compared.

To Measure Peak Expiratory Flow Rate in Standing Position

To Measure Peak Expiratory Flow Rate in Sitting Position

Total 213 participants from RK University were taken in which 157 were included and 56 were excluded, both male and female aging between 18 to 25 years

Only individuals who fell under inclusion criteria were included and others were excluded.

General instructions about study were given to participants who included in the study.

Basic Assessment and Consent were taken.

Height and weight were measured.

The Peak Expiratory Flow Rate was measured in Standing and Sitting positions using Mini Wright Peak Flow Meter of Choicemed.

OUTCOME MEASURE

Peak Expiratory Flow Rate

The Outcome measure which is used in the study is the Peak Expiratory Flow Rate. The Peak Expiratory Flow Rate that is the maximum flow produced during a forced expiration after a maximum inspiration till the total lung capacity. The Peak expiratory flow rate shows the strength and the state of respiratory muscles with the level of airflow limitation in large airways.

For the study, the Mini Wright Peak Flow Meter is used. A Peak Flow Meter is a portable, inexpensive, hand-held device used to measure how air flows from your lungs in one "fast blast." In other words, the meter measures your ability to push air out of your lungs. Peak Flow Meters come in two ranges to measure the air pushed out of your lungs. A low range Peak Flow Meter is for small children, and a standard range Peak Flow Meter is for older children, teenagers, and adults. An adult has much larger airways than a child and needs the larger range.

Steps to use a Peak Flow Meter: -

Step 1: Before each use, make sure the sliding marker or arrow on the Peak Flow Meter is at the bottom of the numbered scale (zero or the lowest number on the scale).

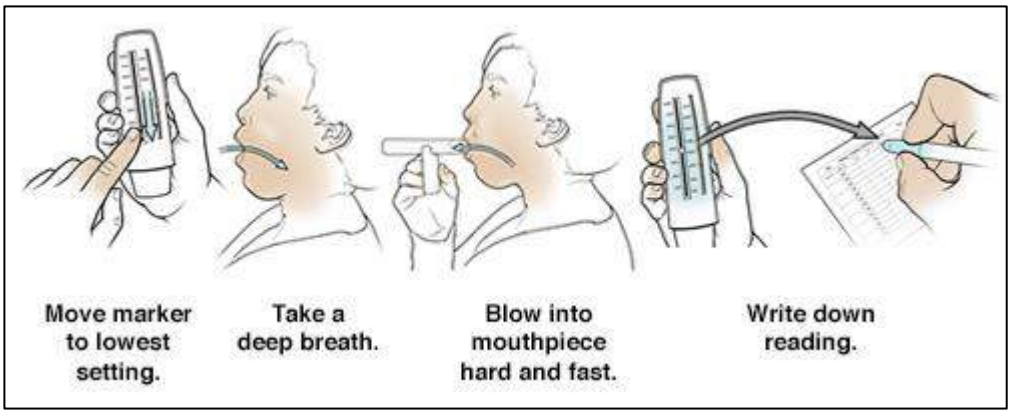
Step 2: Remove gum or any food from your mouth. Take a deep breath (as deep as you can). Put the mouthpiece of the peak flow meter into your mouth. Close your lips tightly around the mouthpiece. Be sure to keep your tongue away from the mouthpiece. In one breath, blow out as hard and as quickly as possible (like you are blowing out candles on a birthday cake). Blow a "fast hard blast" rather than "slowly blowing" until you have emptied out nearly all of the air from your lungs.

Step 3: The force of the air coming out of your lungs causes the marker to move along the numbered scale. Note the number on a piece of paper.

Step 4: Repeat the entire routine three times. (You know you have done the routine correctly when the numbers from all three tries are very close together.)

Step 5: Record the highest of the three ratings. Do not calculate an average. This is very important. You can't breathe out too much when using your peak flow meter but you can breathe out too little. Record your highest reading.

The normal value range for The Peak Expiratory Flow Rate is 450 - 550 L/min in adult males and 320 - 470 L/min in adult females.



Measurement of Peak Expiratory Flow Rate

RESULT

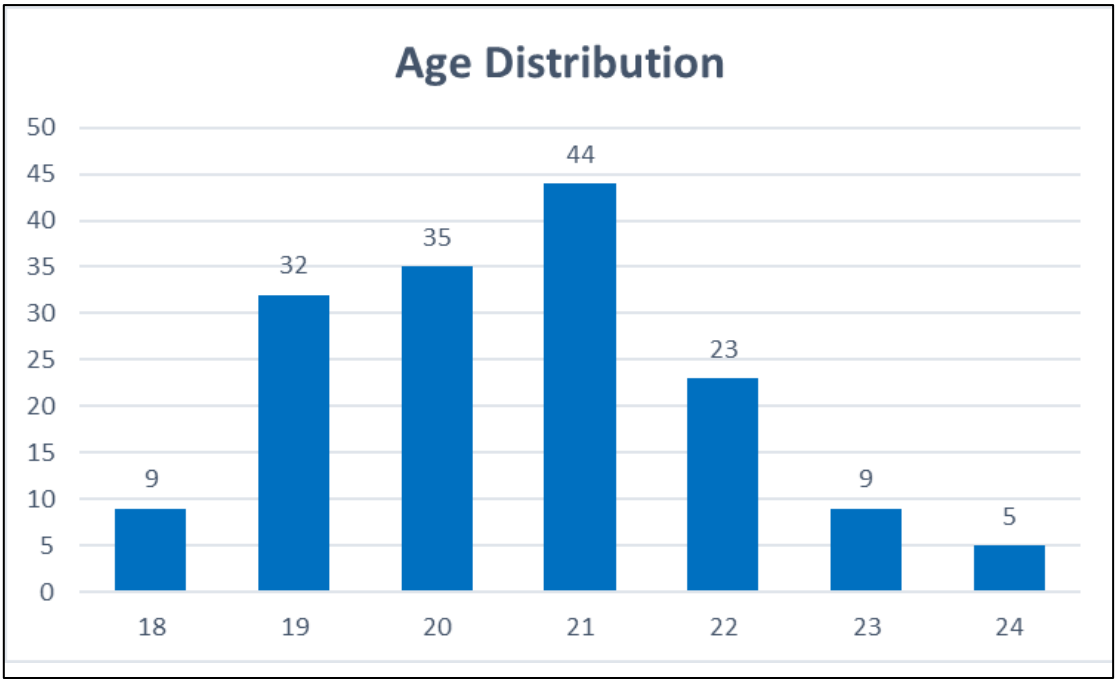
STATISTICAL ANALYSIS

All statistical analysis was done by using The Statistical Package for the Social Science (SPSS) version 21 for windows, Microsoft Word and Microsoft Excel were used to generate graphs and tables. The Normality of the data was measured using skewness, kurtosis. Standing and Sitting Position were analyzed using parametric test. Group analysis was done using a paired- T test in the group.

Level of Significance (p-value) was taken 0.05 and Confidence Level (CL) was taken 95%.

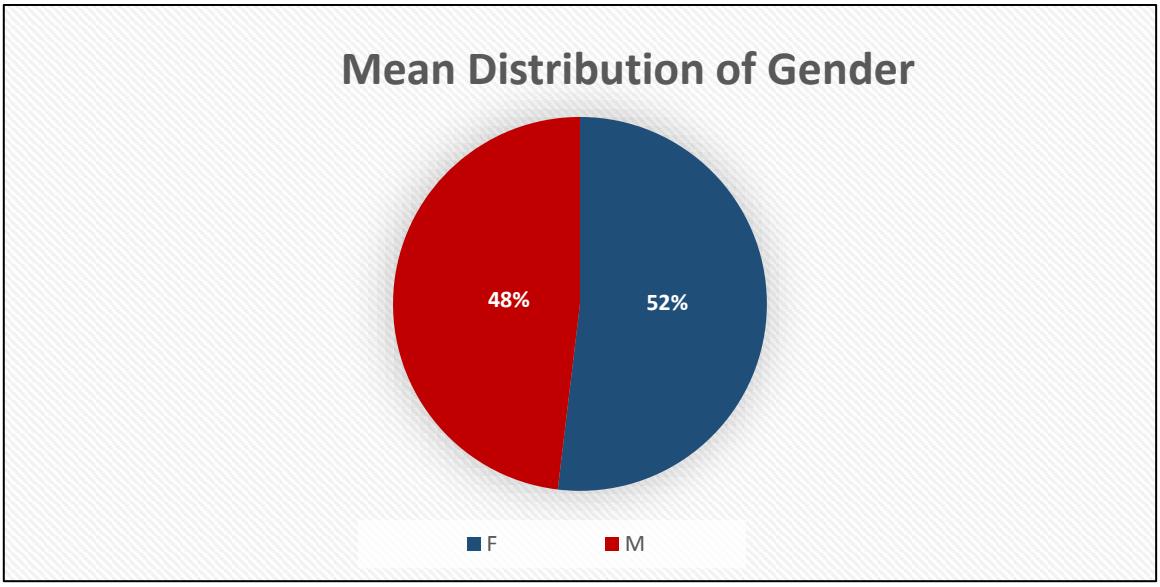
Table 1: Mean Distribution of Age

Mean Distribution of Age	
Mean	20.5506



Graph 1: Mean Distribution of Age

Interpretation- The above graph and table shows an age distributions of male and female and it shows a Statistical values of Age (Mean-20.5506).

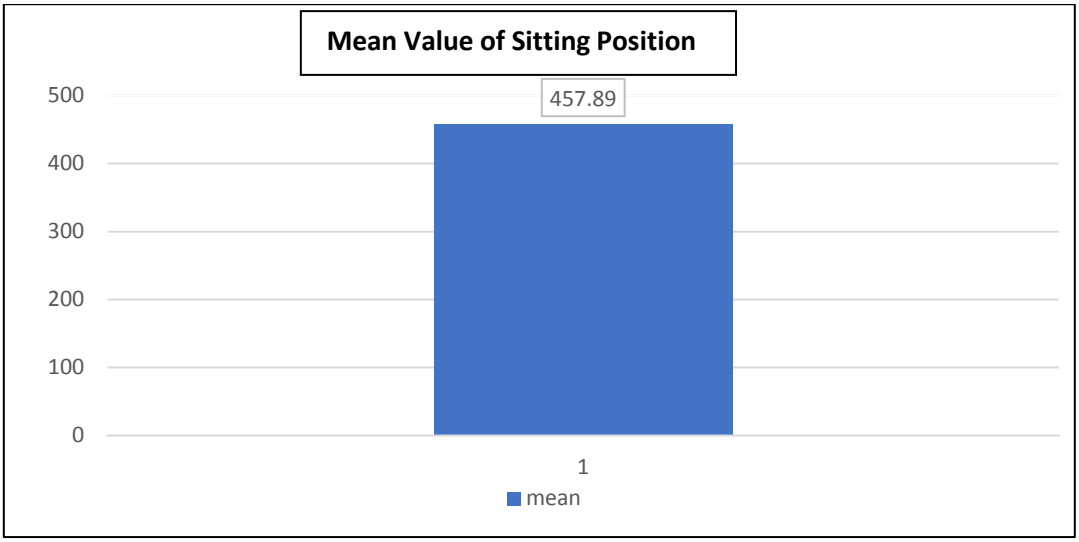


Graph 2- Mean Distribution of Gender

Interpretation- The above graph shows the number of participator and percentage according to the gender. The females are more compared to male.

Table 2: Mean value in Sitting position

Statistics Sitting position	
Mean	457.8924

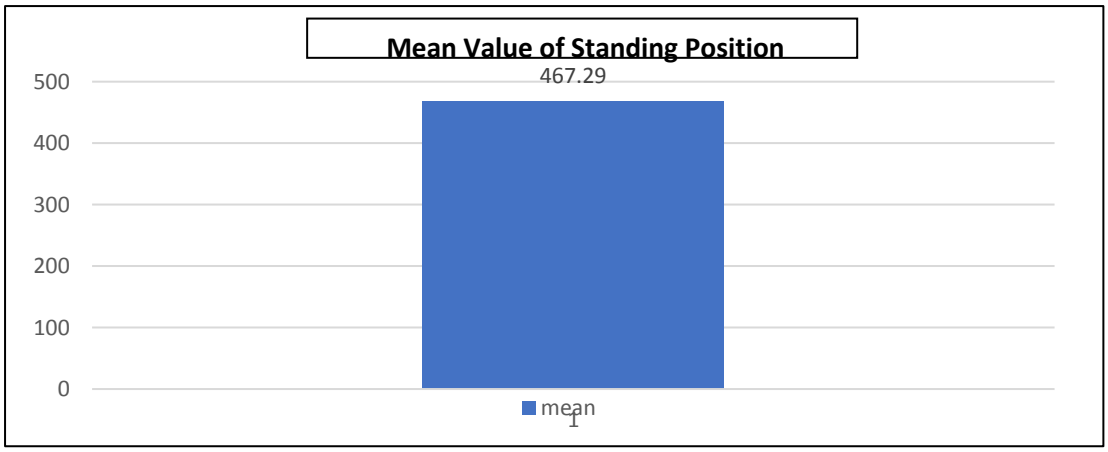


Graph 3: Mean value in Sitting position.

Interpretation- The above graph and table shows a Mean value in sitting position (Mean-457.8924).

Table 3: Mean value in standing position

Statistics Standing position	
Mean	467.2911

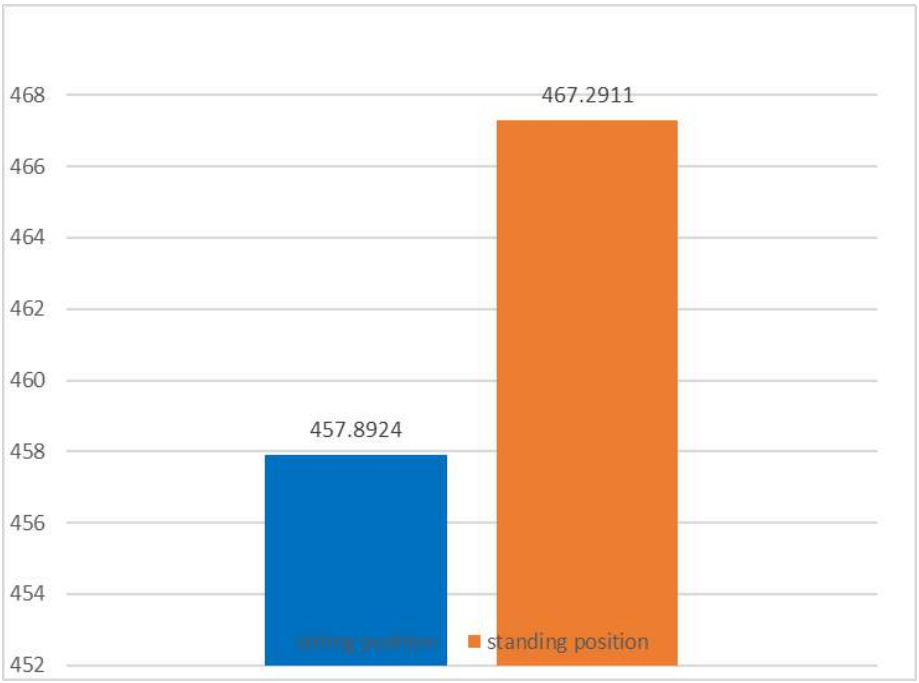


Graph 4: Mean value in Standing position

Interpretation- The above graph and table shows a Mean value in Standing position (Mean-467.2911).

Table 4: Paired Samples t-test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
sitting - standing	-9.39873	72.21411	5.74505	-20.74629	1.94882	-1.636	157	.104



Graph 5: Comparison of mean values in sitting and standing position

Interpretation- The above graph and table shows a Comparison of Mean value in sitting and standing position using Paired Samples Test and it showed statistically

significant mean value of Peak Expiratory Flow Rate is higher in the Standing Position than the Sitting Position.

DISCUSSION

The aim of the present study was to evaluate the Impact of Different Body Position on Peak expiratory flow rate (PEFR) measures among Collegiate Students**.**

A comparative study carried out with 157 subjects between the age group of 18 to 25 (Male and Female) PEFR was used for outcome measures.

This study reveals that PEFR decreased in the sitting position compared with the standing position in the male and female participants.

Standing has been shown to lead to highest lung volumes and when standing was not measured, upright sitting resulted in the highest lung volumes. As higher the lung volumes the greater the elastic recoil of the lungs and chest wall and the expiratory muscles are at a more optimal part of the length tension relationship curve which are capable of generating higher intra thoracic pressure, this is due to Gravity pulls the abdominal contents caudally within the abdominal cavity, increasing the diameter of the thorax. [11]

According to N. Siva Jyothi Asst. Professor reported that peak expiratory flow rate in different positions increases the sensitivity for detecting upper airway or assessing the effects on upper airway patency. [12]

By Jeeny Jayapal, he suggested that in postural changes, PEFR measurements significantly differ based on whether the measurements are taken in the standing or in sitting position in healthy participants. The effect of posture may be of importance in recording PEFR changing to a better posture may be especially useful for those participants with weak expiration. [13]

According to Ajith Pakkala he reported that with postural changes, standing is the best position in terms of PEFR following by sitting, semi fowler's and then supine which has least PEFR value. [14]

Unlike Positions such as supine, the bases of the lungs are not compressed by weight of heart and abdominal contents. This allows alveoli that had been compressed to reopen and increase lung compliance. Inspiratory muscles are able to expand the

unrestricted thorax in all directions, as a result the diaphragm is able to contact even further caudally and increase lung volume, which leads to greater elastic recoil.

Following deep inspiration, the contracting diaphragm increases pressure on abdominal contents pushing them forward which places the abdominal muscles at a stretch that makes the abdominal muscles to be more capable of stronger contraction and helps in the generation of higher expiratory pressure. Other factor that may have influenced the result in standing position includes patient comfort and higher arousal level. [15]

According to Jeremy L Thomas suggested that PEFR measurements do not significantly differ based on sitting or standing measurements among healthy participants. Based on the results of this study it may not be necessary for the patient to stand while performing PEFR measurements. [16]

By Martin Raymond Miller, he reported that PEFR has similar effects on different body positions like sitting, standing or lying. [17]

The peak expiratory flow rates are best in standing with a mean of 467.2911 followed by sitting with a mean of 457.8924.

Limitations:

- Small sample size.
- Limited Age ranging.
- Less Time duration.
- Study was performed only on sitting and standing position.

Further Recommendations:

- Study can be done in larger number of healthy individual as well as individual with variety of medical conditions.
- Can also be performed in different position like semi fowler, supine, lying, prone lying etc.
- Lung function can also be measured with more accurate results along with values of FEV\! and FVC using spirometry.
- The study can also be performed on different population.
- It can also be done different age groups.
- Study can also be done with population having underweight or overweight.

CONCLUSION

The postural changes have a significant effect on the Peak Expiratory Flow Rate measurements. The Peak Expiratory Flow measures differs significantly in different Positions. The values of the recordings depend upon the Position of the subject. The measurements are significantly higher in Standing Position than the Sitting Position in the healthy individuals. Thus, it can be concluded that the Standing Position is much more effective than the Sitting Position to improve expiration and ultimately increasing the Peak Expiratory Flow Rate in the individuals.

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"A STUDY TO EVALUATE THE HAND GRIP STRENGTH AND HAND FUNCTION IN CONSTRUCTION WORKER: AN OBSERVATIONAL STUDY"

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Abstract:

BACKGROUND: everyday activities and function required a high contribution of hand and forearm in construction workers. It also works on the hand grip strength and hand function due to overuse of hand and wrist, it will lead to repetitive stress over muscles and tendons and will cause other abnormalities like tendinopathy, tenosynovitis etc. Thus, the aim of this study was to evaluate the hand grip strength and hand performance in construction workers.

AIM: The purpose of the study was to evaluate hand performance and hand grip strength in construction workers.

OBJECTIVE: To evaluate the hand performance in construction worker. To evaluate the hand grip strength in construction worker.

METHOD: According to the selection criteria all the subjects were selected for the study. All the Selected 100 subjects were explained about study procedure and informed consent obtained from each participant. All the subjects had been examined for Hand Grip Strength through Dynamometer and Hand performance by Using Duruoz Hand Index.

RESULT AND DISCUSSION: Data was analyzed using Microsoft Excel2017. The result of the present study there is no affection in hand grip strength and hand performance.

CONCLUSION: It was concluded that there is no affection in hand grip and Hand function.

KEY WORDS: Hand Grip Strength, Hand Performance, Hand Held Dynamometer, DURUOZ Hand Index

Introduction

What is handgrip strength?

Hand Grip strength is prime component related to subject performance. The increase or decrease in muscle strength can influence the productivity of workers and contribute the development of musculoskeletal disorder.

The measurement of grip strength allows us to set up a parameter of the functional integrity of the upper limb. The Power grip is the result of forceful flexion of all finger joints with a maxima voluntary force that the subject is able to apply under normal bio-kinetic conditions. In gripping activities, the flexion muscle in the hand and forearm stabilize the wrist. [1]

The Hand grip strength can be assessing by measuring the amount of static force that the hand can squeeze around a dynamometer. The focal point of recent research has been on the correlates or has which were record in various studies. Auyeung et al. studied the sex differences in the annualized has decline rate and found that females had a faster rate or grip strength decline compared to males, whereas other studies found faster decline rate in males, than female's other sociodemographic correlates such as ethnicity and occupation and anthropometric measures. [2-3]

Figure 1.1 hand grip strength with hand dynamometer

Hand grip in construction industry:

The construction industry is an important economic section in India. Due to the increasing mechanization process, the line of constructing structure involves a high demand of muscle strength and repetitive movement of wrist and upper limb. The work capacity and the pressure to increase manufacture, alternating shirts, the existence or physical risks and the lack of independence can be associated with carpal tunnel syndrome, Rheumatoid arthritis etc. conditions. employee with lower hand grip have low productiveness, with higher rise of injury at work, which can affect the worker's health. [4]

Grip strength is an important aspect of all working activities in daily active life in which employee use their hands in manual operations like construction substance mixing, manual material handling, etc. in addition, workers who operate hand - held power tools, who are occupationally exposed to hand transmitted vibration, which is associated with various disorders of the hand and arm.
In construction worker's repetitive motion are especially risky when they involve the same joints and muscle groups over and over again and whenever the same motion is done too often, too fast and for long. Examine the repetitiveness of a task involves steps or cycles it takes. Work involving repetitive motion is very tiring because the employee cannot fully recover in the short period of time between motion. If work activities continue in spite of the fatigue, trauma can occur. [5-7]

Duroz hand index:

The Duruoz Hand Index appear as a self-report questionnaire that can be frequently used to check hand-related activity limitation in patients with RA. It has been cross-validated for outcome assessment of hand-related activity in patients with OA, Systemic Sclerosis. Its reliability has been shown in patients with RA, OA and Systemic Sclerosis. Its responsiveness has been shown during the course of the disease and after hand surgery in patients with RA.

The Duruoz Hand Index is also known as Cochin Hand Functional Disability Scale. It has been composed of 18 items related to hand activities. It has five factors such as kitchen (1-8 items), dressing (2 items), personal hygiene (2 items), office tasks (2 items), and others (4 items). Every item has a score between 0-5 and total score 0-90. The reliability and validity of Duruoz Hand Index have been studied in hand osteoarthritis (16), traumatic hand flexor tendon injuries (17), stroke (18), systemic sclerosis (19), and diabetic hands (20). [8-10]

METHODOLOGY

- **Study Design**: An Observational study
- **Study Setting**: Various Construction sites - Rajkot
- **Study Sample**: 100 Subjects
- **Study Duration**: 6 Months
- **Study Population**: Male & Female of Construction Worker
- **Study Technique**: Convenient sampling

INCLUSION CRITERIA

- >1 year of experience are included
- Age between 18-50 years

EXCLUSION CRITERIA

- Nearly hired workers, those with less than a year on the job.
- Those with hand injury or pain at the time of testing.
- Those who refused to participate voluntarily were excluded from the study.

MATERIAL USED

- Pen, Paper, Chair & Table
- Consent Form & Assessment Form
- watch
- Hand held Dynamometer
- Duroz hand index scale

PROCEDURE

- In 100 construction workers were enrolled in this study after written informed consent was obtained from each participant. Participants age, gender, dominant hand and duration of works (Months) was recorded. Each participant was assessed through Hand Grip strength by Hand-held Dynamometer and hand-functions with the use of Duruoz Hand Index.

Hand-Grip Strength:

- A Jamar Hand Dynamometer was used to evaluate grip strength in the dominant hand.
- Sit the patient comfortably in a standard chair with legs, back support and fixed arms, use the same chair for every measurement.

↓

- Ask them to rest their forearms on the arms of the chair with their wrist just over the end of the arm of the chair, wrist in a neutral position, thumb facing upwards.

↓

- Demonstrate how to use the jamar handgrip dynamometer to show that gripping very tightly register the best scores.

↓

- Position the hand so that the thumb is round one side of the handle and the four fingers are around the other side. The instrument should feel comfortable in the hand. After it position the handle if necessary.

↓

- The observer should rest the base of the dynamometer on the palm of their hand as the subject hold the dynamometer. The aim of this is to support the weight of the dynamometer, but care should be taken not to restrict its movement.

↓

- Encourage the participants to squeeze as long and as tightly as possible or until the needle stops rising. Once the needle stops raising the participants can be instructed to stop squeezing.

↓

- Read grip strength in kilograms from the outside dial and record the result to the nearest 1kg on the data entry form.

↓

- Do two further measurements; the best score of the three grip strength measurements is used in statistical analysis so as to encourage the subjects to get as high a score as possible.

OUTCOME MEASURES:

Duruoz Hand Index:

- The DHI 18 items on hand ability in the kitchen, during dressing, while performing personal hygiene, office tasks, and other general items. The first part represents activities requiring force and rotation, the second part represents activities requiring dexterity and precision. Third part represents dynamic activities requiring flexibility of the first 3 fingers. Scores for kitchen tasks range from 0 to 40. Scores for dressing, hygiene, and office tasks range from 0 to 20. Persons rate their ability from 0- no difficulty to 5- impossible to do. The questionnaire yields a total score from 0 to 90. It takes about 3 minutes to complete. An excessive score shows greater activity limitation or more difficulty.

RESULT

- 100 construction workers were enrolled into this study according to selection criteria. Hand grip strength were taken of the subjects by hand held dynamometer.
- Data was coded in Microsoft excel and word were used to generate graphs and tables.
- All the statistical analysis was done by the **STASTICAL PACKAGE FOR THE SOCIAL SCIENCE (SPSS)** software version **21** for windows. Normality of data was checked by using a mean, average and std. Deviation.

Table and Graph: 6.1 Mean Distribution of Gender

MALE	65
FEMALE	35

Table:6.3 Mean value and average of dynamometer and duroz hand index

	Dynamometer[kg]	Duruoz hand index
AEVERAGE	23.32	5.43
Min value	12	1

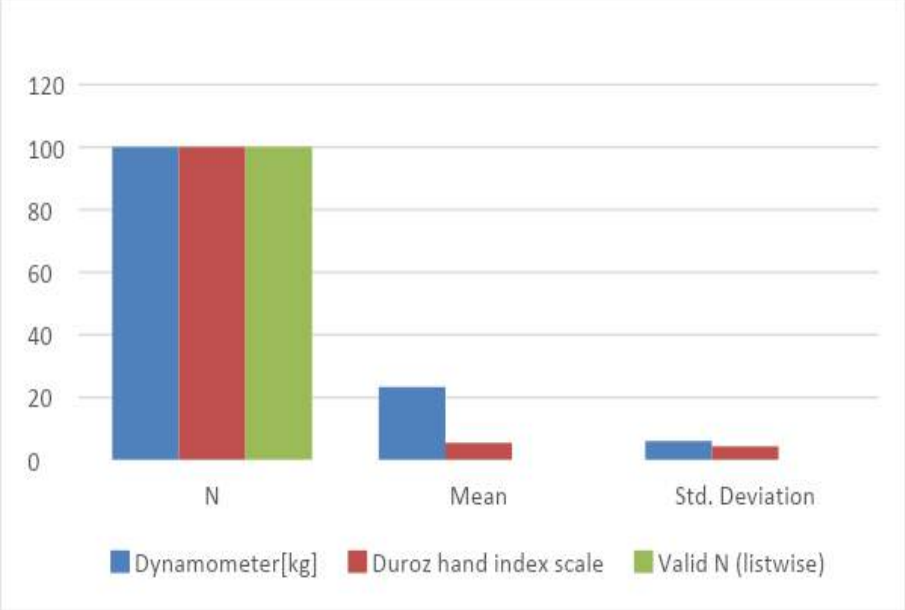
Graph :6.4 Mean value and average of dynamometer and duroz hand index

Table:6.5 Descriptive statistics

	N	Mean	Std. Deviation
Dynamometer[kg]	**100**	**23.32**	**5.969**
Duroz hand index scale	**100**	**5.43**	**4.333**
Valid N (listwise)	**100**		

Interpretation: The above table is shown mean and standard deviation of dynamometer (kg) and duroz hand index scale.

Graph:6.6 descriptive statistics



Interpretation: Above graph is descriptive statistics of dynamometer and duroz hand index

DISCUSSION:

The primary aim of the present study was to investigate hand performance and hand grip strength in construction workers.

In this study 100 construction workers were enrolled from various construction sites in Rajkot. First took written consent from each participant. After that each participant assessed through hand grip strength by hand-held dynamometer and hand function with use of Duruoz hand index (DHI).

Hand grip affected in construction employee might be related to the high demand of muscle strength and repetitive movements of the wrist and upper limb.

The Duruoz Hand Index is also known as Cochin Hand Functional Disability scale. It has total 18 items related with the hand activities. it was used to check hand functions.

All working activities in daily active life in which employee use their hands in manual operations such as construction substance mixing, manual material handling, etc. in addition, workers who operate hand - held power tools, who are operationally exposed to hand transmitted vibration, which is associated with various disorders of the hand and arm.

The result of present study suggests that there is no affection in hand grip strength and hand performance in construction worker.

“Rukadikar Charushila A1, Geeta Shamnani, etc. all (2017) studied on ‘correlation of arm fat index and hand grip strength in cricket players: a cross sectional study’ they concluded that there is need to improve physical fitness parameter to enhance player’s performance. Body fat training and hand grip strength training should be executing at inferior level to build whole body mass and to counter asymmetrical load placed on the body through the nature of game. Hand grip strength training should be planned at various levels such as school, collage, university, state. Through this we can give a specific mark prescription to player while choosing a sport. In Japan, they have already applied this sport prescription method at earlier stages which help person to choose a game. So, it should be considered in India as it will be supportive for the performance of the sport player our aim of ‘RIGHT SPORT FOR RIGHT PERSON’ should be worked.

CONCLUSION

After conducting the evaluation of hand with hand dynamometer and with Duruoz Hand Index Scale: It was concluded that there is no affection in hand grip strength and hand performance in construction workers.

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A STUDY TO COMPARE AN IMMEDIATE EFFECT OF PNF HOLD-RELAX STRETCHING TECHNIQUE AND BLR TECHNIQUE ON HAMSTRING MUSCLE TIGHTNESS IN COLLEGIATE STUDENTS- AN EXPERIMENTAL STUDY

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ABSTRACT

Background: A tightness of the hamstring muscle is majority seen in the students. Longer period of sitting can be a contributory factor in hamstring muscle tightness.

Need of the study: The purpose of the study is to compare an immediate effect of mulligan BLR and PNF hold-relax stretching techniques on hamstring tightness

Methodology: for the study purpose, 30 subjects were taken from the school of physiotherapy at RK University. Subjects were divided in group A-BLR technique and group B-PNF hold-relax stretching technique with the help of random sampling method. One day treatment was given according to group-A/B and pre and post data of sit and reach test was taken for the comparison.

Result: Paired t test for both techniques for pre and post techniques showed 0.000 for both mulligan BLR and PNF hold relax techniques respectively and independent t test showed 0.240.

Conclusion: on the basis of the results, we can conclude that BLR technique and PNF hold-relax stretching technique are equally effective on hamstring muscle tightness.

Key words: Mulligan BLR, PNF hold-relax, sit and reach test, hamstring tightness

INTRODUCTION:

- Hamstring consists of 3 large muscles: Biceps femoris, semitendinosus and semimembranosus.(1)
- Originates from inferio-medial impression of the upper part of ischial tuberosity and insert on upper part of posterior surface of tibia.(1)
- Works on knee flexion and hip extension which indicates biceps femoris is a two joint muscle.(1)
- Due to prolonged sitting, students may have hamstring tightness and when it comes to the injury rate within hamstring muscle it is the long head of biceps femoris which is frequently injured and accounts for approximately 80% of all hamstring injury.(2-4)
- The flexibility of hamstring muscle is always emphasized more. The commonest muscle to always go for tightness is the hamstring muscle.(5-7)
- Normal hamstring flexibility affected by numerus factors including age, gender, race, tissue temperature, strength training, stiffness, awkward posture and reduced warm up period during exercise.(8)
- The hamstring muscle tightness apparently increases from childhood to age of 40-49. Males have more prevalence of hamstring muscle tightness than females.(9-10)
- Sit and reach test is valid for assessing hamstring muscle tightness.(11)
- Mulligan BLR(bent leg raise) is a newer technique to manage hamstring muscle tightness and to improve hamstring muscle flexibility.(12)
- PNF (proprioceptive neuromuscular facilitation) is advanced technique developed as a form of rehabilitation which provides stretching and muscle contraction of targeted muscle group.(11)

CRITERIA FOR DATA COLLECTION

Inclusion criteria

- Age between 18-25 years
- Male and Female
- Students with hamstring muscle tightness

Exclusion criteria

- Subjects with history of musculoskeletal injury, neurological LBP, pathology of pelvis, hip or knee
- Any injury of hamstring muscle in last 6 months from time of study

MATERIAL USED

- Sit and reach box
- Pen
- Paper
- Plinth
- Stool
- Laptop

METHODOLOGY

- **Sit and reach test :** 30 subjects were taken from R K University and divided into 2 groups by randomized chit method of 15 subjects each
- **Group A :** Mulligan BLR technique
- **Group B :** PNF hold-relax stretching technique
- **Study duration :** Single time study

METHOD

In the experimental study 30 subject were taken from school of physiotherapy RK university. subjects were equally divided into 2 groups, Group-A BLR technique and Group-B PNF stretching technique with the help of random sampling method.

The needed information about the study was given to the subjects with the written consent. All the advantages and disadvantages of the techniques was taught to subject after that the subjects which was fulfill the inclusion and exclusion criteria of the study was allowed to participate in study.

SIT AND REACH TEST:

Tightness of the hamstring muscle was measured by using sit and reach test. Standard sit and reach box was placed on the floor the participant sat on the floor with both the leg in extension so the sole of foot get flat. Then participant was asked to place the arm on the top of the other arm with the palm facing downward. Then the participant was asked to lean forward sling along the measuring bending the knee.(13)

BLR TECHNIQUE:

It was performed while participant is in supine position at the edge of the plinth with the hip and knee flexed at 90 degree. The participant was asked to hold the plinth with the hand of unaffected side and put the other arm below the head or neck.

Therapist was in walk-stand position lateral to the effected side. Shoulder of inner hand is placed under the popliteal fossa, grasp the lower end of thigh with both hand, longitudinal traction was applied along the long axis of femur.

Therapist takes the hip into flexion until first resistance is felt. If participant complains of stretch pain or if therapist feel resistance due to muscles tightness, contract-relax was applied by asking the participant to push the therapist's shoulder gently and hold for 5 seconds. Now the therapist can take the participant's hip into further flexion if pain is free.

If participant complains of the pain, more traction is given with hip abduction or external rotation before further hip flexion was added. Whatever the range is possible without pain, hold it for 20 seconds. The process was repeated for 3 times and re-assessed the changes brought about this mobilization.(14)

PNF HOLD-RELAX STRETCHING TECHNIQUE:

With the hold and relax procedure, the range limiting target muscle was first lengthened to the point of tissue resistance or to the extent that is comfortable for the participant. The participant then performed a pre-stretch, end-range, isometric contraction (for about 5 seconds) followed by voluntary relaxation of the range limiting target muscle. The limb was then passively moved into the new range as the range limiting muscle is elongated. This technique was repeated for 3 times.(15)

Figure 1: Sit and reach test

Figure 2: BLR technique

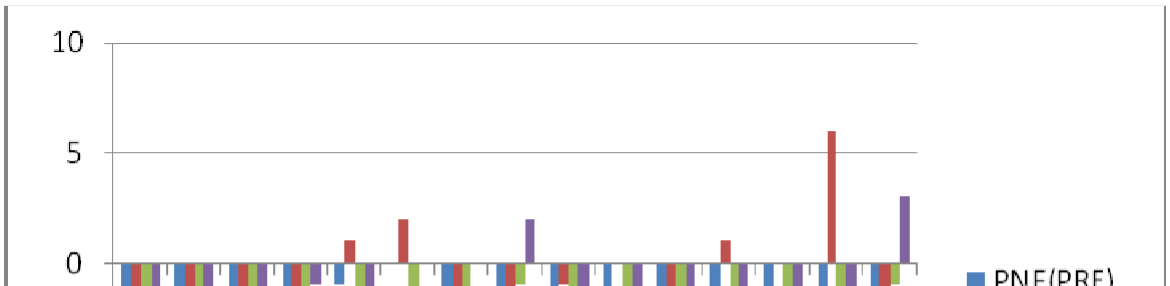
Figure 3: PNF stretching technique

RESULT

	N	CORRELATION	SIG.
PAIR 1 BLRpre & BLRpost	15	.911	**.000**
PAIR 2 PNFpre & PNFpost	**15**	**.904**	**.000**

Table 1: Paired t Test for both mulligan BLR and PNF hold-relax stretching techniques

- Unpaired t test was used to compare between both groups and the significance value shows 0.240



Graph 1: graphical presentation of pre and post for both the techniques.

DISCUSSION

In this present experimental study comparison between BLR technique and PNF hold-relax stretching technique was done. For that 30 subjects were taken and the techniques were performed according to the group division.

The result of the present study on the basis of paired T test said that PNF hold-relax stretching technique and BLR technique both are increasing hamstring muscle flexibility or reducing the hamstring muscle tightness but on the basis of mean value result shows that both the techniques are equally effective for hamstring tightness. Neither of techniques are superlative on each other. Thus, the present study supports the null hypothesis and rejects the experimental hypothesis.

BLR technique is reducing hamstring muscle tightness by releasing adhesion between sciatic nerve and gluteus maximus and adductor magnus by applying stretching of the gluteus maximus and adductor magnus, mobilization of sciatic nerve will occurs in relation to these muscle without the nerve getting stretched, helps in opening of the inter-vertebral foramen and the facet joint of the inter-vertebral foramen and also help in releasing thoraco-lumbar fascia.[14]

Practitioners in clinic and athletic training settings have reported that the hold and relax

technique appear to make passive elongation of muscles more comfortable for a patient than manual passive stretching. It has been assumed that the sustained, pre-stretch contraction is followed by reflexive relaxation accompanied by a decrease in electromyographic (EMG) activity in the range limiting muscle, possibly as the result of autogenic inhibition.(15)

The present study supports the study done by tejashreebhio, Deepak B.Anap who studied immediate effect of mulligan BLR technique versus self myofascial release on hamstring muscle tightness in young adults and concluded that both techniques mulligan BLR and self MFR are equally effective in improving hamstring muscle flexibility after single intervention and this study also supports the study done by Gauri Shankar, Yogita who conducted a study on effectiveness of passive stretching versus PNF hold-relax technique in flexibility of hamstring muscle and concluded that effectiveness of hamstring lengthening, there is highly significant increase ROM with hold-relax as compared to passive stretching.

While the present study does not support the study done by toby hall et al.2006 who conducted study on mulligan BLR technique of immediate effects after a single intervention and concluded that there is no any immediate effects of BLR, however SLR technique found to be effective on hamstring muscle tightness.

CONCLUSION

On the basis of the results we can conclude that the BLR technique and PNF hold-relax stretching technique are improving hamstring muscle tightness and both are equally effective. Neither technique is superlative on each other.

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“EFFECT OF GOLDFISH EXERCISE TO IMPROVE TONGUE PROTRUSION AND MOUTH OPENING IN TOBACCO CHEWERS : AN EXPERIMENTAL STUDY”

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Abstract:

BACKGROUND: Mouth opening and tongue protrusion is reduced in chronic tobacco chewers. Due to continuous action of mastication muscles there is fibrosis of the TMJ joint which eventually leads to reduced disc space and reduced mouth opening.

AIM AND OBJECTIVES:

AIM: Effect of goldfish exercise to improve tongue protrusion and mouth opening in tobacco chewers: an experimental study

OBJECTIVES: Effective in pain intensity reduce

Effect of mouth opening improve

Effect of mouth closing improve

Effect of protrusion improve

Effect of mouth deviation improve

METHODOLOGY: Study Design : Experimental Study

Study Sample : 80

Study Population : Tobacco Chewers

Study Duration : 3 Months

Study Setting : Rajkot, Gujarat

Study Sampling : Convinent

RESULTS: Mean between pre and post changes seen in range of mouth opening and VAS scale.

CONCLUSION: The value of post range of motion of mouth is increased and the pain was reduced.

KEYWORDS: Goldfish exercise, TMJ dysfunction, reduce jaw opening

INTRODUCTION:

ANATOMY: The jaw is also known as TMJ or temporo-mandibular joint. It can be painful as the result of injury, inflammatory disease, poor postures and habits of growth disorders. TMJ is made up of several parts- lower mandible and the socket (temporal bone). In between mandible and socket is a disc. The disc allows the joint to girdle smoothly on opening and closing. Joint is also held in place by joints and ligaments.

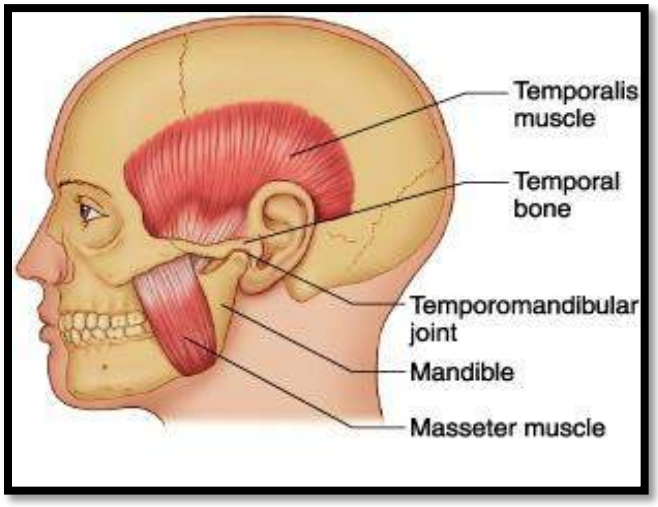
MUSCLES OF TMJ:

Masseter – composed of superficial and deep head

Temporalis – sphenomandibular is considered as part of temporalis by some source

Medial pterygoid

Lateral pterygoid

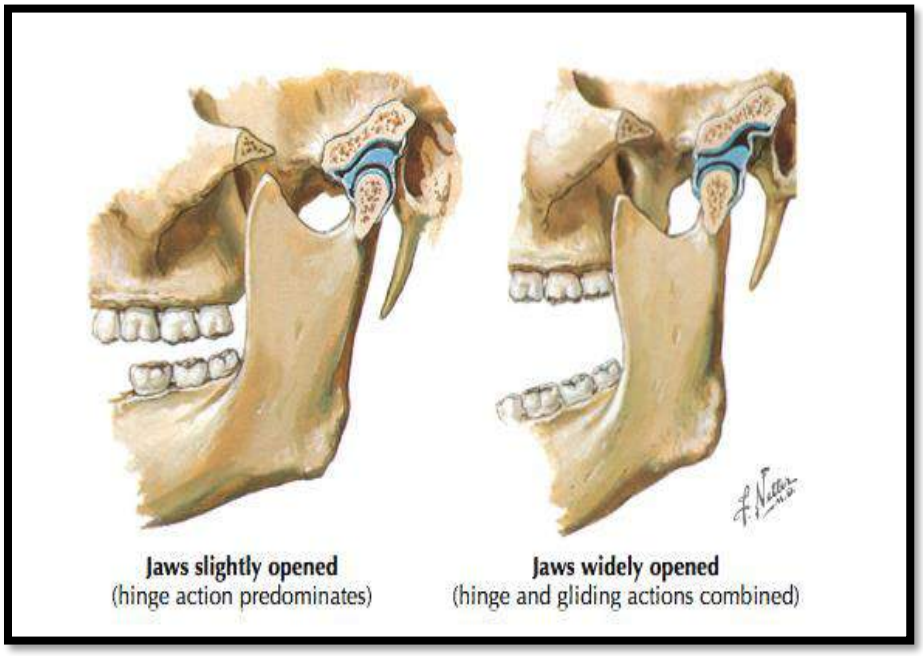


CAUSES TMJ PAIN:

There are number of causes which leads to TMJ and it is a combination of these rather than one single cause. It can be due to a blow to jaw either directly to joint or elsewhere on the jaw. Over activity of jaw muscles which can occur due to continuous grinding and clenching of teeth. Wear and tear, reduction in disc space also causes TMJ pain. Arthritis is another reason for TMJ dysfunction.

SIGNS AND SYMPTOMS OF TMJ DYSFUNCTION:

Pain in the jaw joints and facial muscles. Cliking, grinding and locking of the jaw headache and dizziness difficulty in opening and closing of mouth comfortably pain on talking chewing and yawing ear pain, tinnitus (ringing in ears) and hearing loss.



MOVEMENTS OF TMJ:

1. Mouth opening :

Mouth opening is generally considered normal at 40 to 50 mm. This should be an unstrained vertical movements and is measured from lower edge of upper central incisors.

2. Lateral mandibular movement:

This is measured from maxilla – mandibular midline to extreme of both right and left lateral mandibular movement. The mouth is slightly open so that the teeth do not touch during this test. Normal range is 10 to 12 mm each side.

3. Protrusion:

The mandible can normally be protruded 10 to 20mm from point of maximum occlusal contact.

The degree of TMJ dysfunction was based on the measurement of maximum mouth opening and self-assessment of symptoms using four measures on TMJ visual analog scale(VAS). The degree of TMJ dysfunction was also classified into “none”, “slight”, “moderate”, or “severe” as described in table 1. This classification is a modification of the TMJ criteria of International Association of oral and maxillofacial surgeons (IAOMS) and American Association of oral and maxillofacial surgeons (AAOMS). Pain at rest, pain on mandibular motion, pain on chewing and intensity of interference in daily life were self – recorded individually by patients.

Degree of TMJ dysfunction	Maximal mouth opening (mm)	Maximum value on any of 4 VASs (range 0-100)
None	≥40	0
Slight	35-39	1-33
Moderate	30-34	34-66
Severe	29-0	67-100

AIM AMD OBJECTIVES:

AIM: Effect of goldfish exercise to improve tongue protrusion and mouth opening in tobacco chewers: an experimental study

OBJECTIVES: Effective in pain intensity reduce

Effect of mouth opening improve

Effect of mouth closing improve

Effect of protrusion improve

Effect of mouth deviation improve

METHODOLOGY:

- Study Design : Experimental Study
- Study Sample : 80
- Study Population : Tobacco Chewers
- Study Duration : 3 Months
- Study Setting : Rajkot, Gujarat
- Study Sampling : Convinent

CRITERIA FOR SELECTION:

INCLUSION CRITERIA

(1) Pain on mandibular motion and pain on chewing in unilateral TMJ region with VAS score > 34 mm

(2) Maximal mouth opening ≤ 35 mm

EXCLUSION CRITERIA

(1) Patient whose age is ≤ 15 or 70 years old.

(2) Patients with history of mandibular fracture.

(3) Patients with skin disease in TMJ region.

(4) Patients with history of digestive bleeding, heart disease, lung disease, renal disease or other severe systemic diseases.

PROCEDURE:

The patient with mandibular pain and decreased range of mouth opening were selected for data collection. Ultrasound was given prior to demonstration of Goldfish exercise. Parameters of ultrasound were set to 3MHz frequency, 0.2 W/cm^2 intensity, 5 minutes of duration. Ultrasound was given in small circulatory movements over temporo – mandibular junction. After ultrasound treatment Goldfish exercise were demonstrated individually to all 80 patients. Goldfish exercise demonstrated to patients are as follow:

1. Relaxed Jaw Position

Place the tongue lightly on the top of your mouth behind your upper front teeth,allowing the teeth to come apart and relaxing the jaw muscles.

2. 'Goldfish' Exercise 1 (partial opening)

1. Keep tongue on the roof of your mouth.
2. Place one index finger on the TMJ.
3. Place your other index finger on your chin.
4. Allow the lower jaw to partially drop down and back
5. with help from the index finger
6. Monitor this partial jaw opening in a mirror to make sure the opening is straight(tongue stays up).

Repeat 6 times, 6 times a day

3. Goldfish' Exercise 2 (partial opening)

1. Keep tongue on the roof of your mouth.
2. Place one finger on each TMJ.
3. Allow the lower jaw to partially drop down and back to bring the chin to the throat.
4. Monitor this partial jaw opening in a mirror to make sure the opening is straight.
   Repeat 6 times, 6 times a day

4. 'Goldfish' Exercise 3 (full opening)

1. Keep tongue on the roof of your mouth
2. Place one index finger on the TMJ

3. Place your other index finder on your chin.
4. Allow the lower jaw to fully drop down and back with help from the index finger
5. Monitor this full jaw opening in a mirror to make sure the opening is straight (Progression: perform with tongue dropped off the roof of the mouth)


5. 'Goldfish' Exercise 4 (full opening)

1. Keep tongue on the roof of your mouth.
2. Place one finger on each TMJ.
3. Allow the lower jaw to fully drop down and back to bring the chin to the throat.

4. Monitor this full jaw opening in a mirror to make sure the opening is straight. Repeat 6 times, 6 times a day

(Progression: perform with tongue dropped off the roof of the mouth)

6. Mandibular Stabilisation Exercises

Maintaining the jaw in a neutral position, appiy gentie pressure to the jaw using your index finger/thumb

TO THE LEFT

TO THE RIGHT

OPENING

7. Mandibular Stabilisation Exercises (Advanced)

1. Place knuckle of index finger between top and bottom teeth.
2. Remove it, keeping the teeth separated one-knuckle apart.
3. Apply gentle pressure to the to the jaw using your index finger/thumb asdemonstrated in the pictures below.

8. Cervical Retraction 'Chin Tucks’

Standing or sitting with shoulders back and chest up, bring your chin straight back creating a double chin'. Do not allow your head to bend up or down as you do this. Hold for 2-3 seconds, repeat 10 times


RESULTS:

For this observational study, 80 tobacco chewers who had decreased mouth opening and tongue protrusion were selected. The result was analysed using SPSS software and were expressed in the form of p-value, t-value and mean value.

The result were analysed according to the mandibular movements and pain score:

1. VAS score pre and post
2. Mouth Opening pre and post
3. Mouth Closing pre and post
4. Deviation pre and post
5. Protrusion pre and post

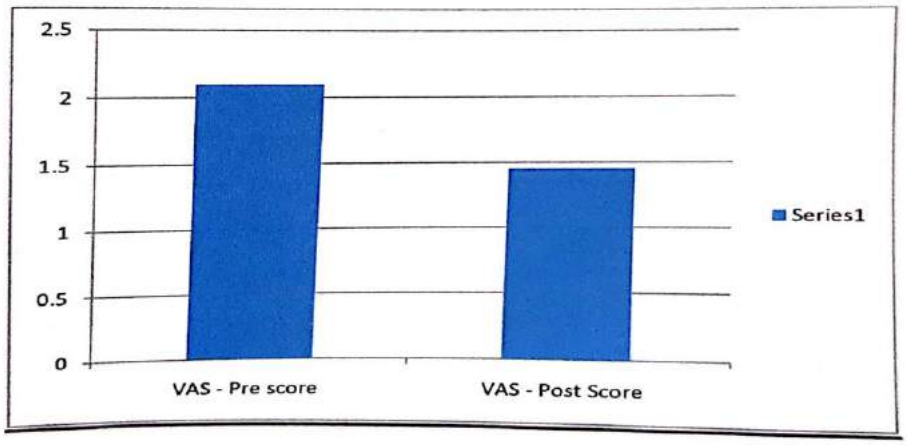
RESULT OF PRE AND POST VAS SCORE

TABLE-9.1: COMPARISON OF PRE AND POST VAS SCORE

	MEAN VALUE	T VALUE
PRE	2.1	3.115
POST	1.45	
P Value	0.0057	

Paired t test was applied to analyse pre and post score of VAS score and P value is 0.0057 so result is not significant.

Figure-9.1.1: COMPARISION OF PRE AND POST VAS SCORE



COMPARISION BETWEEN PRE ND POST VAS SCORE, POST VAS DECREASE THAN PRE VAS

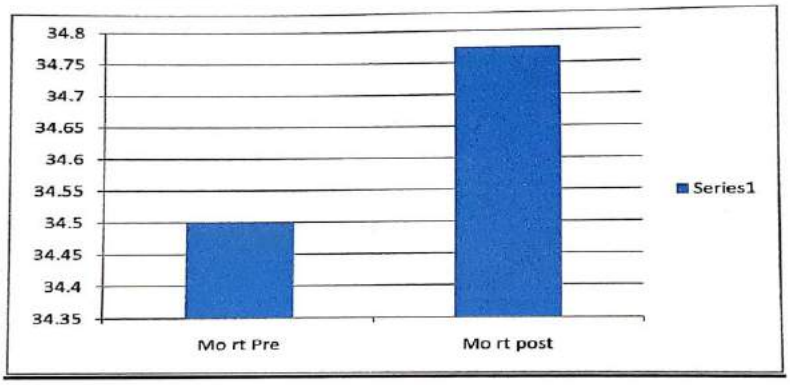
RESULT OF PRE AND POST MOUTH OPENING (RIGHT)

TABLE-9.2: COMPARISON OF PRE AND POST MOUTH OPENING ON RIGHT SIDE

	MEAN VALUE	T VALUE
PRE	22.1	3.115
POST	1.45	
P Value	0.0007	

Paired T test was applied to analyse pre and post score of right side mouth opening and P value is 0.0007 so result is significant.

Figure-9.1.2: COMPARISION OF PRE AND POST MOUTH OPENING ON RIGHT SIDE



COMPARISION BETWEEN PRE AND POST MOUTH OPENING ON RIGHT SIDE, POST MOUTH OPENING INCREASE THAN PRE MOUTH OPENING

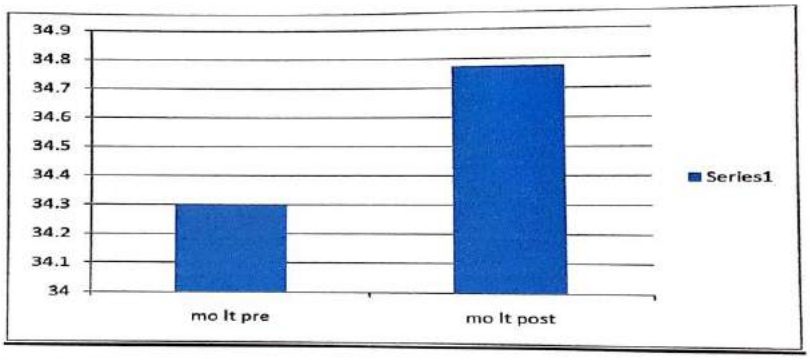
RESULT OF PRE AND POST MOUTH OPENING (LEFT)

TABLE-9.3: COMPARISON OF PRE AND POST MOUTH OPENING ON LEFT SIDE

	MEAN VALUE	T VALUE
PRE	34.3	4.046
POST	34.775	
P Value	0.0007	

Paired T test was applied to analyse pre and post score of Left side mouth opening and P value is 0.0007 so result is significant.

Figure-9.1.3: COMPARISION OF PRE AND POST MOUTH OPENING LEFT SIDE



COMPARISION BETWEEN PRE AND POST MOUTH OPENING ON LEFT SIDE, POST MOUTH OPENING INCREASE THAN PRE MOUTH OPENING

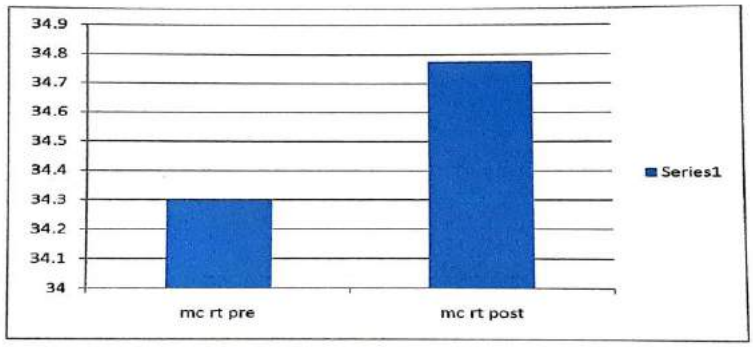
RESULT OF PRE AND POST MOUTH CLOSING (RIGHT)

TABLE-9.4: COMPARISON OF PRE AND POST MOUTH CLOSING ON RIGHT SIDE

	MEAN VALUE	T VALUE
PRE	34.3	4.046
POST	34.775	
P Value	0.0007	

Paired T test was applied to analyse pre and post score of right side mouth closing and P value is 0.0007 so result is significant.

Figure-9.1.4: COMPARISION OF PRE AND POST MOUTH CLOSING RIGHT SIDE



COMPARISION BETWEEN PRE AND POST MOUTH CLOSING ON LEFT SIDE, POST MOUTH CLOSING INCREASE THAN PRE MOUTH CLOSING

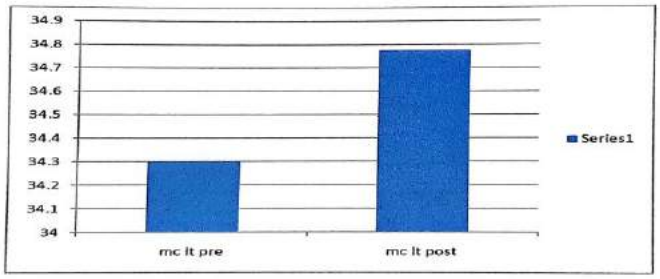
RESULT OF PRE AND POST MOUTH CLOSING (LEFT)

TABLE-9.5: COMPARISON OF PRE AND POST MOUTH CLOSING ON LEFT SIDE

	MEAN VALUE	T VALUE
PRE	34.3	4.046
POST	34.775	
P Value	0.0007	

Paired T test was applied to analyse pre and post score of left side mouth closing and P value is 0.0007 so result is significant.

Figure-9.1.5: COMPARISION OF PRE AND POST MOUTH CLOSING LEFT SIDE



COMPARISION BETWEEN PRE AND POST MOUTH CLOSING ON RIGHT SIDE, POST MOUTH CLOSING INCREASE THAN PRE MOUTH CLOSING

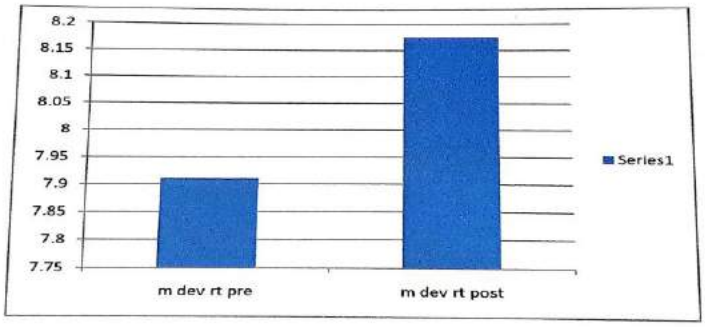
RESULT OF PRE AND POST MOUTH DEVIATION (RIGHT)

TABLE-9.6: COMPARISON OF PRE AND POST MOUTH CLOSING ON RIGHT SIDE

	MEAN VALUE	T VALUE
PRE	7.91	3.762
POST	8.175	
P Value	0.0013	

Paired T test was applied to analyse pre and post score of right side mouth deviation and P value is 0.0013 so result is significant.

Figure-9.1.6: COMPARISION OF PRE AND POST MOUTH DEVIATION RIGHT SIDE



COMPARISION BETWEEN PRE AND POST MOUTH DEVIATION RIGHT SIDE, POST MOUTH DEVIATION INCREASE THAN PRE MOUTH DEVIATION

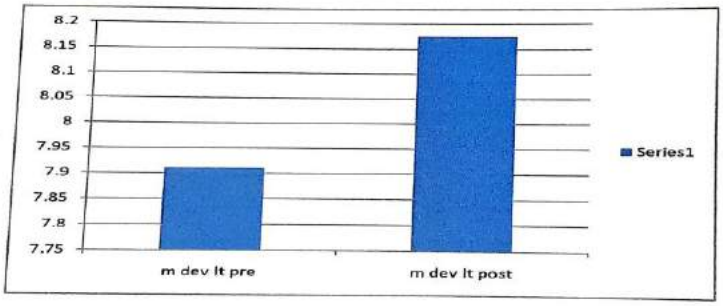
RESULT OF PRE AND POST MOUTH DEVIATION (LEFT)

TABLE-9.7: COMPARISON OF PRE AND POST MOUTH CLOSING ON LEFT SIDE

	MEAN VALUE	T VALUE
PRE	7.19	3.762
POST	8.175	
P Value	0.0013	

Paired T test was applied to analyse pre and post score of left side mouth deviation and P value is 0.0013 so result is significant.

Figure-9.1.7: COMPARISION OF PRE AND POST MOUTH DEVIATION LEFT SIDE



COMPARISION BETWEEN PRE AND POST MOUTH DEVIATION LEFT SIDE, POST MOUTH DEVIATION INCREASE THAN PRE MOUTH DEVIATION

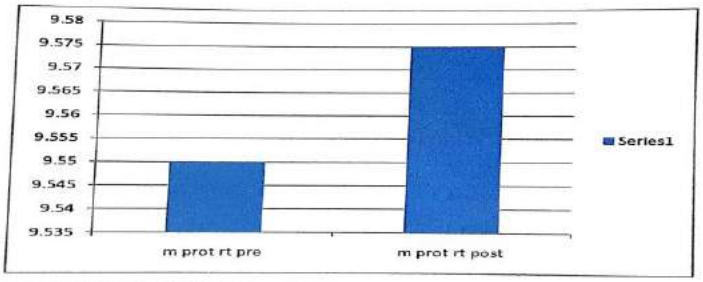
RESULT OF PRE AND POST MOUTH PROTRUSION

TABLE-9.8: COMPARISON OF PRE AND POST MOUTH PROTRUSION

	MEAN VALUE	T VALUE
PRE	9.55	1
POST	9.575	
P Value	0.3299	

Paired T test was applied to analyse pre and post score of mouth protrusion and P value is 0.3299 so result is not significant.

Figure-9.1.8: COMPARISION OF PRE AND POST MOUTH PROTRUSION SIDE



COMPARISION BETWEEN PRE AND POST MOUTH PROTRUSION, POST MOUTH PROTRUSION INCREASE THAN PRE MOUTH PROTRUSION

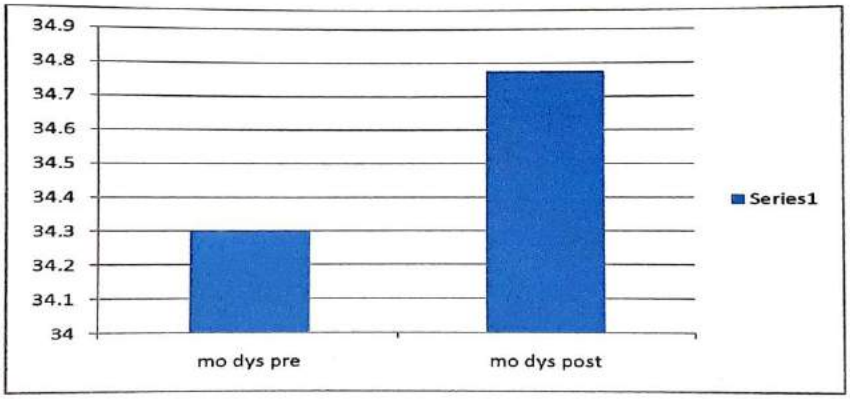
RESULT OF PRE AND POST MOUTH OPENING DYSFUNCTION

TABLE-9.9: COMPARISON OF PRE AND POST MOUTH OPENING DYSFUNCTION

	MEAN VALUE	T VALUE
PRE	34.3	4.046
POST	34.775	
P Value	0.0007	

Paired T test was applied to analyse pre and post score of mouth dysfunction and P value is 0.0007 so result is significant.

Figure-9.1.9: COMPARISION OF PRE AND POST MOUTH OPENING DYSFUNCTION



COMPARISION BETWEEN PRE AND POST MOUTH DYSFUCTION, POST MOUTH DYSFUNCTION INCREASE THAN PRE MOUTH DYSFUCTION

DISCUSSION:

Tobacco chewing is major preventable cause of decreased mouth opening in many of the chronic tobacco chewers. It leads to orofacial submucosis, locking of jaw, cancer etc.

Prolong tobacco chewing leads to fibrosis of muscles of mastication and this leads to decreased mouth opening and tongue protrusion. Sometimes the subject feels difficulty in opening mouth wide to bite any food material, certain times there are cases of locking of jaw due to this habit of tobacco chewing.

Here, 80 subjects with chronic tobacco chewers were selected for the study who had the chief complaint of reduced mouth opening and tongue protrusion. Some of these subjects were complaining of the mandibular pain which was mainly due to continuous working of muscle of mouth opening.

The effect of physiotherapy by goldfish exercise was helpful in relieving pain. Other effects of this exercise are - strengthening jaw muscle, stretch the jaw, relax the jaw, increasing the jaw mobility, reducing jaw clicking, promote the jaw healing.

All the results are significant as the P value of all of them is below 0.005. The data was analysed using SPSS software.

Except mouth protrusion all the other parameters are significant as their P values are below 0.005.

CONCLUSION:

The conclusion of the present study is significant improvement in mouth opening, mouth closing and mouth deviation. TM joint ROM statiscially and graphically expect mouth protrusion. So Goldfish exercise is used as rehabilitation in temporo-mandibular joint pathology patients.

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“Devices and methods for Stretching and release of hamstring muscle: A Narrative review”

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Abstract:

BACKGROUND: Daily working activities required hamstring flexibility. There are many causes for tight hamstring muscle. Hamstring tightness is common, no matter your activity level. Stretching those muscles may temporarily alleviate symptoms, but the cure might lie in posture and proper alignment.

NEED OF THE STUDY: to critically assess the different methods/instruments used to manage tight hamstring and find out if they are really useful or a sham.

METHODOLOGY: The electronic databases MEDLINE, PubMed, Cochrane Library were searched between 10 DEC and 31 DEC 2022 to locate scientific articles on Hamstring muscle tightness and its management. Google search engine is also used to search the devices and some of the material also been taken from the website of the manufactures companies.

RESULT: Managing Hamstring Tightness. Review the ‘direct’ and ‘indirect’ methods of managing tight hamstring muscle.

DISCUSSION: There are various direct and indirect methods for stretch and release of hamstring muscle.

CONCLUSION: The conclusion of this study is every device is lacking a bio kinesiology concept which is none of the devices are taking care of stabilizing the contralateral stability.

KEY WORDS: hamstring tightness, hamstring flexibility, direct and indirect methods

Introduction:

Hamstring muscle:

The hamstring muscle complex is comprised of three individual muscles and plays a critical role in human activities. Majority of muscles within the hamstring complex cross both the femoroacetabular and tibiofemoral joints.

The hamstring muscle group plays a prominent role in hip extension (posterior movement of the femur) and knee flexion (posterior movement of the tibia and fibula).

Figure 1.1 hamstring muscle

Causes of Tight Hamstring:

- A weakness in one area may cause other areas of the body to suffer from overcompensation.
- Posture is the Problem
- You Sit Too Much
- You Injured Your Hamstring Before

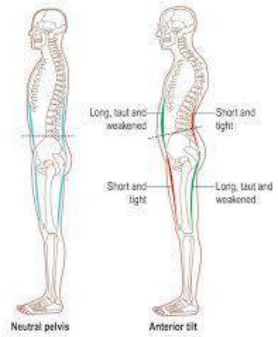


Figure 1.2 anterior pelvic tilt

Figure 1.3 prolonged sitting

Prevalence of hamstring muscle Tightness:

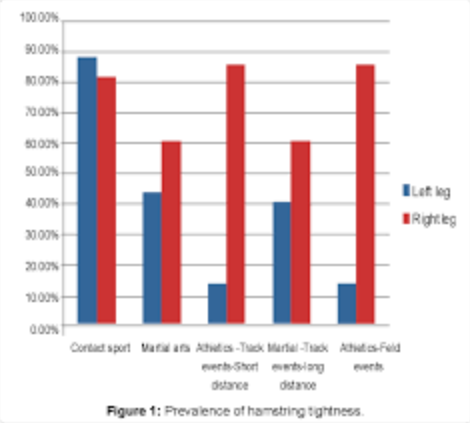
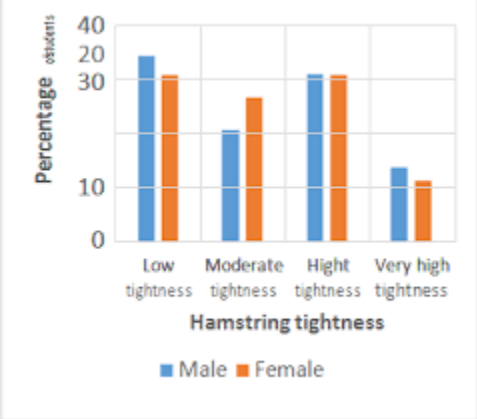


Figure 1: Prevalence of hamstring tightness.

The Prevalence of Hamstring Tightness among the Male Athletes of University of Peradeniya in 2010, Sri Lanka
Ishanka Weerasekara, Iresha Kumari, N Weerarathna, Charith Withanage, Chamika Wanniarachchi, Yancy Mariyanayagam, S. Vigneshwaran, Priyanthi Shivaraja, H. J. Suraweera, International Journal of Physical Medicine and Rehabilitation,2013, volume1, pages 1-2



Chellapillai FMD, Wijayalath WPLD, Dayarathna WMS, Safinaz ZMFZ, Ihsan AN, et al. (2019) Predisposing Factors for Hamstring Tightness among University Students. Physiother Rehabil 4: 17

Rational:

● Tight hamstrings can cause stiffness and limit mobility. They are usually the result of exercise so can activities like dancing and running.

● Hamstring tightness is common, no matter your activity level. Stretching those muscles may temporarily alleviate symptoms, but the cure might lie in posture and proper alignment.

Need of the study:

There are many devices which are available to release or manage the tight hamstrings but most of the devices are commercially available and having lack of biomechanical and structural anatomy knowledge so there is a need to critically assess the different methods/instruments used to manage tight hamstring and find out if they are really useful or a sham.

Aim of the study:

There are diverse methods available for managing the tight hamstrings some are manual and other are assisted with the device, some of the devices are very popular commercially in recent times but there is lack of agreement regarding the effectiveness of these devices. Therefore, the aim of this review was to provide an overview of the anatomy and role of hamstring muscles, implications of hamstring muscle tightness and evaluate the different methods or devices used to manage Tight hamstrings and understand the rationale behind them.

Selection criteria:

Research articles were identified that related to hamstring and tightness of hamstrings. Articles had to meet certain criteria for inclusion. The inclusion criteria were as follows.

(i) Research related to the role of Hamstring muscles

(ii) Research related to the anatomy of Hamstring muscles

(iii) Research describing the hamstring muscles and its tightness. Papers relating to the hamstring muscle tightness, but it became apparent that few papers existed.

(iv) Publication in peer-reviewed journals

(v) Full-text English language articles

(vi) Unpublished content on internet

(vii) online retailer information

Search Methods:

The electronic databases MEDLINE, PubMed, Cochrane Library were searched between 10 DEC and 31 DEC 2022 to locate scientific articles on Hamstring muscle tightness and its management. The search engine Pedro was also accessed. Further articles were identified by hand searching reference lists of the extracted articles. Google Scholar was also searched to identify any relevant unpublished or in press articles using the same search terms as those used in the database searches. The abstracts of the located articles were then read to select the appropriate articles, with full copies of the articles examined if the study was relevant to the research aim. Google search engine is also used to search the devices and some of the material also been taken from the website of the manufactures companies, personal website or blogs these data is not been published in any journal yet very popular as they are selling some of the devices there with description of the problem (hamstring tightness) and how to resolve it. As our aim is to collect all the relevant information which deals with management of tight hamstrings.

Result:

Managing Hamstring Tightness We will review the ‘direct’ and ‘indirect’ methods of managing tight hamstring muscle. The subheading ‘direct methods of managing hamstring tightness reviews the methods that can directly stretch the hamstring muscle with some external device. The subheading ‘indirect methods of assessing intrinsic muscle strength’ reviews methods that are unable to directly stretch the hamstring muscle but released the muscle and enhance muscle activity and flexibility.

Management of tight hamstring:

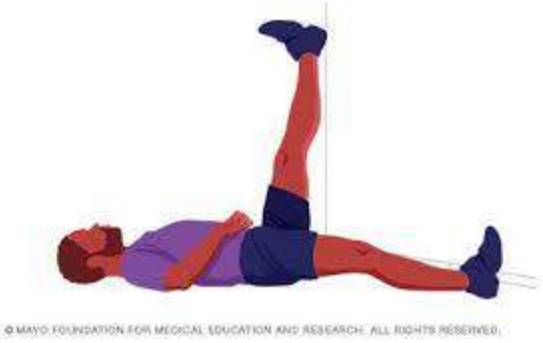


Figure 6.1 stretching of hamstring **Figure 6.2 release of hamstring**

DISCUSSION:

Direct methods:

1) IDEAL Stretch Original Hamstring Stretching Device
2) Various Fitness Device
3) Hammy stretch
4) stretch strap
5) NEPPT Calf Stretcher

Indirect methods:

1) Self-myofascial release with roller
2) Thera gun PRO massager
3) Massage Ball

CONCLUSION:

There are various devices and methods available for the stretching and releasing the hamstring muscle. Some direct and indirect devices are available at market. The conclusion of this study is every device is lacking a bio kinesiology concept which is none of the devices are taking care of stabilizing the contralateral stability.

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"DEVELOPING HYDROPS REDUCING PROTOTYPE DEVICE FOR LOWER LIMB LYMPHEDEMA PATIENT- A TECHNICAL NOTE"

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ABSTRACT

Background: A pathologic disease known as lymphedema is marked by an excessive build-up of fluid that contains protein. There are 200 million lymphedema patients worldwide. Lymphedema may develop as a primary ailment or become acquired (secondary). The intricacy of compression devices has increased even further, enabling digital programming to replicate manual lymphatic drainage techniques and encourage fluid removal. The compression device's effectiveness and supporting data are inadequate. The compression device retained less fluid. Therefore, it is necessary to create a combination device that offers vibration therapy in addition to compression therapy for drainage.

Aim: To design and test hydrops reducing device for lower limb lymphedema.

Objectives: To develop portable and easy to use device.

To check it's effectiveness among patient having lower limb lymphedema.

Methodology: It is multiphasic study, for the development of device various instruments like Microprocessor, Air compressor, Motor driver, Cuffs etc., are used. Once the device was made it will integrate to reduce edema for lower limb lymphedema patient.

Possible outcomes: Developing cost effective, portable, easy to use device to reduce lymphedema among lower limb lymphedema patient.

Keywords: Lymphatic system, Stemmers sign, Lymph, Portable, Edema

INTRODUCTION:

The word "lymphedema" refers to a group of pathologic diseases where excessive protein-rich fluid build-ups.[1] Around the world, 200 million people have lymphedema. Lymphedema affects females more often than males.[2] It can be either a primary or acquired (secondary) condition.[1] Physical symptoms including pain, heaviness and tightness and difficultly to perform daily activities are common. The development of lymphedema can also lead to long term psychological distress, and affect social and work relationships. On-going costs of lymphedema treatment are likely to be of great concern to those who are unemployed or on low incomes.[3] Compression devices have advanced in sophistication, allowing for digital programming to mimic manual lymphatic drainage techniques and promote fluid clearance.[4] Although compression device is one of the most commonly used modalities in clinical settings, the efficacy and evidence of compression device is poor. The use of compression device yielded reduction in volume of lymphedematous extremity but smaller amount of retained fluid from interstitium into lymphatic lumen remains undrained.[5]

NEED OF THE STUDY:

- Lymphedema is the condition which leads to difficulty in activity of daily life, also impact psychological and social life of the patient. Co-morbidities like hypertension, diabetes, cellulitis and many more further worsen the condition.
- There are many treatment approaches for lymphedema includes manual massage, stockings, elevation of extremity, exercise and pharmacological approach.
- The use of compression device yielded reduction in volume of lymphedematous extremity but smaller amount of retained fluid from interstitium into lymphatic lumen remains undrained.
- Hence there is need to develop combination device which provides compression along with vibration therapy for drainage can be made which overcome the limitation of pneumatic compression therapy.

AIM:

To design and test hydrops reducing device for lower limb lymphedema.

OBJECTIVES:

- To develop portable and easy to use device.
- To check it’s effectiveness among patient having lower limb lymphedema.

METHODOLOGY:

A device with following main components was made to reduce edema in lymphedema patient.

TABLE 1: Components used for making device

COMPONENTS	DESCRIPTION
Air compressor	To create pneumatic pressure
Battery	To power up the device
Balanced charger	To re-charge the battery
Vibrator	To create vibration
Cuffs	Provide seal with airways
Motor driver	To control opening and blocking of air pressure

Once the device is available six cuffs of the device will be placed at foot, calf and thigh of the patient. A cuff around limb which inflates and deflates and helps to enhance the lymphatic drainage and vibratory component creates vibration which helps in drainage of fluid which are essential for complete drainage of fluid from extremities.

POSSIBLE OUTCOME:

Developing a cost effective, portable, easy to use device to reduce lymphedema among lower limb lymphedema patients.

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"TO DEVELOP A GUIDELINE ABOUT PHYSICAL ACTIVITY, POSTURE AND EXERCISE AMONG COMPUTER WORKERS WITH NON-SPECIFIC LOW BACK PAIN: AN INTERVENTIONAL STUDY''

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ABSTRACT

BACKGROUND: Low back pain is a very common health problem that most people experience at some point in their working life. It results in sick leave, and disability, producing restrictions on usual activity and participation among many office workers. The working style of computer workers is mostly sedentary and inadequate ergonomic support provided by their home workstations caused them to adopt incorrect posture, which eventually led to the development of back pain.

AIM: To find out the efficiency of the Non-specific low back pain guideline on computer workers.

OBJECTIVES: **1.** To develop a Non-specific low back pain Guideline. **2.** To assess a non-specific low back pain Guideline on computer workers.

METHODOLOGY: In this study, 30 subjects with NSLBP were recruited based on the selection criteria, consent form and assessment were taken from all participants.The NSLBP guideline was prescribed. The Protocol duration was 30-35 min/d, 6 days/week for 2 weeks. The NPRS and BPFS were taken as outcome measures. Data was collected and analyzed using SPSS version 25.0 IBM.

RESULT AND DISCUSSION: The Normality of data was checked using the Shapiro-Wilk test, which showed that the data were parametric. The outcomes were analyzed by using Paired t-test. There was a significant improvement in NPRS and BPFS scores ($p<0.05$).

CONCLUSION: The study concluded that the Non-specific low back guideline is effective in improving functional health.

KEYWORDS: Non- Specific Low Back Pain, Computer workers, Posture, Physical activity

INTRODUCTION

Low back pain is the leading cause of years lived with disability in both developed and developing countries, and sixth in terms of overall disease burden.[1-3] A study of 4, 02,406 adolescents from 28 countries found that 37% reported low back pain monthly or more frequently. [4]Low back pain is slightly reported as more common in females as compared to males prevalence increased with age. [5]

Analysis of Global Burden of Disease (GBD) 2019 data showed that approximately 1.71 billion people globally live with musculoskeletal conditions, including low back pain, neck pain, fractures, osteoarthritis, amputation, and rheumatoid arthritis. Low back pain is the main contributor to the overall burden of musculoskeletal conditions 570 million prevalent cases worldwide. [6]

Low back pain due to its growing prevalence is a challenge for the Healthcare system and a significant social problem. It has been assumed that the lifetime prevalence of low back pain may be up to 84%. [7-9]

80% of LBP complaints can’t attributable to a recognizable, known specific pathology (e.g., infection, tumour, fracture, axial spondylo-arthritis) or anatomic abnormality and are therefore pragmatically classified as ‘’Non-specific LBP’’ (NSLBP) [10, 11]

Non-specific low back pain is the most common form of low back pain. This term is used when the pathoanatomical cause of the pain cannot be determined. e.g., infection, tumour, osteoporosis, fracture, structural deformity, an inflammatory disorder, radicular syndrome. [1, 12, 13]

The causes of NSLBP include weakening of the hip abductor and extensor, and core muscles. The hamstring, iliopsoas, tensor fasciae latae, and piriformis muscles may be over-activated to compensate for the weakening of the hip and core muscles. [13-15]

Risk factors: Women, Sedentary Lifestyle as well as Strenuous Physical Activity, Occupational overload, Smoking, and Obesity. [7]

Core stability exercise (CSE) is emphasized as a universal physiotherapy method for NSLBP. CSE trains muscle activity patterns without unnecessarily overloading the tissue and can help to stabilize the spine. Additional physiotherapy for NSLBP patients aim to treat the hip joint, especially for those patients with accompanying hip joint pain. [16, 17]

The present scenario on lifestyle is persons are doing fewer activities and using more gadgets it's called a sedentary lifestyle and a sedentary lifestyle has an impact on a person's postural health of the body and its give impact on the structure of the body like bones and muscles due to faulty adaptation of postures it gives more impact on the spinal health of the human body.

The spinal has a major role in human mechanics because it is an integral part of human body. It provides mobility and stability to body as it has natural curvature. When natural curve of the spine is altered unnaturally high it's called kyphosis. This results as poor posture and lordosis may develop because of an enlarged lumbar spine curve. [18-21]

Dysfunction of muscles of the lumbopelvic-hip complex (core muscles) has been demonstrated to reduce spinal stability and increase spinal loading with altered core muscle recruitment patterns and cause of LBP, particularly in a chronic form. [22]

The altered pelvic position is proposed to put more strain on intervertebral discs, causing increasing pain. [23, 24]Tight hamstring muscles may reduce the lumbar lordosis, potentially decreasing the absorption of force, and increasing the possibility of developing LBP. [25]

Static postural alignment (viewed from the side) is defined as a straight line (line of gravity) that passes through the earlobe, the bodies of the cervical vertebrae, the tip of the shoulder, midway through the thorax, the bodies of the lumbar vertebrae, slightly posterior to the hip joint, slightly anterior to the axis of the knee joint, and just anterior to the lateral malleolus. [26]

Correct posture is the position in which minimum stress is applied to each joint. Any static position that increases the stress on the joints may be called faulty posture. [27]

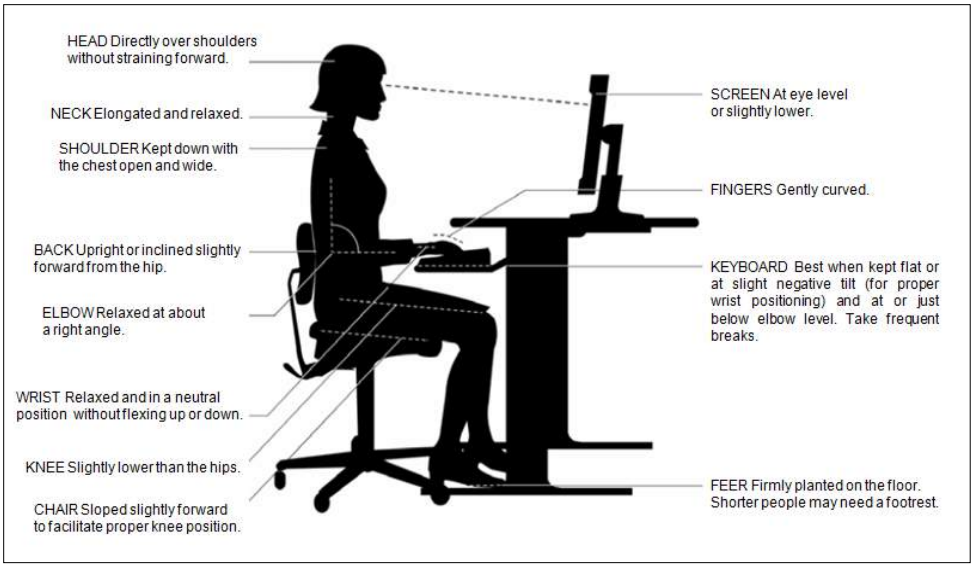


Figure 1: Ergonomic Design of Workstation [27]

Low back pain is commonly classified and treated Based on symptom duration, potential cause, presence, or absence of radicular symptoms, and corresponding anatomical or radiographic abnormalities. Acute back pain can be defined as lasting less than 4 weeks, sub-acute back pain lasting 4 to 12 weeks, or chronic for more than 12 weeks according to the duration of symptoms. [7, 28-31]

EXPERIMENTAL

Material and Method

Method:

- **Research Design** **:** An Interventional study
- **Sample Design** **:** Simple Random Sampling
- **Study Population** **:** Computer workers with Non-specific low back pain
- **Sample Size** **:** 30
- **Study Setting** **:** Rajkot city
- **Study Duration** **:** 6 Months

Materials:

- Assessment form
- Consent form
- Pen and Paper
- Laptop

GENERAL PROCEDURE

This study consists of developing a Guideline for Non-specific low back pain afterwards the Ethical committee and CTRI approval.

A total number of 30 computer workers experiencing Non-specific low back pain were selected for the study based on selection criteria.

Once the treatment plan and procedure had been discussed with the participants, before participating in the study, all computer workers were needed to provide consent by signing forms and they also underwent thorough physical examination to assess their condition.

All the participants were instructed about the guideline and Information regarding the correct technique for each exercise was provided.

The program began with a supervised session, followed by additional non-supervised sessions throughout the rest of the program.

The treatment plan for Non-specific low back pain (NSLBP) has been determined, and it involves prescribing the NSLBP guideline.

The guidline involved Stretching exercises and Stabilization exercises.

DETECTION METHOD

The protocol duration for this treatment were span over two weeks, with participants required to invest 30-35 minutes each day, six days a week.

This study utilized two different outcome measures to assess the results, namely Numeric Pain Rating Scale (NPRS) [32] and Back Pain Functional Scale (BPFS) [33]

RESULTS AND DISCUSSION

Statistical analysis was done using SPSS version 25.0 IBM and Microsoft excel to generate graphs and tables.

RESULT

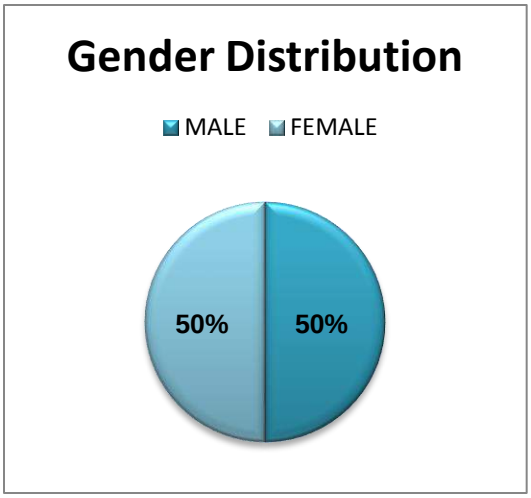
TABLE 1: Statistical Analysis of age of Normal Participants

	MEAN ± SD	SKEWNESS SD ERROR	KURTOSIS SD ERROR	SHAPIRO-WILK TEST
AGE	31.37 ± 5.109	0.390	-0.990	0.078

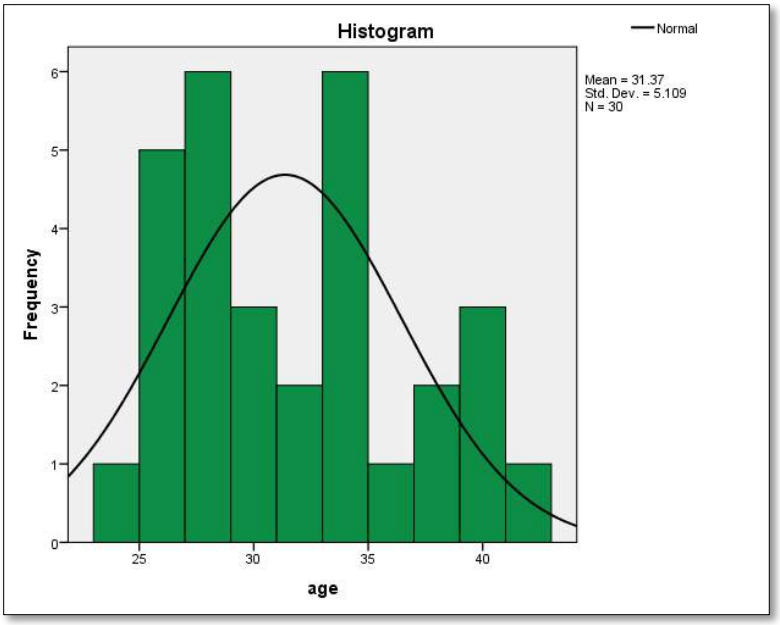
TABLE 2: Gender Distribution

TOTAL SUBJECTS	MALE	FEMALE
30	15	15

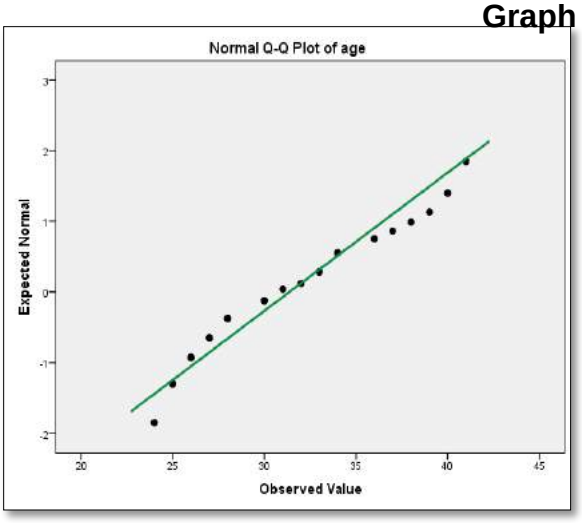
GRAPH 1: Gender Distribution



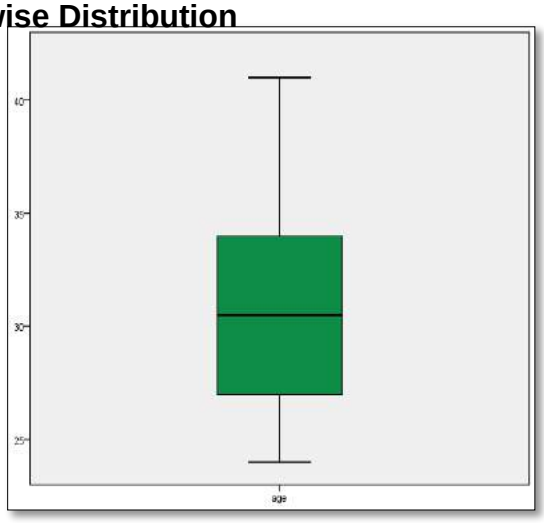
INTERPRETATION: Above graph shows equal Gender distribution of all participants.



Graph 2: Age wise Distribution



Graph 3: Q-Q Plot for the age of Participants



Graph 4: Box plot for the age of Participants

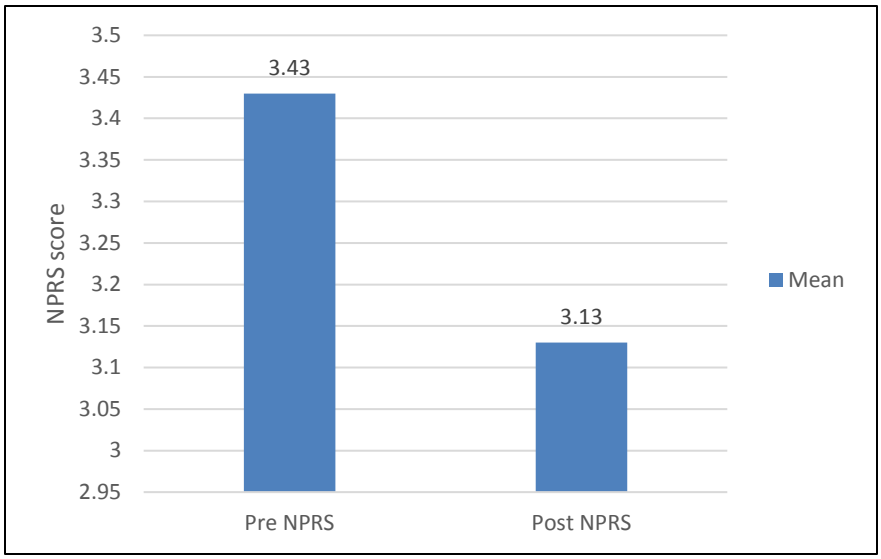
INTERPRETATION: Graphs 2, 3 & 4 show the bell shape curve, q-q plot, and box plot for age in Group A as per the Shapiro-Wilk test. Significance was 0.667 which was more than 0.05 and the graph curve was bell shape. This show data were normally distributed.

Table 3: Table of all Normal Participants

OUTCOME	SKEWNESS	STD. ERROR	KURTOSIS	STD. ERROR	SHAPIRO-WILK TEST
AGE	0.390	0.427	-o.990	0.833	0.078
Pre NPRS	0.106	0.427	0.126	0.833	0.064
Post NPRS	0.730	0.427	0.287	0.833	0.057
Pre BPFS	0.733	0.427	-0.04	0.833	0.054
Post BPFS	0.511	0.427	-0.633	0.833	0.067

Table 4: Mean of NPRS

PARAMETERS	Mean
PRE NPRS	3.43
POST NPRS	3.13



Graph 5: Mean of Pre and Post-NPRS

INTERPRETATION: The mean value of Pre NPRS was 3.43 and Post NPRS was 3.13. The result shows improvement in the Post NPRS score.

Table 5: Comparison of Pre and Post-Treatment scores of NPRS

Parameters	Mean ± Std. Deviation		t Value	*p* Value	Result
	Pre	Post			
NPRS	3.43± 1.406	3.13± 1.925	0.758	0.455	Statistically not Significant

INTERPRETATION: The above table shows the mean and SD of pre-NPRS values i.e., 3.43 ± 1.406, and post-NPRSS values i.e., 3.13 ± 1.925. The result shows statistically not significant difference between the pre-post-value of NPRS. (T= 0.758, p>0.05).

Table 6: Mean of BPFS

Parameter	Mean
Pre BPFS	42.53
Post BPFS	44.00

Graph 6: Mean of Pre and Post BPFS

INTERPRETATION: The mean value of Pre BPFS was 42.53 and Post BPFS was 44.00. The result shows significant improvement in the Post BPFS score.

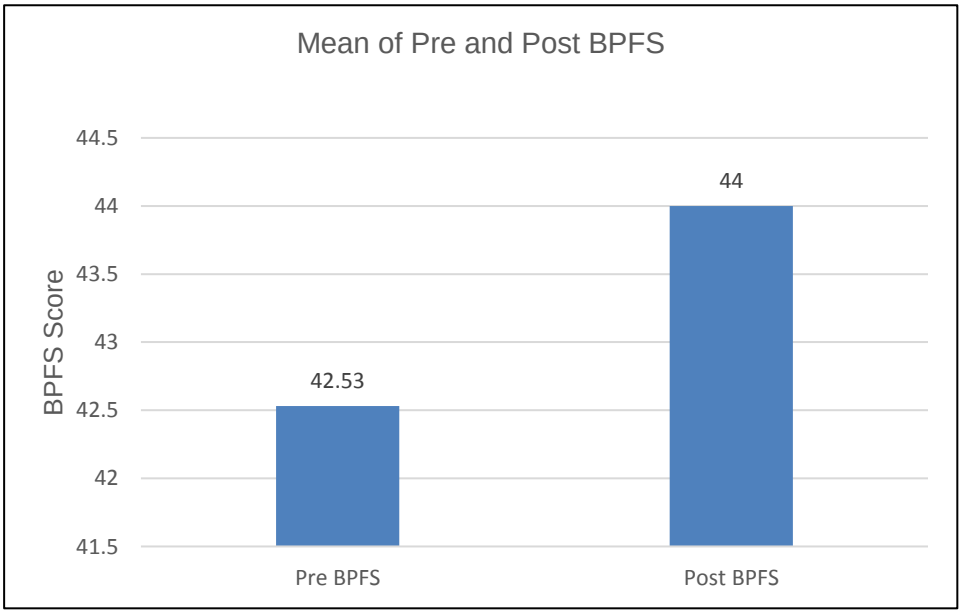


Table 7: Comparison of Pre and Post-Treatment scores of BPFS

Parameters	Mean ± Std. Deviation		t Value	*p* Value	Result
	Pre	Post			
BPFS	42.53± 3.693	44.00± 3.815	-4.475	0.000	Significant

INTERPRETATION: The above table shows the mean and SD of pre-BPFS value i.e., 42.53 ± 3.693, and post-BPFS value i.e., 44.00 ± 3.815. The result shows a significant difference in the Pre and post-value of BPFS. (t= -4.475, $p<0.05$).

DISCUSSION:

According to Global Burden of Disease, (GBD) 2019 analysis data showed that approximately 1.71 billion people globally live with musculoskeletal conditions, including low back pain, neck pain, fractures, osteoarthritis, amputation, and rheumatoid arthritis. Low back pain is the main contributor to the overall burden of musculoskeletal conditions.[6]

The prevalence of low back pain is very high; therefore, this could be challenging for the Healthcare system and a significant social problem. It has been assumed that the lifetime prevalence of low back pain might be up to 84 %.[7-9]

The guideline on the Non-specific low back pain for computer workers is not available. A total of 30 participants were assigned with age of 25 to 40 years for the study. All participants were treated with the new developed Non-specific low back guideline.

The NPRS and BPFS score were assessed at the beginning of treatment and after the completion of the protocol at the end of 2 weeks.

After the completion of 2 weeks of a treatment session, post-treatment data scores were taken and evaluated statistically in SPSS software version 25 IBM. According to the result, the mean value of Pre NPRS was 3.43 and Post NPRS was 3.13. The result shows significant improvement in the Post NPRS score. The mean value of Pre BPFS was 42.53 and Post BPFS was 44.00. The result shows significant improvement in the Post BPFS score.

The result of this present study shows a significant effect of BPFS score more than NPRS score thus, functional capacity significantly improved because strengthening and stretching exercises improve core stability and flexibility.

According to **Silvia Gianola dc et al [34]** most episodes of acute and sub-acute NSLBP average pain intensity is moderate. Most guidelines agree that light physical activity is beneficial for them. When second-line treatment is needed, a range of therapeutic interventions (pharmacological and physiotherapy) for acute NSLBP are available. [34]

Saragiotto et al [35] noted that Exercise and/or cognitive behavioural therapy, with multidisciplinary treatment for more complex presentations, are recommended for patients with chronic LB. Electrotherapy, traction, orthoses, bed rest, surgery, injections, and denervation procedures are not recommended for patients with NSLBP. For acute and sub-acute pain (<12 Weeks) superficial heat, massage, spinal manipulation, and chronic (>12 Weeks) structured exercise, spinal manipulation, and psychological therapy are useful. Encourage the patient to stay active and avoid bed rest, continue daily activities, stay at work or return as soon as possible. Avoid language that promotes fear of pain and catastrophic thinking (e.g., “let pain be your guide”, “stop if you feel pain” and “you have to be careful”). [35]

The results of the present study are similar to those reported (2020). **Beomryong Kim et al** [13] conducted a study on Core Stability and Hip Exercises Improve Physical Function and Activity in Patients with NSLBP and hip muscle stretching exercises, Core stability exercise and hip muscle strengthening exercises improved physical function and activity. [13]

According to **Marc Russo et al** [36] a significant number of people with primarily nociceptive CLBP have impaired neuromuscular control of the key stabilizing muscles of the lumbar spine as the root cause of their pain, especially impaired control of the lumbar multifidus. Exercise therapy targets the restoration of neuromuscular control of the multifidus is effective in some cases, but most people find it difficult or impossible to voluntarily contract the multifidus. [36]

According to **Patrick J Owen et al** [37] various exercise training approaches are effective and should be incorporated into usual care for adults with non-specific CLBP due to their potential for improving pain, physical function, muscle strength, and mental health. Importantly, exercise training was more effective than hands-on therapist treatment for reducing pain and improving physical function and mental health. However, despite our identifying numerous studies that examined exercise training, we were unable to determine whether exercise training improved trunk muscle strength, trunk muscle endurance, and reduced analgesic pharmacotherapy use; these outcomes were not often reported. [37]

The results of the present study are similar to those reported by (2021). **SuSu Hlaing et al** [38] Core Stability Exercises as an optimal treatment for improving proprioception, balance, and percentage change of muscle thickness while reducing functional disability and fear of movement in patients with sub-acute NSLBP. [38]

CONCLUSION

The findings of the present study concluded that the Non-specific Low Back Pain guideline is an effective intervention for improving the Back Pain Functional Score among computer workers. Specifically, this guideline was found to be particularly effective in enhancing the functional health of computer workers.

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Tools available for range of motion measurement – A Systamatic review

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Abstract

Background: Range of motion (ROM) assessment of body joints is an important measurement tool for assessing an individuals joints health and assess their ability to complete different activities of daily living. Different body joints ROM has been identified as a useful Predictor for joints injuries in both general population and sporting professionals. This article attempts to study how many tools are available for measuring the joint ROM. Tools like goniometer, digital inclinometer, measure tape, inclinometer, digital goniometr, clinical photograph method, smart phone application, kinect – based tele- medicine tool. These all tools are available for measuring the body joints ROM.

method: A Narrative review based on SANRA guideline. The databases used for selection of litreature were pubmed, goggle scholar, web of science. Years 2000 to 2022 published article were included. Total 8 articles were selected based on eligibility criteria and the criteria is as follows, 1. Full text english, 2. Pedro score < 6 , 3. Duplicate articles were excluded. Based on searched articles there are many tools are available for ROM measurement but an accurate

measurmnet and objective tool is needed for ROM measurement.

Conclusion: Goniometer, Digital inclinometer, Measure tape, Inclinometer, Digital goniometr, Clinical photograph method, Smart phone application, Kinect – based tele- medicine tool. These all tools are valid tool for ROM measurement but reliability is poor.

Keywords: **:** Range of motion, goniometer, different tools, different movements of joints, objective measurement of range of motion.

Introduction

Range of motion is defined as movement that occurs at joint or series of joints.[1] Range of motion (ROM) assessment of body joints is an important measurement tool for assessing an individuals joints health and assess their ability to complete different activities of daily living. Different body joints ROM has been identified as a useful Predictor for joints injuries in both general population and sporting professionals. This article attempts to study how many tools are available for measuring the joint ROM.[2] Universal goniometers are commonly used to measure range of motion but inter- observer reliabilty of goniometeric measurement is consistently lower than intra- observer reliability.[3] Smartphone application is also one of the tool for measuring a range of motion, it has more measurment option for ROM .[4] Inclinometer is also used for cervical , thoracic – lumbar ROM measurment.[5] We can also use the low cost device such as tape measurment for spine ROM.[6] Digital inclinometer one of the objective tool for ROM measurment.[7] Kinect – based Tele – Medicine tool also used for ROM which is work on (video, deapth, skeleton, and audio).[8] Halo digital goniometer is used for lower extrimity ROM measurment. [2] Digital photography method is used

for knee ROM.[3]

Experimental

Material and Methods:

Identification of study:

A search of pubmed , goggle scholar, web of science , cochrane library. Years from 2010 to 2020 published article included. Following serach term were defined: Range of motion, goniometer, different tools, different movements of joints, objective measurment of range of motion.

Eligibility criteria

All the articles were scanned and some of them are removed. Article were further screened on their abstracts and full text articles were retrived. Outcome measures ROM of body joints.

General procedure:

Inclusion criteria:

Male and female both included

Age > 18

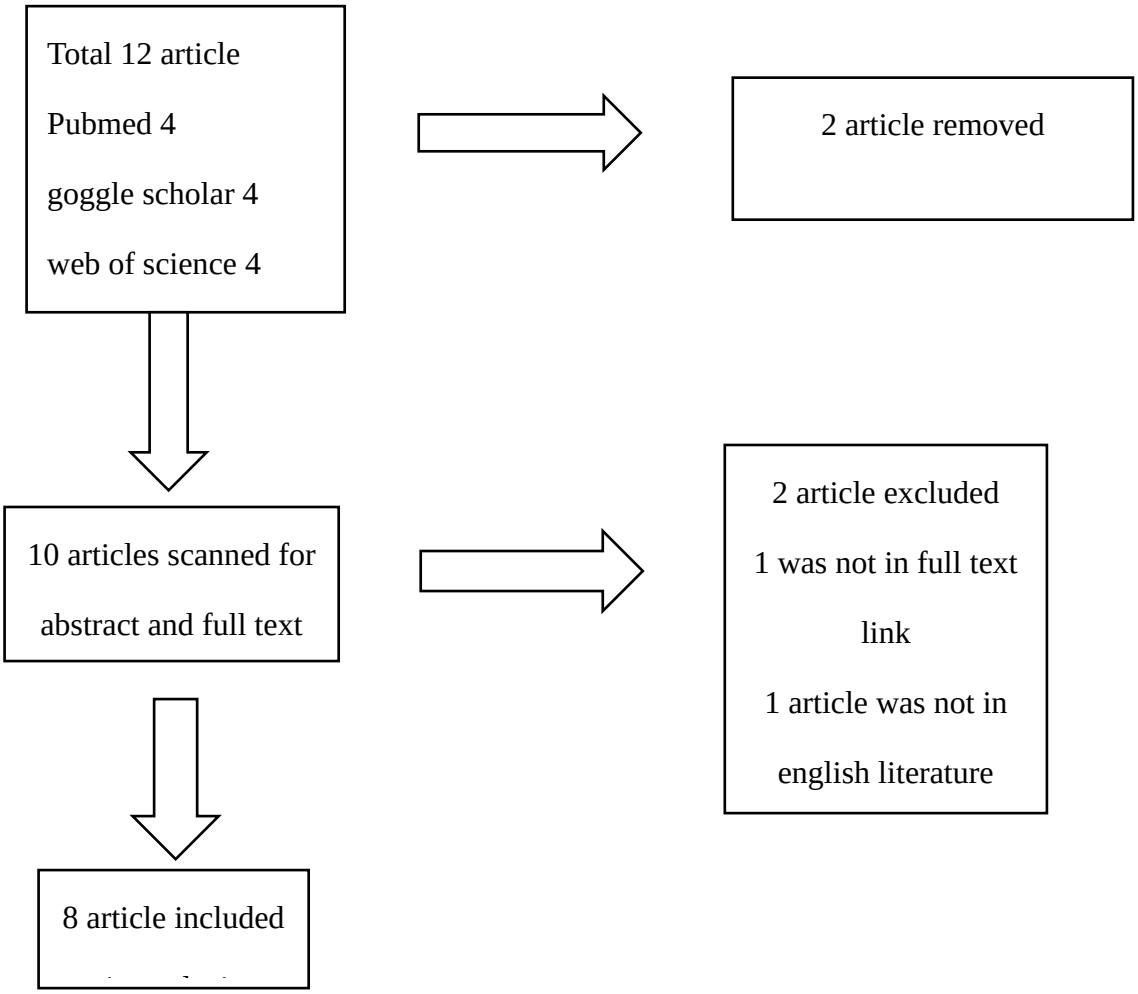
Article were published in english litereture.

2.4 Exclusion criteria

Article should be in full text

Article was in english litreature

2.5 Selection of articles



Tools name, sample saize, outcome measure, conclusion of selected articles

Author	Tool name	Sample size	Outcome measure	Conclusion of study
Filip Verehaegen, Vannik Ganseman	Goniometer	49 patients male / female	ROM	Conclusion of the study is, It is universally used. But intre- observe reliability is consistently lower than intra- observer reliability.
Justin w., L. Keogh	Smartphone application	100 patients male/ female	Shoulder, elbow, hip, knee, ankle, wrist ROM	Concluded that, Smartphone application has a high validity but reliability is poor in case of spinal ROM measurement.
Saur, Petram.M.MD;Ensink	Inclinometer	50 patients	Lumbar ROM	Conclusion of the study is Validity is good but reliability of lumbar extension is poor than lumbar flexion.
Walas Mohammd, Faten Holzgreve	Digital inclinometer	102 healthy individual	Hip, knee , ankle ROM	Concluded that Digital inclinometer which is an objective tool but it is less valid and it has limitation like it can't measure the movement in frontal plane and transverse plane.
Laura Fraculin, Fabian Holzgreve.	Tape measure	22 healthy individual	Lumbar ROM	Conclusion of the study is Validity and inter-rater and intra- rater reliability almost perfect.
Saimyrooban Muralidaran, Ashley R.	Halo digital goniometer	100 healthy individual	Lower extrimity ROM	Concluded that Halo has high validity , high inter reliability but moderate intra reliability.
Filip Verhaegen, Nele Arnout	Clinical photograph method	49 patients	Knee flexion, extension	Conclusion of the study is ,Validity is high but intra observer reliability is high than inter observer reliability.
Seung Hak Lee, Chiyul Yoon	Kinect based tool	15 healthy individual, 12 patients of adhesive capsulitis	Shoulder ROM	Conclusion of the study is , accuracy is less. Reliability is uncertain of kinect based tool.

Discussion

The main finding of this study is that all tools have high degree of agreement with the universal goniometer. Goniometer is valid tool but it has inter- observer reliability is low. Smartphone applications have many option to measure the ROM, it is valid tool but reliability is poor. Inclinometer is valid tool but reliability of lumbar extension is poor than lumbar flexion. Digital inclinometer is objective tool but it is less valid and it has limitation like it can't measure the movement in frontal plane and transverse plane. Tape measure is valid tool and inter- rater and intra- rater reliability almost perfect. Halo digital goniometer has high validity , high inter reliability but moderate intra reliability. Clinical photograph method has high validity but intra observer reliability is high than inter observer reliability. Kinact based tool is less accurate but reliability is uncertain.

Conclusions

All tools are valid to asses the rom in healthy individual as well as patients also. But reliability is still uncertain. So there is a need of such device which is objective and accurate and cost effective.

Limitation

Goniometer is valid and universaly used tool but it is a subjective tool. Smartphone application , Digital inclinometer can't measure the movement in frontal plane and transverse plan. Inclinometer, tape measurment , Halo digital gonimeter, Clinical photograph method, kinect based tele medicine, These all tools have poor reliability.

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PROFUNCTIONAL STERNAL PRECAUTIONS: PRACTICALITY OF USE IN POST STERNOTOMY PATIENTS DURING CARDIAC REHABILITATION: PROTOCOL FOR A PILOT RANDOMISED CONTROLLED TRIAL.

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Abstract

Research Background: Median sternotomies are often performed on patients having cardiac surgery. Patients are then instructed to take certain precautions in order to avoid problems. They impose numerous restrictions and prolong the healing process. The theoretical basis for activity restrictions following sternotomy. Reviews and earlier studies have suggested that these safeguards are unduly stringent. They are not practical when performing ADLs. Standard sternal precautions have no common definition. They restrict and slow recovery. Sternotomy activity restrictions are theoretical.

Need for study: There is disagreement because there aren't any evidence-based protocols, the effect on patient outcomes is unknown, and different organizations use it in different ways. This pilot will help us assess the feasibility/acceptability of this novel approach **PROfunctional SP,** approach use in a larger scale study.

Aim: To determine whether changing the less stringent sternal restrictions after a median sternotomy improves quality of life in terms of health, pain, and physical function. To derive the sample size for a large scale trial.

Objectives: To treat post CABG patients considering conventional sternal precautions.

To treat post CABG patients considering modified (less stringent) sternal safety measures. Evaluate the final outcome using SPPB, pain, and kinesiophobia.

Methodology: Prospective, simple randomisation, controlled trial with concealed allocation, blind assessors, and intention-to-treat analysis.

Results and Conclusion: This study showed that patients using the PROfunctional movement protocol may return to function more quickly in the early post-operative period.

Key Words: Sternal Precautions, CABG, Cardiac rehabilitation, Sternal pain

Introduction

Interventions like coronary artery bypass grafting (CABG) and valve replacement are often done to help people with heart problems. [1] This method's wide mediastinal access and excellent exposure of the heart and coronary vessels are its main benefits. [2,3] Coronary artery disease (CAD) was expected to affect 47 million Indians in 2010. [4,5]

Alterations to the sternum, often known as sternal measures, are proposed in order to prevent the breastbone from becoming dislodged while it heals. If the sternum comes apart, it may take longer for the bone to heal. Some problems of the sternum are suppuration, ruptured sutures, not healing, and inflammation. [6] Right after surgery, patients are instructed to minimize their use of their shoulders and upper limbs as part of the standard application of sternal precautions. These limitations are enforced in several ways. There are also inconsistent time periods for which these limits are suggested. [6-7] There are national surveys done in Australia, Greece, Canada, Gauteng, Korea, and New-Zealand. Recently, surveys and reviews have shown that there is a significant variation in type and duration. All of them have reported

inconsistencies in the practice of Sternal precautions. [7]

However, research has demonstrated that hospital, clinic, and institutional levels have institute level protocols. All patients who have had median sternotomies, are being uniformly followed. Findings, restrictions, requirements, and objectives unique to the patient are completely disregarded. [8-10] Sternal limits primarily include constraints on the shoulder, arm, and many weight-bearing movements through the upper limbs. [8-11] It is yet unclear how these limits affect sternal loading and sternal healing. Despite these contradictory conclusions and illogical arguments, they are adhered to globally. The limitations are based only on theoretical reasoning. [10-13] Criticisms have been made about rules that are too strict. It is also said to make people take longer to heal and affect their quality of life after surgery. [12-16] There are not many written studies that show how sternal safety measures used by physiotherapists affect their patients. In this area, there are no exact recommendations that have been written down. [12, 14, 15] The current approach needs to be written down and looked at in order to encourage more study, improve clinical services, and come up with a way to make data-based clinical practice guidelines. [12], During cardiac rehabilitation, this study will assist us in determining whether any alterations to the practice of sternal precautions are necessary following median sternotomy. Does changing the typical sternal precautions in order to make them less restrictive, in the case of patients who have undergone heart surgery via median sternotomy, increase physical function, pain, kinesiophobia, and other aspects of health-related quality of life?

Aim and Objectives:

Aim: To find out if changing strict sternal precautions can help improve physical

performance, pain, kinesiophobia, and the quality of life related to health after a median sternotomy. To derive sample size for large scale trial.

Objectives:

To treat post CABG patients considering conventional sternal precautions.

To treat post CABG patients considering modified (less limiting) sternal protection.

Assess final outcome using SPPB, pain, Kinesiophobia.

Material and Methodology:

- Study design: A prospective, randomised, controlled study with blinded assessors and an "intention-to-treat" analysis. The allocation was kept confidential.
- Study population: Cardiac surgery involving median sternotomy. Age ≤ 25 years. Sternotomy Closure done by single stainless steel wires.

- **Sampling Framework:**

Sampling technique- Convenient sampling. Each participant's sternal precautions were given to them at random (block method).

Sample size- 10 PATIENTS (5 EACH)

Study duration-6 months.

Exclusion criteria: Obesity class II and class III, Diagnosed case of osteoporosis, carcinoma. Long term medications like anticoagulants, corticosteroids, chemotherapy. Physiotherapists who are unaware about the protocol, following cardiac surgeries.

Study-location: Hospital facilities carrying out cardiac surgeries & cardiac rehabilitation.

Outcome measures:

Primary:

- Physical Performance Battery (SPPB)

Secondary:

- Functional disability scale.
- Pain intensity(NRS)
- Tampa Scale of Kinesiophobia

Procedure:

The attending physiotherapist gave each participant uniform verbal and written sternal precautions. Telephone follow-up was conducted weekly for 6 weeks.

Standard restrictions (Control group)	**PROfunctional (Experimental group)**
Avoid using your arms as levers to push or pull.	Use your pain and discomfort to direct how you use your arms.
Avoid using just one arm for activities.	Avoid using single arm to pull or push.
Limit the arm elevation to 90 degrees.	When raising, keep both arms close to the torso.
Support your sternum while coughing by cupping yourself in your arms or using a cushion.	When coughing, support sternum with a cushion or the arms in a self-hugging position
Lifting anything more than 2 kg is not advisable.	The act of simultaneously stretching the backs of both arms should be pain-free.
When getting out of bed and	Roll onto your side, slide your legs over the

standing from a seated position, use your arms as little as possible.	edge of the bed, and carefully use your arms to help you sit up from the lying position when getting out of bed.
Avoid placing the arms behind the back	No restriction.

Outcome measures used:

a) Sternal instability scale:

Grades of Motion	Sternal Instability Scale
0	Clinically stable sternum (no detectable motion) - normal
1	Minimally separated sternum (slight increase in motion upon special testing# - upper limbs, trunk)
2	Partially separated sternum- regional (moderate increase in motion upon special testing#)
3	Completely separated sternum- entire length (marked increase in motion upon special testing#)

Method: The Sternal Instability Scale was used to assess and monitor the stability of the sternum in patients who underwent median sternotomies. The Sternal Instability Scale has demonstrated excellent validity, inter-rater reliability, and intra-rater reliability. The scale is applied by physical examination, manual palpation along the median sternal ridge of the sternum, and the designation of a single grade that represents the degree of instability experienced during dynamic upper body motions such as deep inhalation, coughing, and shoulder flexion and abduction. (17,18)

b) The Short Physical Performance Battery (SPPB) is a functional test that assesses daily functional tasks performed by older patients receiving acute care, especially

those undergoing cardiac surgery. The test is intended to mimic common physical activities older people engage in and is a well-established and validated measure of lower extremity performance. Gait speed (8-foot walk), standing balance, and lower extremity strength and endurance (chair raise task) are all part of the test. [19, 20]

c) FDQ: An outcome measure used to test the statistical validity of a shortened Functional Difficulty Questionnaire (FDQ) and find out how well it can measure physical function. It includes 13 different functional tasks that are needed in everyday life and involve movements in the thoracic area. The researchers chose these tasks. Subgroups of participants were used to assess the reliability, validity, predictive value, responsiveness, and least clinically significant difference of the FDQ-s. At the same intervals, participants also completed alternative tests of physical ability, discomfort, and health-related quality of life. FDQ is a good tool for this purpose, and people who are going to have cardiac surgery can finish it safely and effectively both before and after the surgery. Because of its adaptability, the FDQ is especially well-suited to the acute postoperative stage. Each of the component activities is based on a daily task that people accomplish, so if they are unable to complete it during the assessment (due to weariness, for example), they can base their response on the last time they completed it.

   [21]. The discomfort intensity was measured using a numeric rating scale. The instrument is an 11-point visual analogue numerical scale used to quantify all types of pain, with scores ranging from 0 (no pain) to 10 (the most severe pain).. The 11-item Tampa Scale of Kinesiophobia assessed patients' movement- and re-injury-related pain-related fears. Each of the 11 items was rated by the participants on a 4-point Likert scale. [22] A drop of at least 4 points on the scale is

the best way to tell if a person's fear of movement has changed in a major way. [23]

Statistical analysis:

All data were entered into a computer by a coding system, proofed for entry errors.

The data obtained was compiled on a MS Office Excel Sheet (v 2019, Microsoft Redmond Campus, Redmond, Washington, United States). Data was subjected to statistical analysis using the Statistical Package for Social Sciences (SPSS v 26.0, IBM).

Descriptive statistics like frequencies and percentages for categorical data mean and SD for numerical data have been depicted. Due to small sample size, non-parametric tests have been used for comparisons. Intergroup comparison (2 groups) was done using the Mann Whitney U test. The comparison of frequencies of categories of variables with groups was done using the Chi-square test. For all the statistical tests, $p<0.05$ was considered to be statistically significant, keeping α error at 5% and β error at 20%, thus give the study a power of 80%.

Result:

There was a statistically significant difference seen for the values between the groups ($p<0.05$) for the Tampa Kinesiophobia Scale PRE treatment, with higher values in group 2.

There was a statistically non-significant difference seen for the values between the groups ($p>0.05$) for all variables in the **Short physical performance battery outcome**.

There was a statistically non-significant difference seen for the values between the groups ($p>0.05$) for all other variables in the **Functional disability scale**,

except walking with arms swinging freely. There was a statistically significant difference (p0.05) between the groups' Post q2 values, with the control group having higher values.

There was a statistically non-significant difference seen for the values between the groups (p>0.05) for all other variables

There was a clinically significant difference in **Numeric rating scale** (**NRS)** pain scores in both groups however the drop in scores was larger in experimental group.

For Post Q9, there was a statistically significant difference between the groups (p0.01, 0.05), with higher scores in group 2 than in group 1. 2. Pre Q6 with higher values in experimental group. Pre Q7 with higher values in group 2 Pre Q9 with higher values in group 2 Pre Q11 with higher values in experimental group.

Pre Total Score with higher values in experimental group. There was a statistically non-significant difference seen for the values between the groups (p>0.05) for all other variables.

Discussion:

Steps to avoid sternal problems such as surgical site infections, sternal fragility vary depending on the institutional policies, expert advice, and surgeon’s opinion. Not just the protocol, but even the purpose of following these precautions remain unclear. These protocols' dependability has always been a debate. [24] In this pilot, we tried to implement a novel treatment approach during cardiac rehabilitation Phases I and II.

We hypothesized that the treatment protocol would make significant improvements in shoulder girdle movements, improved blood circulation to the mediastinal structures, faster healing, and a better return to activities of daily living.

In fact, prolonged inactivity, especially in the elderly, can hinder recovery and encourage muscular atrophy. [25] This study found no statistically significant differences in physical function, functional disability scale, pain or kinesiophobia, between participants receiving modified sternal precautions and those receiving usual restrictive sternal precautions at the end of 1 and 6 weeks following cardiac surgery via a sternotomy. Following surgery, participants in both groups grew in these areas.

Therefore, we were unable to conclude that the less restrictive protocol, results in less difficulty with movement for patients, despite clinical observations. With the aid of our discoveries, we wish to emphasise that the use of modified sternal precautions did not result in any injury or adverse events, which is something that practitioners managing patients following heart surgery frequently worry about.

The Primary outcome measure, i.e, the Short Physical performance battery score (SPPB), did not show improvement. The insignificant improvement may be attributed to the fact that the selected outcome could assess general rather than arm-specific function. Four days after surgery, nearly all participants had moderate to severe impairment on the SPPB, but by Week two, nearly half had the highest score possible, and by Week 6, two-thirds had the highest score possible. This ceiling effect may have hindered the SPPB's ability to detect genuine differences between groups. Although significant benefits were not identified on the FDS outcome measure, the lack of harmful or adverse events supports the progression of arm exercise and a less restrictive approach that encourages motion close to the body with short lever arms. For day-to-day tasks, modified sternal precautions involving unloaded movements within a pain-free range and loaded activity with the upper arms near to the body are more feasible

and practical. This was reflected in the experimental group's trend towards increased utilisation of the upper extremities. These motions were advocated for the experimental group on the basis of biomechanical principles, as they distributed loads symmetrically across the sternum and reduced the strains exerted on the healing sternum. [26]. Clinical observation revealed that patients in the acute care setting using the PROfunctional protocol had improved mobility, reported lesser pain on the NRS, and hence reported more confidence.

Marked by avoidance of certain upper limb movements, which further contributed to the kinesiophobia postoperatively and beyond 4 weeks. Pain-related fear has been reported to influence attendance at exercise-based cardiac rehabilitation. Although the PROfunctional group was encouraged to have lesser limitations to movements, the impact of other health professionals and carers who reinforced strict sternal precautions cannot be completely denied. Although there was an insignificant difference, Kinesiophobia ratings were lower in this group.

Limitations of Study:

- The questionnaire was long because it had to cover a lot of different topics. This could have made the responder patient bored, and he or she may have rushed through the questions.
- Potential reaction inadequacy.
- A Novel treatment approach has not been validated.

Future Scope:

- The study will help narrow down the inconsistencies, if any, in physiotherapy practices all over India. It will help establish clinical guidelines for improving healthcare services.

- The study would provide robust information on individually tailored and patient specific sternal precautions rather than exceedingly stringent ones.
- The exercises and rehabilitation would be more functional oriented than some indefinite protocols with lots of variations.
- This model of modified sternal precautions can be more patient centric. It may vary depending on age, gender, nutritional status, and addictions.
- The restrictions imposed make the patient more dependent on carers during transfers. This directly affects the hospital stay and expenses.

Clinical Applications:

- Clinical trials comparing standard vs. novel will provide better clarity to surgeons, physiotherapists, nursing staff, and other health care providers.
- Freedom in the use of assistive devices, less dependency on HCW and/or Relatives.
- Novel approaches during sternal precautions is more functional activity based. Minimal assistance from carers and early independence.
- It will substantially reduce hospital admission days and health care costs in total.

Conclusion: The key finding from this pilot study is that patients using the PROfunctional movement protocol may return to function more quickly in the early post-operative period.

There is minimal or no greater risk for adverse outcomes (i.e, pain, wound healing problems, antibiotic use, or a longer hospital stay).

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Figure 1: Assessment of sternal instability by manual palpation of the median sternum ridge with three fingers

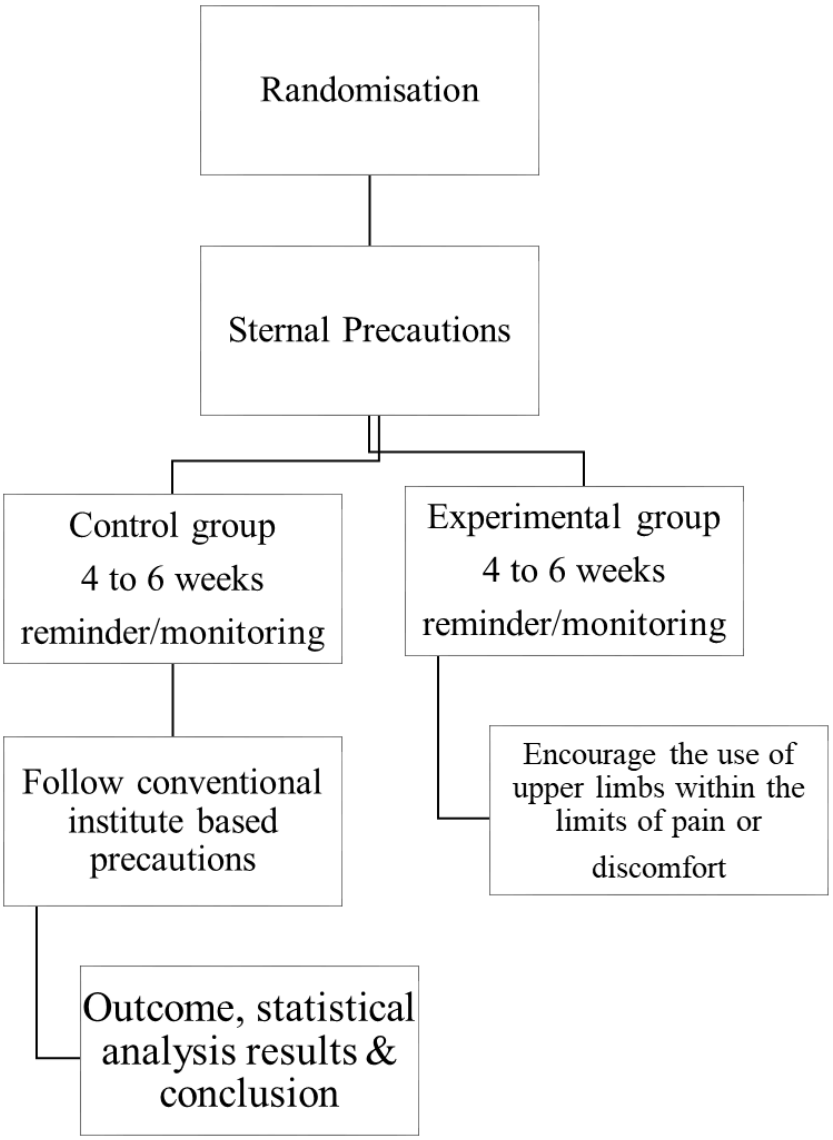

Figure 2: Flow chart showing the Procedure

STATISTICAL ANALYSIS AND RESULTS

Table showing mean & SD of age

	N	Minimum	Maximum	Mean	Std. Deviation
Age	10	26	71	52.80	15.179

Frequency Table

Gender	Frequency	Percent
Female	4	40.0
Male	6	60.0
Total	10	100.0

Table 1: Distribution as per Diagnosis

Operated	Frequency	Percent
CABG	5	50.0
MVR	4	40.0
MVR & CABG	1	10.0
Total	10	100.0

Table 2: Table showing patients posted for surgery.

Figure 3: Graph showing Gender wise distribution

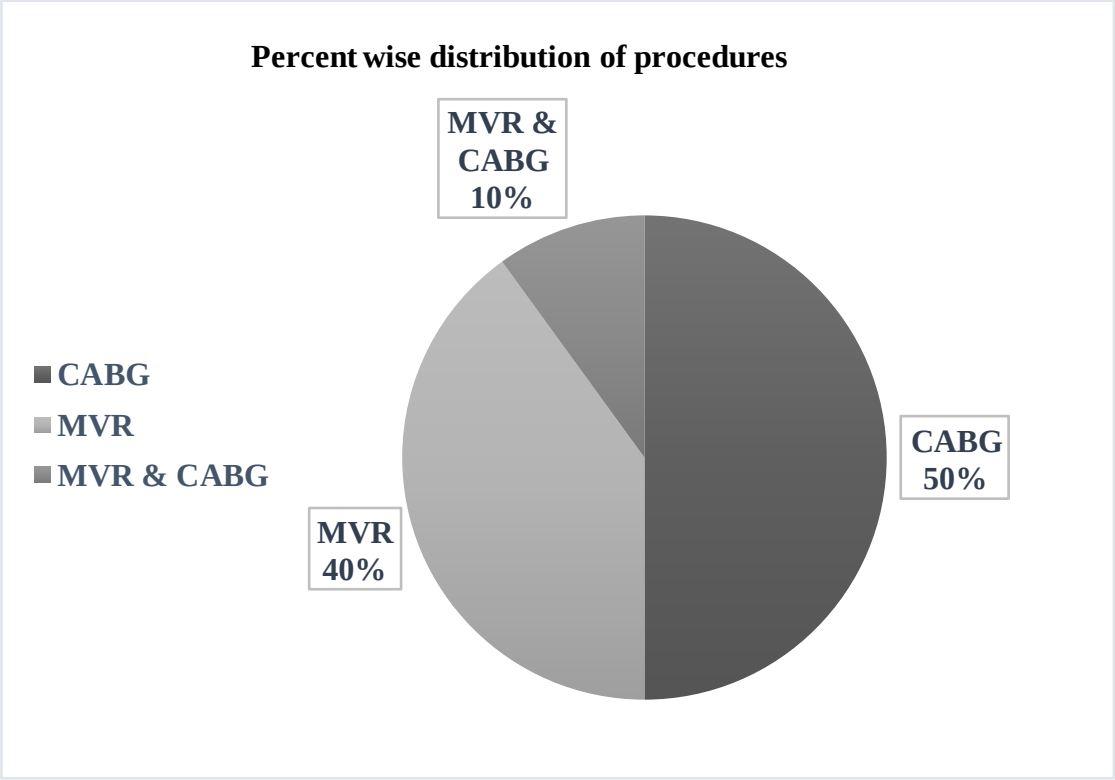

Figure 4: Graph showing distribution as per posted for surgery

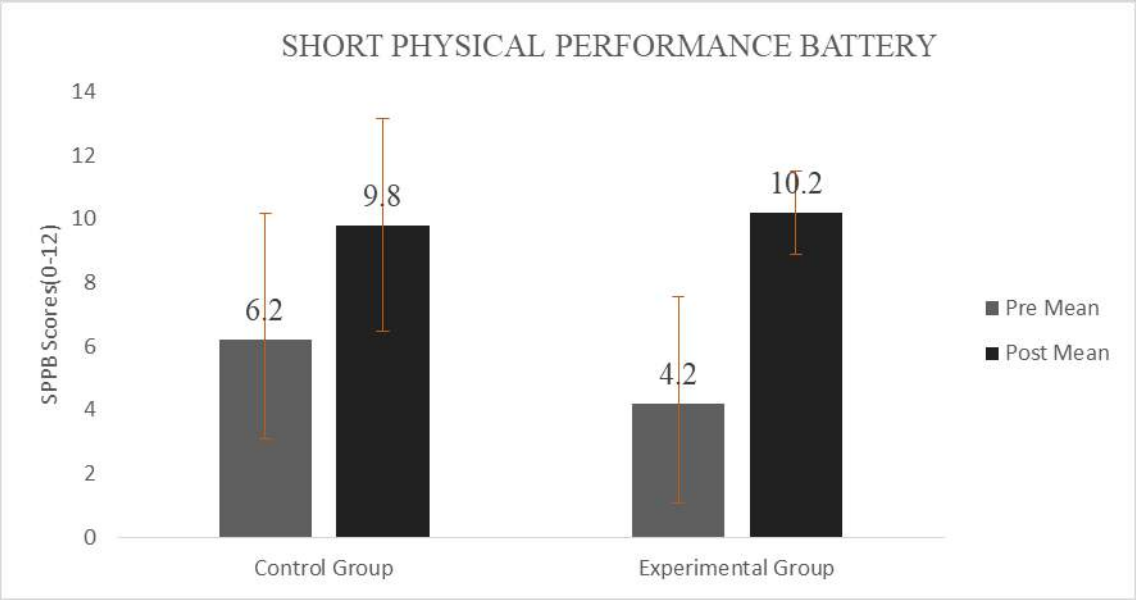

Figure 5: Graph showing in between the group's pre and post comparative scores

Inference: There was a statistically non-significant difference seen for the

values between the groups (p>0.05) for all variables

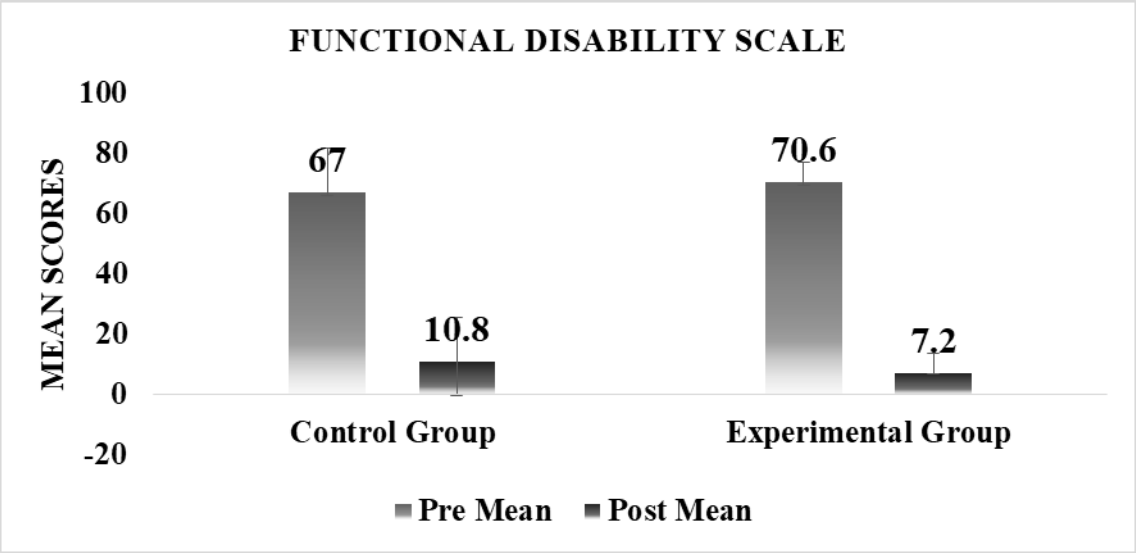

Figure 6: Graph showing comparative scores between groups

Inference: There was a statistically non-significant difference seen for the values between the groups (p>0.05) for all variables of FDS

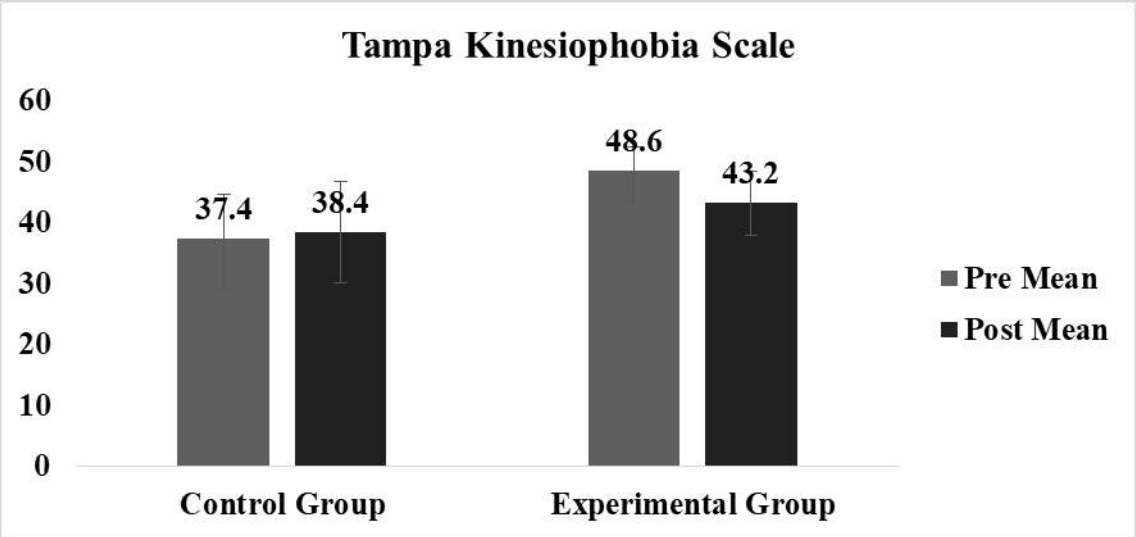

Figure 7: Graph showing comparative scores between groups of TKS

Inference: There was a statistically significant difference seen for the values between the groups (p<0.05) for Tampa Kinesiophobia scale

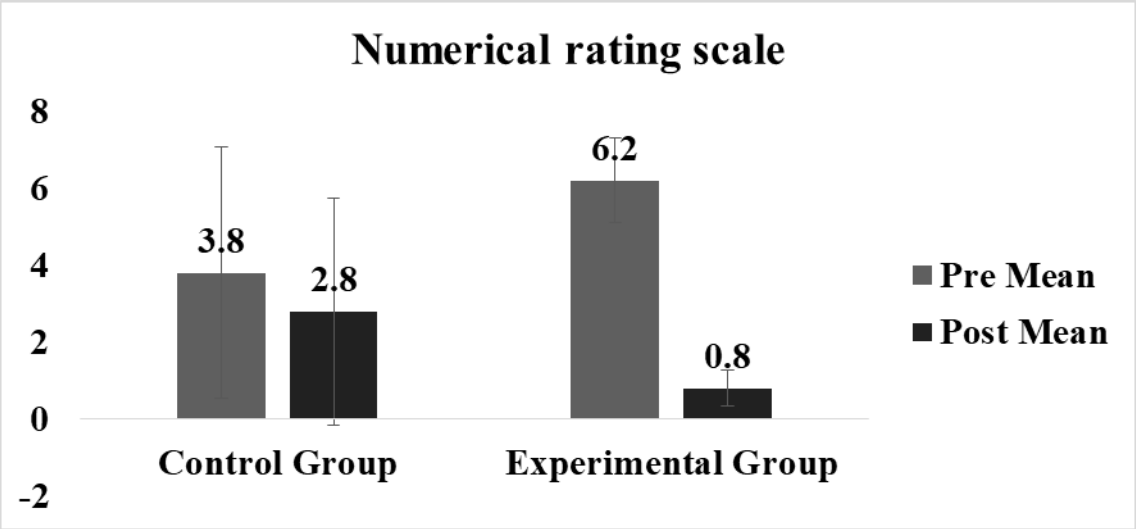

Figure 8: Graph showing pain rating (NRS) comparison between groups.

Inference: There was clinically significant difference in NRS pain scores in both groups however the drop in scores was larger in experimental group

“IMMIDIATE EFFECTS OF SUBOCCIPITAL MUSCLE INHIBITION TECHNIQE ON GASTROCNEMIUS MUSCLE TIGHTNESS- AN EXPERIMENTAL STUDY.”

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Abstract

BACKGROUND: Gastrocnemius is a large powerful and superficial muscle which is situated at the posterior aspect of the leg. It has two head which originates from the posterior aspect of the femoral condyle and inserted on the calcaneus. It is a strong planter flexor of the foot and also flexor muscle of the knee joint. It is a part of the superficial back line (SBL). In general term, SBL is a covering of the whole posterior side of the body which connects and protects the entire posterior surface of the body. It is starting from the top of the head to the bottom of the foot. Tightness is an adaptive shortening of soft tissue which restricts motion.

AIM: To check the effects of the sub-occipital muscle inhibition technique on gastrocnemius muscle

OBJECTIVE: To assess the sub-occipital muscles inhibition technique on gastrocnemius tightness, To assess the sub-occipital muscles inhibition technique on ankle range of motion

METHOD: 30 subjects are taken as per the inclusion criteria. Subjects were given all needed information about our research and procedure. Evaluation from and written consent have been taken. Sub-occipital inhibition technique has been given to each subject for 2 min. after that immediate effects will be checked with dorsiflexion range of motion of the ankle joint

RESULT: Statistical analysis was done using SPSS. Paired T-test was used for Analysis. Result shows statistically significant difference between pre and post data with 95% CI**.**

CONCLUSION: On the basis of the results study concludes that sub occipital muscle inhibition technique has significant immediate effect of gastrocnemius muscle tightness

KEYWORDS: Gastrocnemius, sub-occipital muscle inhibition, gastrocnemius tightness

Introduction

The muscles of the back of legs are known as calf muscle which are classified into two group superficial and deep the superficial muscle are gastrocnemius and soleus and the plantaris. [1]

Gastrocnemius is large powerful and superficial muscle of the back of the leg. It has two head medial and lateral which is originate from medial and lateral condyle of femur. The tendon of this muscle fuses with tendon of soleus to form tendon-Achilles, which inserted in to middle

1/3 posterior surface of calcaneus. Gastrocnemius is strong plantar flexor of foot and also flexor muscle of knee joint. Gastrocnemius and soleus both is supply by tibial nerve. [1]

The superficial back line(figure:1) connects and protects the entire posterior surface of the body like carapace from the bottom the foot to the top of the head in two pieces – toes to knees and knees to brow. Myofascial tracks and bony station. [3]

Tightness is adaptive shortening of soft tissue which restrict motion. Gastrocnemius tightness is checked by using silfverskiod test. [8] Sub occipital muscle inhibition technique done while pt in supine position .and therapist position is sitting in caudally (towards feet) with forearm supported on examination table in supination after that therapist placed both hand beneath head and place finger pads at posterior arch of atlas vertebra by doing finger flexion. So that occiput can rest on hands/palm. Then for two-minute therapist give upward pressure/force by finger pads along minimal traction. [4]

Previously there are many studies done with sub occipital muscle inhibition technique and find it effect on hamstring muscle flexibility, short hamstring, mechanical lower back pain, trapezius, cerebral palsy's child's gait and also in neck pain. There are few studies which show sub occipital muscle inhibition technique effect on the calf muscle or its flexibility. In this study, we are finding sub occipital muscle inhibition technique's effect on calf (gastrocnemius) muscle.

Study design – An experimental study

Study place –Rajkot

Sampling technique – conventional

Study population – Adult / Normal individual

Study duration - 1 month

Criteria for Selection

Inclusion Criteria

Age 18 - 25 (adult), Calf muscle tightness (gastrocnemius), Positive silferskiloid test, Male and female both subjects are involved.

Exclusion Criteria

Individuals with neck pain, Individuals with history of neck trauma [whiplash injury], Individuals with herniated disc, lumbar protrusion, Individuals with low back pain, Individuals with fracture of lower limb, Individuals with cervical ligament instability, Individuals with vertebra basilar artery syndrome, Individuals with History of hospitalization in last 6 month

Uncooperative individuals.

Method of the Technique

Total 30 subjects were included in study. Detailed and signed informed consent was obtained from the subjects. Individuals who satisfied the inclusion criteria were selected

from the normal healthy population. The subjects were told about all the interventions and procedure in detail to be followed in the study and thereafter consent was obtained. Throughout the treatment procedure the patient was instructed to inform about the pain and other discomfort. SILFERSKILOID TEST: There is gastrocnemius tightness when passive ankle dorsal flexion is negative or at neutral when the knee is in extension, during application of a load using moderate strength under the fore foot; and this loss of dorsiflexion normalizes when the knee is in flexion, with a minimum of 13 degrees of difference.[8](figure 2) GONEOMETRY PALCEMENT: Center fulcrum of the goniometer over the lateral aspect of the lateral malleolus, align proximal arm with the lateral midline of the fibula, using the head of the fibula for reference and distal arm parallel to the lateral aspect of the fifth metatarsal.[2](figure 3) SUB OCCIPITAL MUSCLE INHIBITION TECHNIQUE: With the patient supine, the therapist sat at the head of the table and places the palms of hands under the subject's head, pads of therapist's fingers on the projection of the posterior arch of the atlas which is palpated between the external occipital protuberance and spinous process of axis vertebra. The therapist locates with the middle and ring fingers of both hands the space between the occipital condyles and the spinal process of the second cervical vertebra. Then, with the metacarpophalangeal joints in 90o flexion, therapist rests the base of the skull on hands. Pressure was exerted upward and toward the therapist. The pressure was maintained for 2 minutes until tissue relaxation had been achieved.[4](figure 4) During the SMI technique, the subject is asked to keep his eyes closed to avoid eye movements affecting the sub-occipital muscle tone. [7]

Results and Discussion

All statistical analysis was done by Statistical package of social science (SPSS) statistics version 20.0 for windows software. Microsoft excels and word was used to generate graphs and tables. Mean was calculated as a measure of central tendency for ankle dorsiflexion range of motion Standard Deviation (SD) was calculated as a measure of dispersion (Table 1) Pre- treatment and Post-treatment data Ankle dorsiflexion range of motion Test analyzed by Paired T test.

Level of significance (p value) was set to 0.05.

It was calculated as a measure of dispersion. Pre-treatment and Post-treatment data Ankle dorsiflexion range of motion Test analyzed, **Paired T test** was used for pre-treatment and post treatment comparison of Ankle dorsiflexion range of motion. (Table 2) Interpretation: The result of paired T test shows significant difference for pre & post Active Ankle Rang of motion.

Discussion

In the present study, 30 individuals with Gastrocnemius tightness were selected. The subjects were matched on the basis of selection criteria. The results obtained showed a marked improvement in Ankle Dorsiflexion ROM immediately after the treatment technique. In our study, a significant improvement was achieved in outcome measures with the treatment of sub-occipital muscle inhibition technique. Ankle Dorsiflexion ROM showed the improvement of 4.37 Degrees. Treating the sub-occipital muscles for increasing the Gastrocnemius length was found to be effective. This is of special importance in this treatment approach for Gastrocnemius tightness. The gastrocnemius muscle found to be a most prevalent for the tightness in body limitations of ankle dorsiflexion. There for we done this study for flexibility of gastrocnemius muscle & find the effect of sub occipital muscle inhibition technique. A comparison of the pre - test and the post - test value of the sub occipital muscle inhibition technique showed that there was a significant improvement which demonstrate that this technique and effective individually in gastrocnemius tightness.

Mechanism of SBl (superficial back line): The present Study showed that method of produce significantly gain a range of motion on group suggesting that technique. The superficial back line (SBL) is a continuing line of fascia and muscle from head to heel which includes both the sub occipitals and the gastrocnemius. The SBL helps keep us upright and is connected by the one neural system. The very small suboccipital muscles have a link to the Dura mater (the membrane enveloping brain and spinal cord) and because of this are often described as the control center of the SBL having an effect on the movement of the muscles within the SBL, particularly the gastrocnemius muscle. For the SMI technique, the subject is in supine lying, whereas the therapist is seated at his/her head with the elbows resting on the surface of the table. The therapist placed both hands behind the head of the subject, with the palms facing upwards, the fingers flexed, and the finger pads positioned on the posterior arch of the atlas, to allow the occiput to rest in the palm of the hands. A force was applied with the finger pads over the atlas in the direction of the ceiling with slight traction in a cranial direction for 2 minutes.

The SMI technique is a method of inducing relaxation of the fascia by applying soft pressure to the sub occipital area of the patient while he/she is lying comfortably, and it can be easily applied by a therapist. However, the disadvantages that it cannot be done by patients themselves. Therefore, in this study, we applied the SMI technique to the sub occipital area of the gastrocnemius muscle of subjects and compared the effect of the tightness of gastrocnemius.

Limitations of study

- Short follow up time
- Only younger population
- Small sample size

Further recommendation

- With long follow up time
- Use of patients population
- Further study can be performed in large numbers of subject

Conclusion

Based on the results study concludes that sub occipital muscle inhibition technique has significant immediate effect of gastrocnemius muscle tightness.

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TABLES

Table :1 Analyzed Mean and SD value

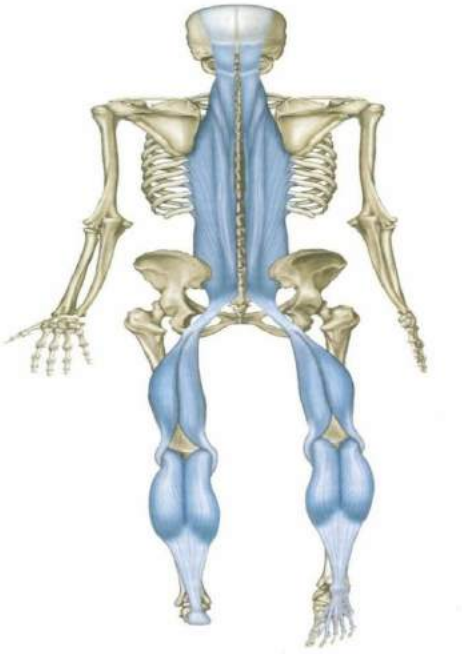
Group	No. of subject	Mean	SD
Pre	30	11.13	1.73
Post	30	15.5	1.94

Table :2 Analyzed Paired T-test

	P	Interpretation
pre and post ankle dorsiflexion ROM	.000	Significant

FIGURES

Figure :1 Superficial Back line



BONY STATIONS		MYOFASCIAL TRACKS
Frontal brow ridge	13	
	12	Scalp fascia
Occipital ridge	11	
	10	Sacrolumbar fascia/erector spinae
Sacrum	9	
	8	Sacrotuberous ligament
Ischial tuberosity	7	
	6	Hamstrings
Condyles of femur	5	
	4	Gastrocnemius/Achilles tendon
Calcaneus	3	
	2	Plantar fascia & short toe flexors
Plantar surface of toe phalanges	1	

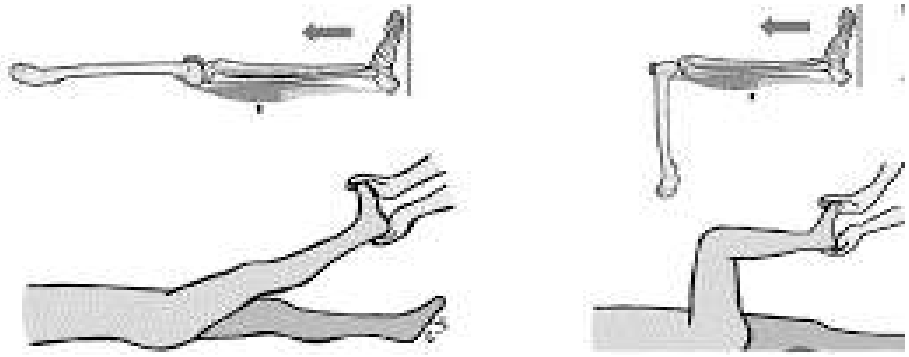


Figure :3 To measure the ankle range of motions

Figure :4 Suboccipital Muscle Inhibition Technique

‘‘DESIGNING AND TESTING BLOOD PRESSURE CONTROLLING DEVICE: AN EXPLORATORY STUDY’’

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ABSTRACT

Background: Hypertension (HTN) is persistent elevation of the Systolic arterial blood pressure ≥140 mm Hg or Diastolic blood pressure above ≥90 mm Hg. Uncontrolled high BP over long time produce some serious medical complications such as stroke, heart attack. Some evidences shown that blood viscosity reduced with magnetic field application and could increased blood flow and possibly reduce the BP.

Aim: To Design and Test Blood Pressure controlling device.

Objectives:

1. To Design and develop Blood Pressure controlling device.
2. To check the effectiveness of Blood Pressure controlling device among normal healthy individuals.

Methodology: 30 normal healthy individuals were recruited depending upon selection criteria and randomly divided into two groups. Group A (N=15) was treated with yoga along with BP controlling device. Group B (N=15) was treated with yoga therapy. after 4 weeks post BP measurement was taken as an outcome measure of both groups. Data was collected and analyzed using SPSS version 25.0.

Result and Discussion: The normality of data checked using Shapiro-Wilk test. The outcomes were analyzed by using Paired t-test and independent sample test. There was significant improvement in BP ($p<0.05$) between pre and post treatment in two groups were found. Group A showed more significant improvement than Group B.

Conclusion: The study concluded that the BP controlling device is highly significant to control BP.

KEY WORDS: Cardiovascular diseases, Blood Pressure controlling device, Magnetic field, Blood viscosity.

INTRODUCTION

Blood pressure is the force of circulating blood pushing against the walls of blood vessels. It is the ratio of the systolic pressure (maximum blood pressure during contraction of ventricles); diastolic pressure (minimum pressure recorded just prior to the next contraction) [1] It is measured in millimetres of mercury (mm Hg) within the major arterial system of the body. Blood Pressure is usually written as the systolic pressure over the diastolic pressure (e.g., 120/80 mm Hg). [2]

Hypertension is defined as a persistent high or raised systolic arterial blood pressure ≥140 mm Hg or diastolic arterial blood pressure ≥90 mm Hg or consuming antihypertensive drugs. [3]

WHO reports that in India, approximately 220 million individuals are affected by hypertension, but only around 12% of them are able to keep their blood pressure under control. Moreover, CVDs are responsible for around one-third of all deaths in India. As of April 2022, over 2.5 million hypertensive patients have been registered across 15000 healthcare facilities in the country. [4]

The prevalence of hypertension especially in low and middle income countries has increased. In India, control of HTN can prevent 400–500,000 premature deaths. [5]

The Behavioural, environmental and nutritional factors throughout the lifespan including air pollution, noise, nutrition and growth, psychosocial stress, long term use of hypertensive medications can affect blood pressure. Some studies suggest that men have higher levels of hypertension than women. [6,7]

Hypertension is directly responsible for 24% of all coronary heart disease (CHD) deaths and 57% of all stroke deaths in India. [8] Controlling this is very important because it can be a key to the prevention of those chronic illnesses. According to WHO, in the last thirty years, adults aged

between 30 to 79 years with hypertension have increased from 650 million to 1.28 billion. Nearly half of them never diagnosed with hypertension. [9]

Most commonly reported symptoms are headaches, dizziness, mood disorders (frustration, irritability, mood swings), chest tightness and reduced vision. [3]

Prolonged periods of uncontrolled high blood pressure can result in severe medical complications, including stroke, vision impairments, heart failure or heart attack, and kidney disease. These conditions are among the leading causes of death and disease worldwide. [11]

There are various ways to manage hypertension, including physical activities, taking medications such as antihypertensives, vasodilators, diuretics, beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, and calcium channel blockers, making dietary modifications, participating in exercise interventions such as endurance exercise (aerobic exercises) and resistance exercise, adopting healthy dietary patterns, managing body weight, modifying lifestyle, managing stress, and undergoing acupressure therapy. [12]

Yoga training for hypertension shows a positive effect on reducing blood pressure. Oxidative stress is one of the underlying causes for hypertension. [13-16] oxidative stress gives inactivation effect of nitric oxide, which is potent vasodilator. This, results in decreased endothelial dysfunctions [17] and endothelial dysfunctions leads to reduce NO production and results in impaired vasodilatation and possibly increased blood pressure. [18]

Yogasanas such as Bhujangasana, Ardha Ustrasana, [18] Adhomukha Virasana, Sputa Badhha Konasana, and Savasana can be beneficial for individuals with hypertension. [19]

The effect of magnetic field on high blood pressure reported positive results. [20] Some evidences shows that blood viscosity is reduced with magnetic field application and could increase blood flow and possibly reduce systolic BP. [21]

For Hypertension general magnetic therapy is a complex treatment which can normalise BP has a positive effect on hemodynamics, improves magnetic circulation, and reduces the average daily dose of antihypertensive drugs by 2 times. Some risk factors like hypercoagulability and hyperlipidemia can be prevented with the use of magnetic therapy. [22]

There are limited studies on magnetic devices for controlling blood pressure. Hence, there is a need to develop a device that can control blood pressure during exercise.

EXPERIMENTAL

Material and Method

Method:

- **Research Design** **:** An Exploratory Study
- **Sample Design** **:** Purposive Sampling
- **Study Population** **:** Normal healthy individuals
- **Sample Size** **:** 30 participants [Group A=15, Group B=15]
- **Study Setting** **:** Cardiovascular and Pulmonary department, SPT, RK University.
- **Treatment Duration** **:** 4 Weeks
- **Study Duration** **:** 6 months

Materials:

- Consent form
- Assessment form
- Chair
- Plinth and Pillow
- Laptop
- Sphygmomanometer
- Stethoscope
- Blood pressure controlling device

Device components:

- Raspberry pi 4
- Electromagnet
- Voltage regulator
- Battery
- Charging module

- Hysteresis module
- Tube stranger power supply
- Board
- Miscellaneous items

GENERAL PROCEDURE

This study consists of developing a blood pressure-controlling device afterwards the Ethical committee and CTRI approval. In this study,

Phase 1 was dedicated to the innovation of the device. Phase 2 of the study consists of collecting the data and analyzing the data.

A total number of 36 participants were screened for the study, out of those, 30 Normal healthy individuals were informed and recruited depending upon Inclusion and Exclusion criteria. The participants were randomly divided into two groups of 15 each in the group. Randomization into two groups was done through a random cheat-picking method. All participants were further provided with an explanation of the procedure of the study.

Once all these aspects had been discussed with the participants, written informed consent was obtained.

The pre-participation assessment form taken and all participants underwent Systolic BP measurement obtained from the brachial artery via manual sphygmomanometer.

The participants were randomly assigned to either Group A -Experimental Group (n=15) or Group B - Control Group (n=15) using the cheat- picking method.

The participants from the experimental group were instructed about the utilization of the BP controlling device and asked to use the device both hands in morning, both hands in afternoon and both feet in evening. Treatment time using the device was 16 minutes per session, 3 times per day and thus 48 min per day. [8, 23] Participants were informed to maintain habitual diet, physical activities and medications throughout the study. [23]

Information regarding the correct technique for each of the yoga asanas was provided to the participants in the control group.

DETECTION METHOD

Both groups were treated five days a week for four weeks.

All participants were assessed by post-SBP measurement which was taken as an outcome measure.

RESULTS AND DISCUSSION

Statistical analysis was done using SPSS version 25.0 IBM and Microsoft excel to generate graphs and tables.

RESULT

STATISTICAL ANALYSIS OF AGE OF PARTICIPANTS

Table 1: Demographic details (Gender distribution)

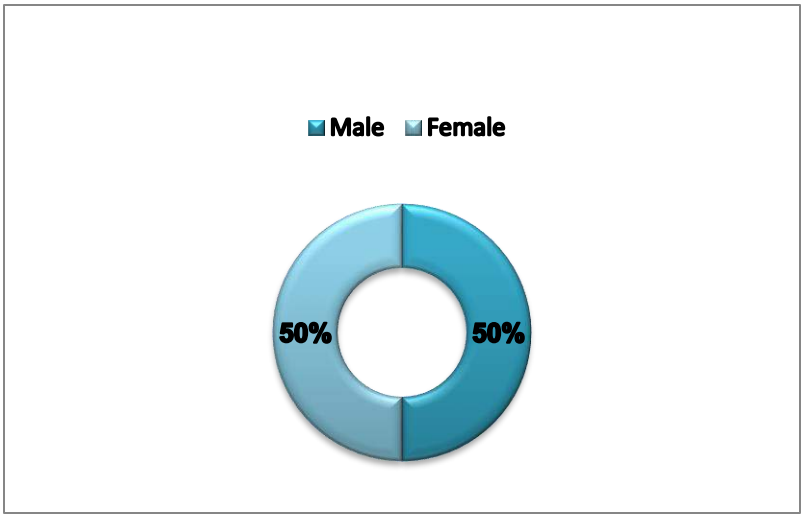
Demographic details		Group A	Group B	Total
Gender	Male	7	8	15
	Female	8	7	15

INTERPRETATION: Table 1 and graph 1 show the gender distribution among Group A and Group B. A total of 30 participants, 15 males and 15 females participated in the study. Out of 30 participants Group A consisted of 7 males and 8 females, Group B consisted of 8 males and 7 females.

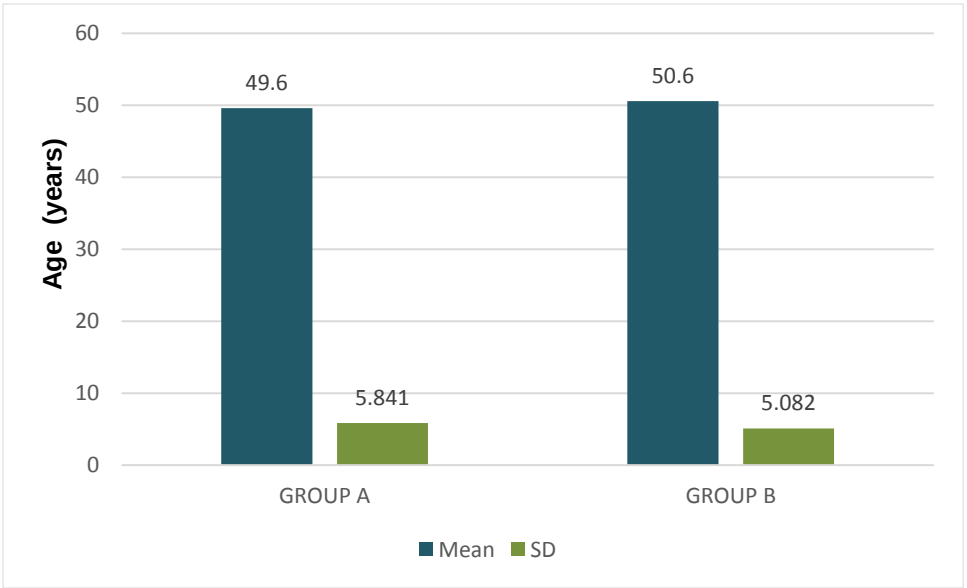
Table 2: Age (Years) Distribution of Participants in Group A & Group B

Variable	Group A	Group B
	Mean ± Std. Deviation	Mean ± Std. Deviation
Age (Years)	49.60 ± 5.841	50.60 ± 5.082

INTERPRETATION: Table 2 and Graph 2 show the Mean ± SD of age was 49.60± 5.841 years in Group A and 50.60 ± 5.082 years in Group B. No statistically significant difference was found between the ages of the subjects in both groups and proving that the groups were homogenous in terms of age.



Graph 1: Gender Distribution of Participants in Group A & Group B

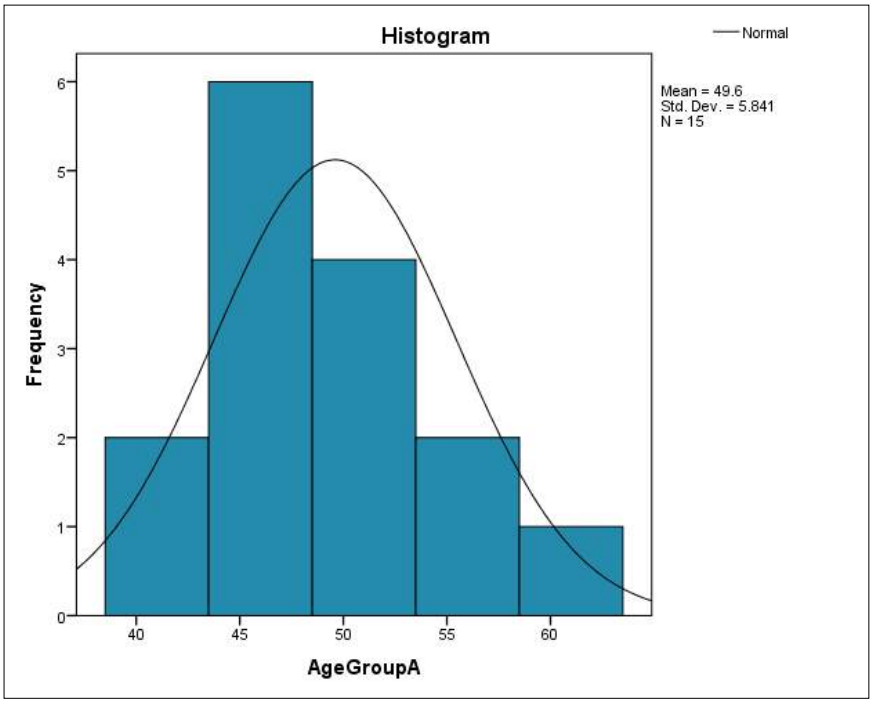


Graph 2: Age (Years) Distribution of Participants in Group A & Group B

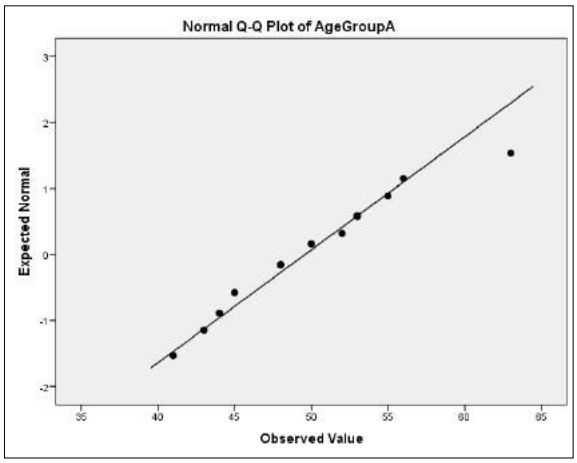
STATISTICAL ANALYSIS OF TEST OF NORMALITY IN GROUP A

Table 3: Table for Normal Distribution in Group A

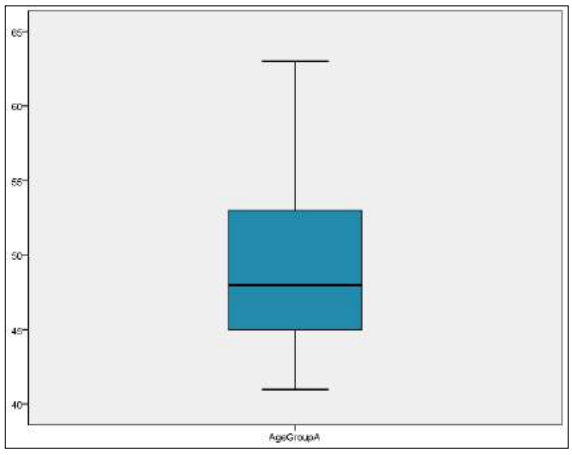
Outcome	Skewness	Kurtosis	Shapiro-Wilk Test
Age	1.15	0.371	0.667
Pre SBP	-1.094	-0.308	0.070
Post SBP	O.158	-1.196	0.096



Graph 3: Frequency distribution of age of participants in Group A



Graph 4: Q-Q plot of the age of participants in Group A



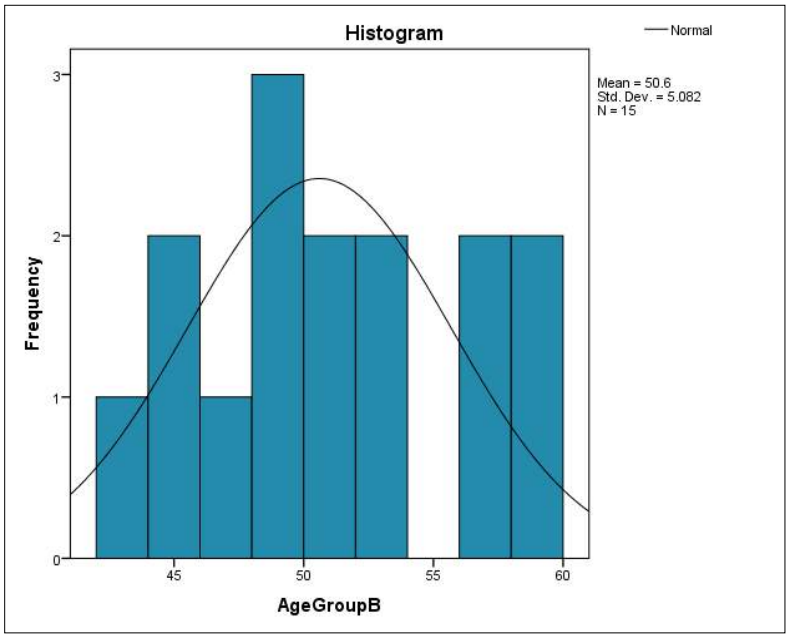
Graph 5: Box plot of the age of participants in Group A

INTERPRETATION: Graphs 3, 4 & 5 show the bell shape curve, q-q plot, and box plot for age in Group A as per the Shapiro-Wilk test. Significance was 0.667 which was more than 0.05 and the graph curve was bell shape. This showed data were normally distributed.

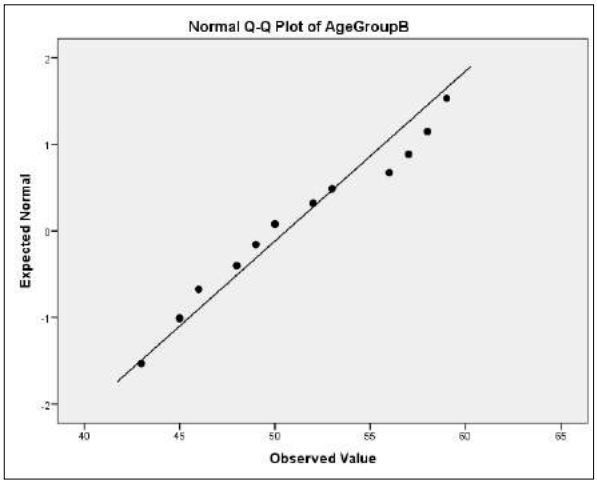
STATISTICAL ANALYSIS OF TEST OF NORMALITY IN GROUP B

Table 4: Table for normal distribution in group B

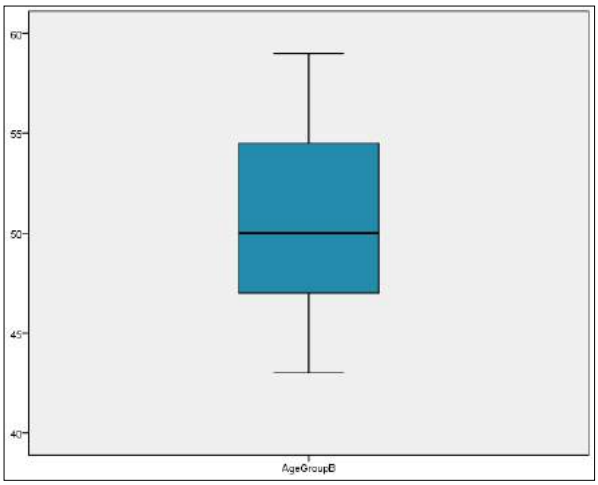
Outcome	Skewness	Kurtosis	Shapiro-Wilk Test
Age	0.548	-0.953	0.443
Pre SBP	-0.681	-1.059	0.101
Post SBP	-0.348	-1.039	0.223



Graph 6: Frequency distribution of age of participants in Group B



Graph 7: Q-Q plot of the age of participants in Group B



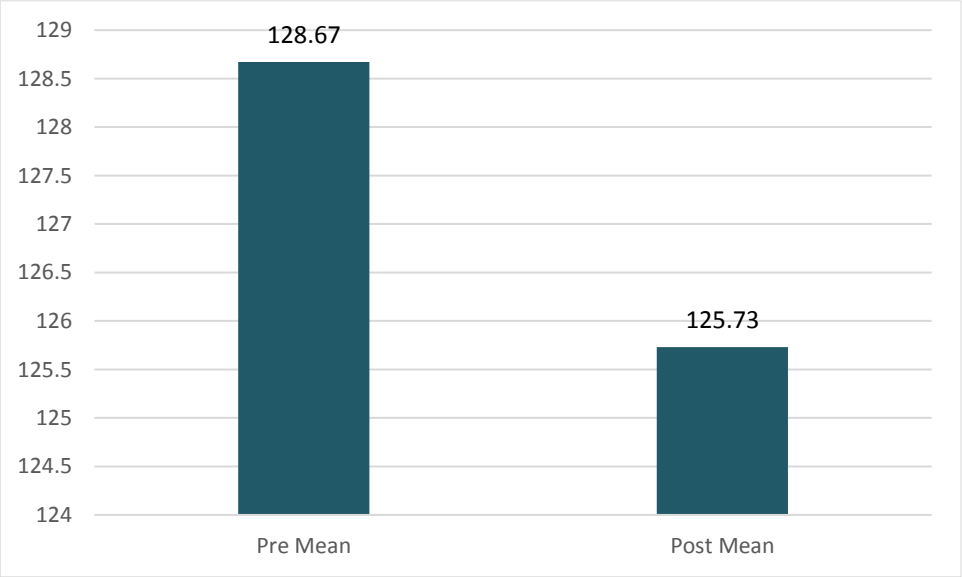
Graph 8: Box plot of the age of participants in Group B

INTERPRETATION**:** Graphs 6, 7 & 8 show the bell shape curve, q-q plot, and box plot for age in Group B as per the Shapiro-Wilk test. Significance was 0.443 which was more than 0.05 and the graph curve was bell shape. This show data were normally distributed.

Table 5: Intra Group Comparison of Pre and Post Treatment Score of SBP for Group A

Parameter	Mean ± Std. Deviation		t-Value	*p*-Value	Result
	Pre	Post			
SBP	128.67± 3.177	125.73± 2.815	3.659	0.003	Significant

INTERPRETATION**:** The above table show the mean and SD of pre-SBP value i.e. **128.67 ± 3.177** and post-SBP value i.e. **125.73 ± 2.815**. Result show significant differences in the pre and post-value of SBP. **(t -3.659, *p*<0.05)**.

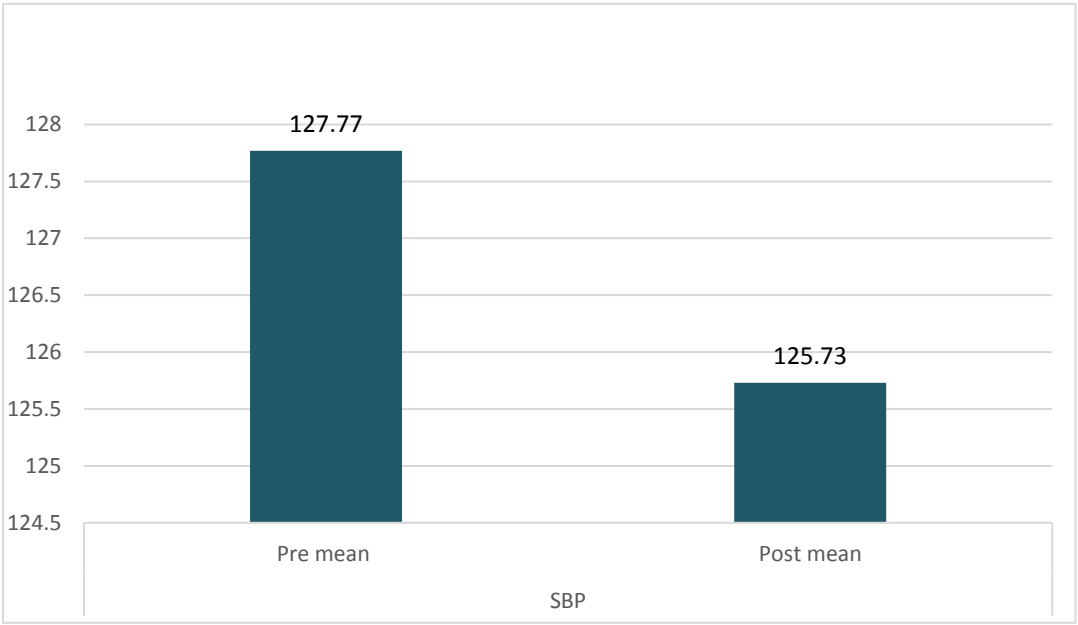


Graph 9: Mean of Pre and Post SBP for Group A

Table 6: Intra Group Comparison of Pre and Post treatment score of SBP for Group B

Parameter	Mean ± Std. Deviation		t-Value	*p*-Value	Result
	Pre	Post			
SBP	127.77± 3.535	125.73± 3.283	3.240	0.006	Significant

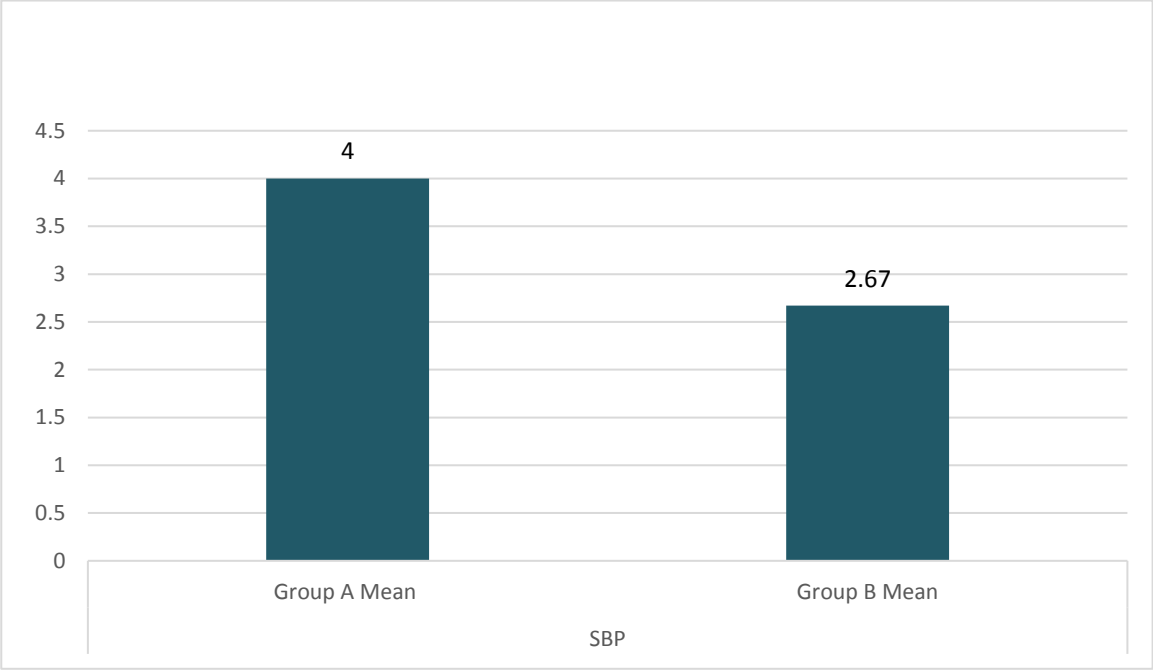
INTERPRETATION: The above table shows the mean and SD of Pre-SBP value i.e., **127.77 ± 3.535** and Post-SBP value i.e. **125.73 ± 3.283**. Result show significant difference in the pre and post-value of SBP. **(t- 3.240, *p*<0.05)**.



Graph 10: Mean of Pre and Post SBP for Group B

Table 7: Inter Group Comparison of Treatment score of SBP for Group A & Group B

Parameter	Mean ± Std. Deviation		t-Value	*p*- value	Result
	Group A	Group B			
SBP	4.00 ± 1.309	2.67 ± 1.952	2.197	0.041	Significant



Graph 11: Inter Group Mean of Pre and Post SBP for Group A & Group B

INTERPRETATION: Table 7 and Graph 11 show the comparison of the mean of difference post-intervention variable (SBP) of Group A and B. Differences in the mean of post-intervention values of both the groups were analysed using an independent sample test for SBP, where **(t = 2.197, p<0.05)**. It means there is statistically significant difference in post-treatment scores of SBP in both groups.

Hence, the null hypothesis is rejected and the alternative hypothesis accepted. There is a statistically significant improvement in the effect of yoga along with BP controlling device on blood pressure in normal healthy individuals.

DISCUSSION:

The purpose of the present study was to develop a device that can control Blood Pressure and investigated the influence of Blood pressure controlling device on Blood pressure among normal healthy individuals. The research on the BP controlling device is limited.

Result of the present study showed positive findings with statistically significant improvement in systolic BP after four weeks as compared to baseline in both the groups. Moreover, a comparison of the two interventions revealed that BP controlling device along with Yoga shows more significant improvement than Yoga therapy alone.

Intra-group comparison of a pre-treatment score of SBP shows homogeneity (p >0.05). Intra-group comparison of the mean of pre and post-treatment scores of SBP shows there is statistically significant improvement in both groups (p <0.05).

Inter-group comparison of scores of SBP shows there is a significant difference in improvement between groups (p <0.05). Hence, the null hypothesis was rejected and the alternative hypothesis was accepted.

According to **Chul-HoKim et al.** [29] proposed that having an elevated blood pressure is considered a significant risk factor for cardiovascular diseases. Those individuals who exhibit a normal resting blood pressure but experience an excessive increase in blood pressure during

exercise are at an increased risk of developing hypertension and related cardiovascular complications. [29]

MCKay et al. [30] noted that initially, magnets were utilized for treating orthopedic disorders; however, no studies have investigated their use in creating a BP controlling device. Some recent research suggests that exposure to a static magnetic field may lead to a mechanism involving baroreflex sensitivity and signal transduction pathways involving Calcium (Ca^{+2}). The magnetic field effect may be related to the modulation of Ca^{+2} outflows through the cell membrane or an increase in Ca^{+2} uptake by the sarcoplasmic reticulum. [30]

Kim et al. [29] addressing the concern regarding the impact of magnetic field exposure on vascular structures results in an increased binding of $Ca^{+2}$and Calmodulin (CaM) in smooth muscles, leading to the formation of nitric oxide in the endothelial layer of the smooth muscles as a result of the binding of Ca^{+2} and CaM to Endothelial Nitric Oxide Synthase (eNOS). [29]

R. Tao et al. [21] proposed that the impact of a magnetic field on blood viscosity has been discovered, whereby the magnetic field induces blood particles to align in parallel with the flow direction, altering the magnetic permeability of Red Blood Cells (RBCs) and plasma, leading to the creation of lengthy, dense chains and RBC clusters after just 12 minutes of exposure. Ultimately, this decrease in blood viscosity has the potential to increase blood flow and lower blood pressure. [21]

The results are also supported by **Ganiyev Sardor et al.** [22] who stated that the use of general magnetic therapy as a treatment for hypertension has been found to have a notable impact on hemodynamics, normalize vegetative status, and improve magnetic circulation. As a result, the therapy can reduce the average daily dosage of hypertensive medication by half. [22]

The above discussion suggests that the combination of a blood pressure controlling device along with yoga intervention has been found to be an effective for improving the systolic blood pressure of healthy individuals.

Hence, the device designed for controlling blood pressure during exercise had a favourable impact on managing systolic blood pressure. It is portable, cost-effective, and can be a useful adjunct in vascular rehabilitation.

CONCLUSION

According to the findings, the treatment was effective in controlling blood pressure among normal healthy individuals in both groups. However, the use of the blood pressure controlling device in conjunction with yoga was more effective than yoga alone in controlling blood pressure.

This prototype has ability to effectively control blood pressure and it can also serves as a useful device for controlling high BP as well.

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"EFFECT OF CORE STABILITY EXERCISE WITH YOGA ON PAIN AND FUNCTION AMONG COLLEGE STUDENTS WITH NON- SPECIFIC LOW BACK PAIN – EXPERIMENTAL STUDY"

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ABSTRACT:

Background: Prolonged sitting had been identify as one of the factor leading to NSLBP. Core stability is essential for proper load balance within pelvis, spine & kinematic chain. Aims & objectives: To study the effect of CSE_S with yoga on pain & function in college students with NSLBP. Methodology: 30 Subjects between 18-25 years having NSLBP >3 months included in this study. All subjects were given to CSE_S with yoga for 4 weeks. Pain and functional disability were evaluated using NPRS and MODI. Result: Data obtained from out comes was analyzed using appropriate statistical test. ($p<0.005$) Conclusion: CSE_S with yoga was effective in reduction of pain and improving function in students with NSLBP.

Key words: Core stability exercise(CSE), Non specific low back pain(NSLBP), Numerical pain rating scale(NPRS), Modified Oswestry disability index(MODI).

INTRODUCTION:

For many years, low back pain has been a significant public health concern, leading to significant work impairment and healthcare expenses. It is estimated that 70–85% of adults in the general population would suffer at least one episode of low back pain at some point in their lives. About 85% of cases of low back pain are nonspecific, which is defined as pain without a known cause. Nonspecific low back pain is tension, soreness and stiffness in the lower back region for which it is not possible to identify a specific cause of the pain. [1] The most important symptoms of non-specific low back pain are pain and disability. Core stability as a preventive regimen and a method of rehabilitation in the management of persistent low back pain. As the primary stabilisers of the low back, the transverse abdominis, multifidus, diaphragm, and pelvic floor muscles have been

identified. They are linked to eccentric deceleration or resisting momentum and aid in postural regulation. [2]

The lumbopelvic region is referred to as the "core" of the torso, and it has been proposed that activities to promote muscle integrity in this region enhance spinal segment stability. [3] For patients with LBP, several types of therapeutic exercises are employed in clinical settings. The co-activation of the transversus abdominis and LM muscles is emphasized in core stabilization exercises (CSE), which are based on the motor learning approach. By increasing intra-abdominal pressure, these deep stabilizing muscles stiffen the lumbar spine and give the spine segmental stability. They link to the thoracolumbar fascia.

Additionally, CSE can improve muscle behaviour, undo pain-related changes in the motor cortex, and retrain the critical role of regional trunk muscles in the neuromuscular regulation of spinal stability. Stabilization exercises can successfully treat postural problems, lessen discomfort and disability, improve proprioception, and increase stability in patient with LBP. Weakness of core muscles leads to decrease in overall functional strength leading to low back pain. Exercises aim to increase strength and control of the global trunk muscles to improve general spinal stability. These exercises could decrease pain and physical disability and increase trunk muscle activity in patients with NSLBP. [4] Yoga have been commonly used as an alternative method for treating LBP since it is a kind of body-mind collaboration concept that has effect on pain relief, functional restoration, and improvements in psychosocial parameters. [3]

Yoga has been immensely promoted for the treatment of LBP. It can be performed by anyone at any age and level of fitness. Yoga is also cost-effective in improving health related quality of life for patients suffering from pain. Patients who are in pain can improve their health-related quality of life more affordably by practicing yoga. According to certain theories, yoga uses asanas, or poses, together with breathing exercises called pranayama, which primarily rely on isometric muscle contractions, to achieve inner, physical, and emotional harmony. [5] Two outcome measures was used in this study. NPRS was used for evaluating for pain and MODI used for low back pain disability. The need arises to combine effect of core stability exercise with yoga on pain and function among college students with non- specific low back pain

AIMS AND OBJECTIVES

Aim of the study: This study aims to effect of CSE_S with yoga on pain & function in college students with NSLBP.

Objectives: To determine the effect of CSE_S with yoga on pain in college students with NSLBP. To determine the effect of CSE_S with yoga on function in college students with NSLBP.

METHODOLOGY

- Source of data: Parul university
- Study type: Experimental study
- Sample size: 30 Subjects
- Intervention duration: 3 days / week for 4 weeks
- Outcome measures: 1) Numerical pain rating scale (NPRS)
  2) Modified Oswestry disability index (MODI)

MATERIAL REQUIRED

Mattress ,Pillow ,Timer ,Pen ,Pencil, Eraser ,Dairy ,Laptop

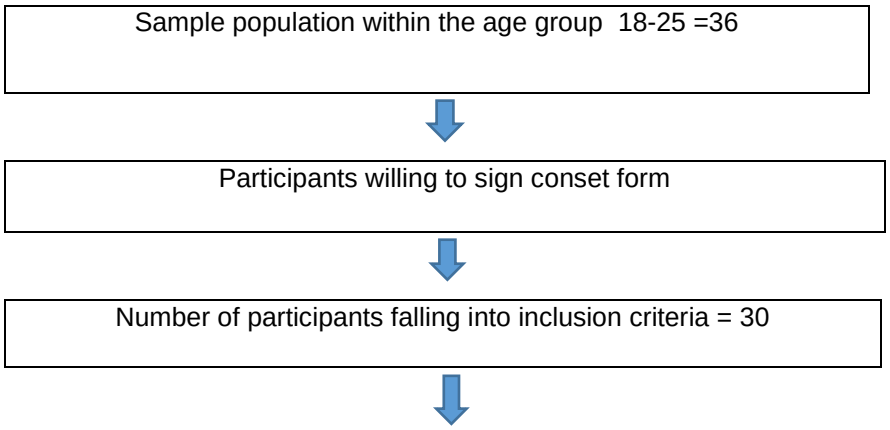
INCLUSION CRITERIA

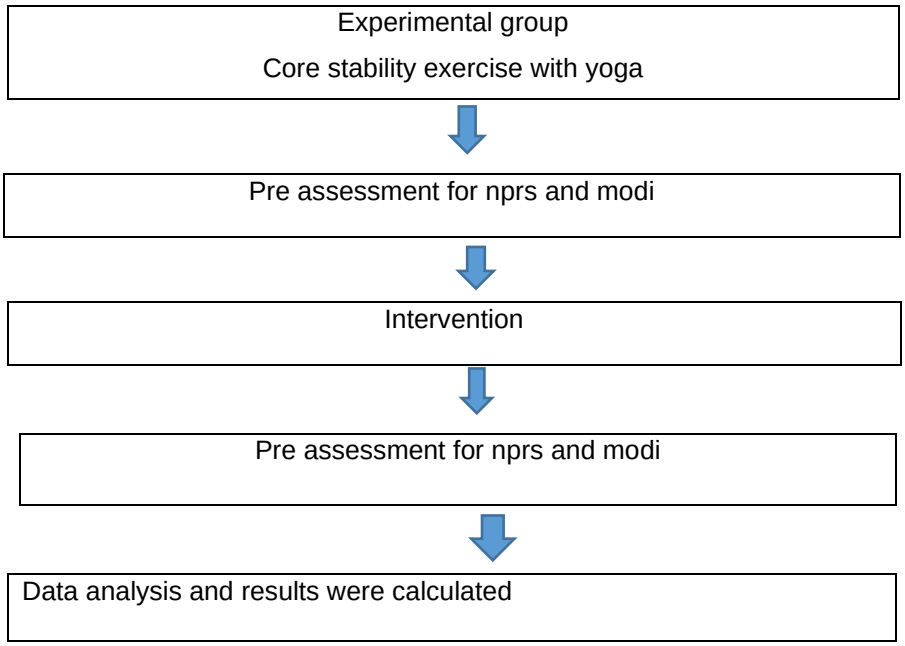
- Only girls are included
- Age group18-25years
- <3 months of NCLBP

EXCLUSION CRITERIA

- Lumbar spine or abdominal surgery
- Pain radiating in legs

PROCEDURE





INTERVENTION

CORE STABILITY EXERCISE (CSE):

1st – 2nd week

- Repetitions: 10
- Hold: 10 secs
- Bridging
- Abdominal crunch
- Plank
- Pelvic floor muscle exercise in supine and sitting
- Abdominal tuck in crook lying, sitting position
- Diaphragmatic breathing exercise 3-4 times

3rd – 4th week

- Bridging with PFM hold and relax
- Abdominal tuck in quadruped position
- PFM exercise in kneeling and standing
- Oblique crunch
- Side plank
- Diaphragmatic breathing exercise 3-4 times

Yoga

Hold: 10 seconds

Repetitions: 10

- Bhujangasana
- Marjarasana
- Shashankasana
- Ardhachandrasana
- Pavanmuktasana

RESULT:

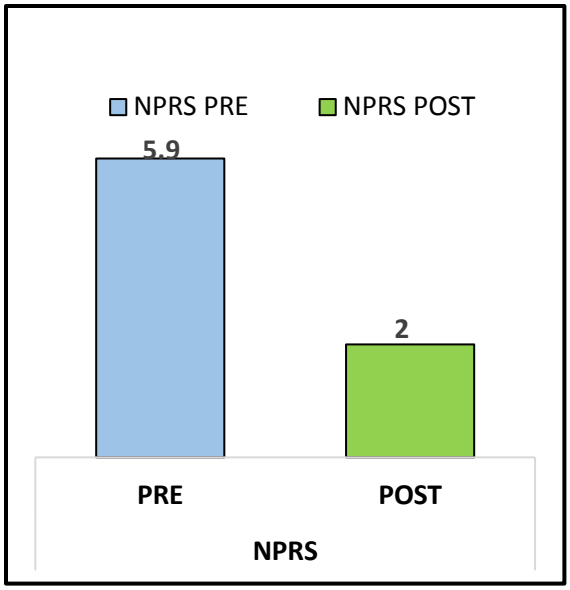
- Wilcoxon test were used to find the significance of parameters pre and post.
- The result showed significant improvement in 30 subjects treated with core stability exercise with yoga. Pre and post Mean difference for NPRS respectively 5.9 and 2.23. Pre and post difference for MODI respectively 60.38 and 66.43 by using IBM SPSS 20 software and excel were used to analyze.

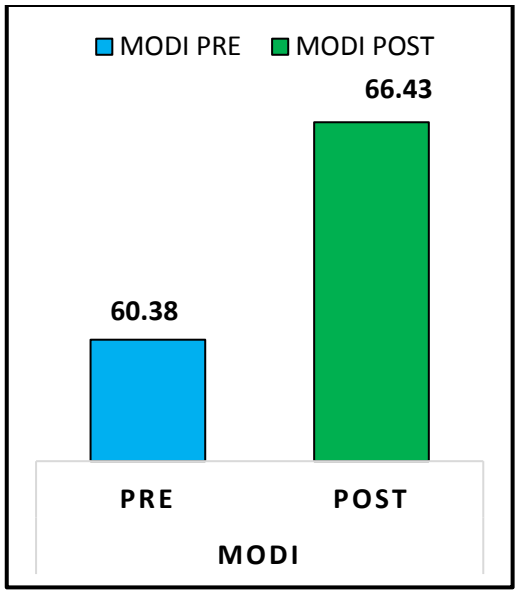
Table 1: Comparison of pre and post data for NPRS

	MEAN	p- value	Test
Pre	5.9	0.005	WILCOXON SIGNED RANKS TEST
Post	2		

Table 2: Comparison of pre and post data for MODI

	MEAN	p-value	Test
Pre	60.38	0.005	WILCOXON SIGNED RANKS TEST
Post	66.43		





Graph :1 Intergroup mean difference of NPRS Graph :2 Intergroup mean difference of MODI

DISCUSSION:

Present study was aimed to check the effects of core stability exercise with yoga on subjects with nonspecific low back pain. The study was conducted at Parul University, Vadodara and participants were taken from the physiotherapy department. The number of participants in group is 30 and the age criteria of 18-25years.

The NPRS was measured and data was compared pre and post treatment. In duration of 4 weeks with 3 sessions per week. Pre and post test mean difference for NPRS is respectively 5.9 and 2.23. ($p < 0.005$).The MODI was measured and data was compared pre and post treatment. Pre and post test mean difference for MODI respectively 60.38 and 66.43. ($p < 0.005$).

The co-activation of the transversus abdominis and LM muscles is emphasized in core stabilization exercises (CSE), which are based on the motor learning approach. By increasing intra-abdominal pressure, these deep stabilizing muscles stiffen the lumbar spine and give the spine segmental stability. [4] Yoga is also cost-effective in improving health related quality of life for patients suffering from pain. [5] The present study showed that effects of CSE with Yoga are effective in decrease pain and improving function.

CONCLUSION: This study concluded that core stability exercise with yoga are effective in reduction of pain and improving function.

LIMITATION:

The sample size is too small.

The study was limited to only university students.

FURTHER RECOMMENDATIONS:

The study can be further continuing with large sample size.

The study can be continuing by using other outcomes.

The study can be done in different age groups.

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Breathing Retraining Therapies: Are We Reaching There? – A Systemic Review

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Abstract
Dysfunction of the respiratory muscles is observed in various conditions, including lung diseases and neuromuscular diseases. In 2017, chronic pulmonary diseases ranked as the third leading cause of death, trailing behind cardiovascular diseases and neoplasm. It is estimated that approximately 544.9 million individuals worldwide suffer from chronic respiratory diseases, which can lead to a range of clinical consequences such as dyspnea, impaired exercise performance, ineffective coughing, respiratory insufficiency, weaning failure, coma, and even death. Thus, giving due attention to breathing retraining becomes crucial. Breathing retraining techniques aim to alleviate respiratory load, enhance gaseous exchange, improve exercise tolerance, delay respiratory fatigue, and boost performance in various sports activities. This article seeks to investigate the available techniques for breathing retraining, both manual and mechanical, and their effects on the respiratory muscles. The research methodology employed is a systematic review following the PRISMA guidelines. PubMed, Google Scholar, Web of Science, and Scopus were the databases used for selecting relevant literature, with articles published between 2002 and 2022 being included. Out of the screened articles, a total of 9 were deemed eligible based on specific criteria. The inclusion criteria consisted of full-text English articles and randomized controlled trials (RCTs) focusing on breathing retraining. Articles with a Pedro score below 6 and duplicate publications were excluded. The findings of the reviewed articles suggest the existence of numerous devices and manual techniques currently employed for breathing retraining. However, the accurate impact and necessity of each technique or device in therapy warrant further research.

Keywords: Breathing retraining, lung disease, respiratory muscles training, respiratory muscle weakness

Introduction

Oxygen transport is essential to life, activity and participation in life consistent with the International Classification of Functioning, Disability and Health (ICF).Maximizing the efficiency of the oxygen transport pathway promotes optimal mobility and independence, the keystone of quality of life and well-being. Give heed to oxygen transports, its deficits and threats to it, is the concern of everyone. [10]

Air entry into the lungs depends on the integrity of the respiratory muscles, Respiratory muscle weakness increases the relative load for breathing, and this can lead to clinical consequences such as dyspnea, impaired exercise performance, ineffective coughing, respiratory insufficiency, weaning failure, coma and death.Dysfunction of the respiratory muscles is observed in several conditions such as chronic obstructive pulmonary disease, asthma, myasthenia gravis and guilliain barre syndrome and Restrictive lung disease.[10]About 544.9 million people worldwide had a chronic respiratory disease in those patients proper respiratory care is necessary to maintain/improve respiratory function.[11]

Many evidences suggests that breathing against an inspiratory load increases both maximal inspiratory pressure and endurance of the inspiratory muscles.[12] Respiratory muscle training has been reported to produce hypertrophy of diaphragm and improves

breathing.[13]Based on studies, In addition to exercise training, IMT can improve exercise capacity more than exercise training alone, IMT can improve inspiratory muscle strength, functional exercise capacity, and quality of life while also decreasing dyspnea and nocturnal desaturation time. Also IMT has been used to improve performance in different sport modalities for enhance exercise tolerance and delay respiratory fatigue.[3,4,9]

Material and Methods

The search was conducted using relevant keywords on electronic databases such as PubMed, PEDro, Google Scholar, and Elsevier, covering the years 2002 to 2022. To manage bibliographic data and related research materials, an open-source reference management software called Zotero was utilized. The keywords employed for the search are listed in Table 1.

Table 1: Keywords used for search in electronic database

1. Breathing retraining
2. Lung disease
3. Respiratory muscles training,
4. Respiratory muscle weakness

Inclusion criteria

1. Full text English article
2. RCT articles
3. Study associate with breathing training
4. Published in between 2002 to 2022-12-27

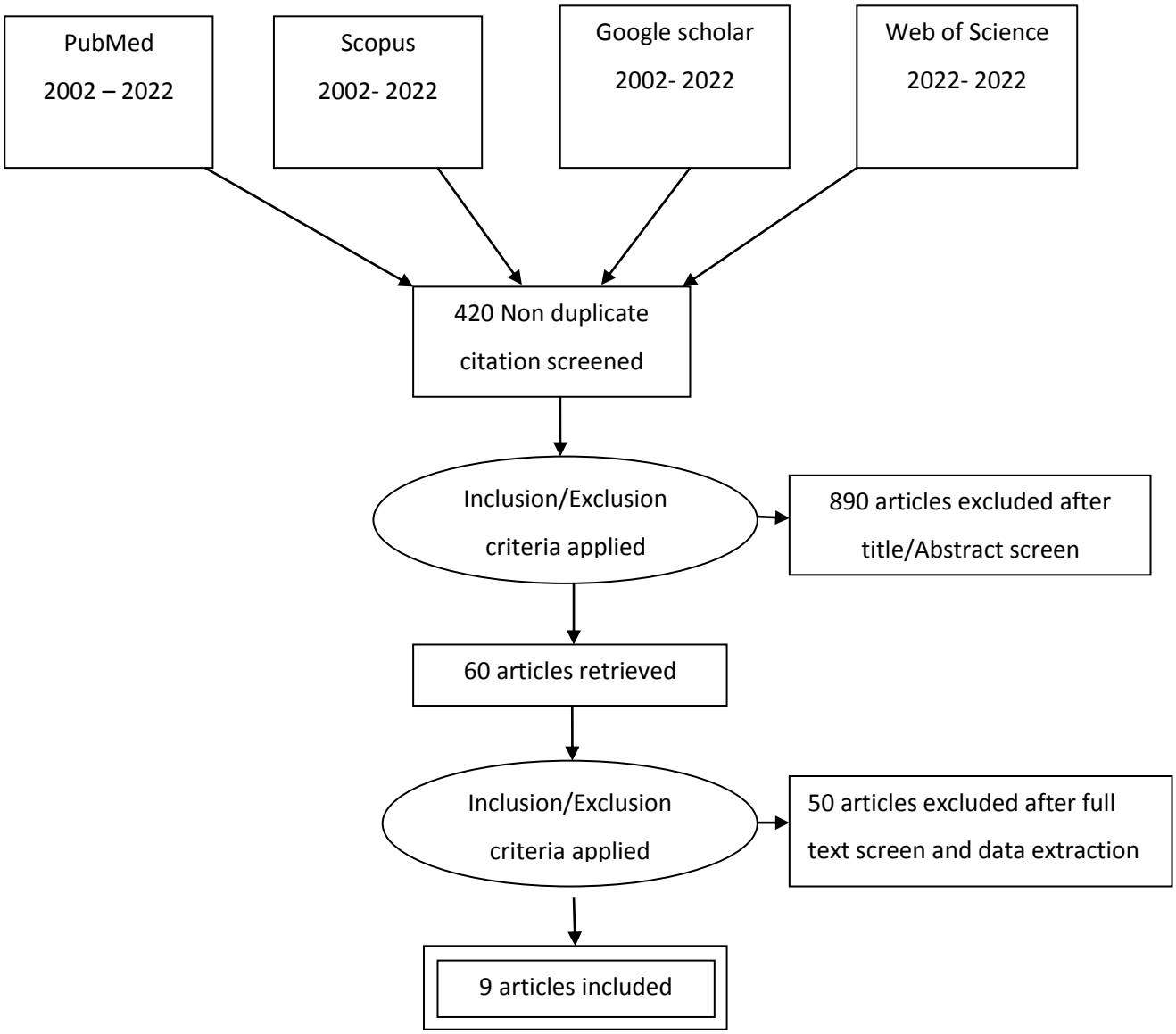
Exclusion criteria

1. Pedro score < 6
2. Duplicate articles
3. Unpublished articles
4. Personal blogs
5. Press column
6. Grey literature
7. Predatory journals

The abstract of the located articles were read to select the appropriate article and full text was evaluated of the relevant research.

General procedure:

The research materials were efficiently managed in Zotero, ensuring proper organization and citation management. Duplicate research articles were identified and removed from the dataset. The PRISMA flow diagram (Figure 1) was generated using the online URL http://prisma.thetacollaborative.ca, providing a visual representation of the article selection process. Out of the 60 articles assessed, their quality was evaluated based on specific criteria. Ultimately, only 10 articles met the eligibility criteria and were selected for inclusion in this systematic review.



Detection Method:

The full text of these 10 Research articles were reviewed for and different techniques and devices for breathing retraining.

SR No.	sAUTHOR	SAMPLE SIZE	INTERVENSION	OUTCOME MEASURES	COCLUSION
1.	Yi Chung et al. (2021)	C.G.-30 I.G.-30 Asthma patient	12-week Program, 25-min sessions 2 times/ week **I.G**.-Conventional breathing **C.G**.- 30 dynamic inspiratory intensity of each breath was 50–60% of maximal inspiratory pressure(PImax).	PFT,PImax, PEmax, Asthma Control Test (ACT), 6MWT, Three-Day Physical Activity Log (3-D PAL)	IMT appears to be more effective than breathing exercise intervention in promoting improvements in respiratory muscle strength.

			(Powerbreathe device)		
2.	Eduardo Salazar-Martínez et al. (2017)	C.G.-8 I.G.-8 Healthy participants	I.G.- 2 sessions/ day, 5 days/week for 6-weeks. 30 inspiratory breaths at 50% of their individual PImax. C.G.- Routine physical activity	PFT, PImax, Cycling test, Incremental exercise testing	Study Suggest positive effect of IMT on cycling time trial performance in both normoxic & hypoxic conditions.
3.	Joshua h. Guy et al. (2014)	C.G.-12 I.G.- 12 Soccer player	I.G.- 6 weeks twice daily for 30 self-paced inspiratory breaths, (Powerbreathe) + Soccer specific fitness protocol(SSFP)- walking, 45 minutes C.G.- No intervention	spirometry measures, PImax, soccer-specific fitness test (SSFT), maximal multistage fitness test (MSFT)	It shows significant improvement to exercise tolerance as detected by accumulative distance in a running test but did not result in substantial change to sport-specific fitness performance
4.	Adauto de Oliveira Nunes Júnior et al. (2018)	C.G.-10 I.G.-10 Rugby player	I.G.- 2 hours/day three weekly sessions, for 12 consecutive weeks total 36 sessions IMT- 30 repetitions using 80% of MIP + warm up (Breather Plus IMT Power) C.G.- Warm up	PFT, PImax, PEmax, Yo Yo test	IMT with pressure loading equipment provided beneficial effects in rugby players, with significant increase in VVM(max. Voluntary ventilation),PImax,PEmax & distance travelled in yo yo test)
5.	Rasmi Magadle et al. (2007)	C.G.-18 I.G.-18 COPD	I.G.- GER plus IMT using a pressure threshold device (POWERbreathe) 3 times/week for 12 months C.G.-General exercise reconditioning(GER) For 1 h 3 times a week	Spirometry, 6MWT, George Respiratory Questionnaire score (SGRQ)	The addition of IMT to pulmonary rehabilitation program shows greater improvements in quality of life and perception of dyspnea.
6.	Alba Ramı´rez-Sarmiento et al. (2002)	C.G.-7 I.G.-7 COPD	I.G.-5 weeks, 5 days /week for 30 min., inspiratory breath as 60 % load of their PImax C.C.-IMT with device without load (threshold inspiratory device)	PFT, 6MWT	The study suggest that inspiratory training induces a specific functional improvement of the inspiratory muscles and adaptive changes in the structure of external

					intercostal muscles
7.	Shao-Kai Sum et al. (2019)	C.G.-26 I.G.-24 Rib fracture	C.G.- General care I.G.- General care with spirometer	pulmonary complication rate, PFT, Length of hospitalization	IS use reduced pulmonary complications, including atelectasis & hemothorax, and further interventions, such as tubethoracostomy, in patients with rib fracture.
8.	Mei-Yun Liaw et al. (2020)	C.G.-10 I.G.-11 Respiratoy muscle weakness after stroke	I.G.-Inspiratory RMT starting from 30% to 60% of MIP and expiratory RMT starting from 15% to 75% of MEP for 5days/week for 6 weeks + Rehabilitation program (DT 11 or DT 14 GaleMed Corporation) C.G.-Rehabilitation program	MIP, MEP, PFT, perception of dyspnea,Fatigue Assessment Scale, Brunnstrom stage, Barthel index	Combined inspiratory and expiratory RMT is feasible as adjuvant therapy for stroke patients to improve fatigue level, respiratory muscle strength, lung volume, respiratory flow, and dysarthria
9.	Charlini S. Hartz et al. (2018)	C.G.-9 I.G.-10 Handball athletes	12 weeks, 2 session daily, 5 times a week I.G.- 1st to 4th week: intensity of 50% of the MIP; the 5th-8th week: 60% of the MIP; the 9th-12th week: intensity of 70% of the MIP. C.G.-1st to 12th week: intensity of 15% of the MEP	PImax, PEmax, MVV, Treadmill incremental maximum oxygen uptake test	IMT shows significant increase in respiratory muscle strength and resistance which suggests that IMT could be incorporated in handball players' training.

Result and Discussion

The primary objective of this investigation was to examine the scientific evidence regarding the impact of breathing training on respiratory muscles. Various devices and techniques have been utilized for respiratory muscle training. Upon detailed analysis of the articles included in this systematic review, it becomes evident that Inspiratory Muscle Training (IMT) enhances respiratory muscle strength, as indicated by increased PImax (maximum inspiratory pressure) and PEmax (maximum expiratory pressure). It also demonstrates positive effects on functional capacity, physical activity, and quality of life. Various outcome measures such as Pulmonary Function Tests (PFT), 6-minute walk test, VO2max, cardiopulmonary tests, and Borg tests were employed to evaluate these effects.

Several studies have been conducted involving IMT in athletes with the aim of improving physical performance. IMT has proven to be effective in sports such as soccer, basketball,

cycling, swimming, running, rugby, handball, and others. Articles indicate that post-training blood lactate concentration significantly decreases, suggesting that IMT contributes to lactate clearance. This suggests a potential increase in the content of oxidative and/or monocarboxylate transport proteins in the inspiratory muscles, leading to improved cardiovascular function and performance. IMT also improves ventilatory efficiency in hypoxic conditions, indicating that incorporating IMT before competing at altitude could be a successful method to enhance performance.

In patients with Chronic Obstructive Pulmonary Disease (COPD), IMT enhances respiratory muscle strength, endurance, exercise capacity, and reduces dyspnea. However, some articles note that significant differences were observed only in Maximum Inspiratory Pressure (MIP) and not in Maximum Expiratory Pressure (MEP), possibly due to the relatively short duration (6 weeks) of the program, which might not be sufficient to achieve a notable effect on expiratory muscle force in neurological patients.

Additionally, a 5-week Expiratory Muscle Training (EMT) program for ischemic stroke patients resulted in an approximate 30 cmH2O improvement in average expiratory muscle strength. Furthermore, a 4-week Respiratory Muscle Training (RMT) utilizing a threshold resistance device in acute stroke patients significantly improved mean Maximum Expiratory Pressure (MEP) by 14 cmH2O and peak expiratory flow rate by 74 l/min.

The findings suggest that breathing training, particularly IMT, holds promise in enhancing respiratory muscle function, exercise capacity, and quality of life in various populations, including athletes, COPD patients, and stroke patients.

Conclusion

Numerous techniques and devices for breathing retraining exist, demonstrating positive effects on respiratory muscles. However, it is important to note that certain devices currently available may not be suitable for individuals with facial muscle dysfunction, limiting their usability in certain cases. Furthermore, it is worth mentioning that some research studies inadequately address the effectiveness of certain devices, possibly leaving gaps in the understanding of their true impact. These factors highlight the need for further investigation and research to address these limitations and provide a comprehensive understanding of the benefits and limitations of different breathing retraining techniques and devices.

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CORRELATION BETWEEN CORE MUSCLE ENDURANCE AND FOOT POSTURE IN COLLEGE GOING STUDENTS: AN OBSERVATIONAL STUDY

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Abstract

The foot posture is important for provide stable base of support during walking, running and jumping.Proximal stability is needed for distal mobility. So the core provide proximal stability to perform proper distal component mobility. The affection in proximal core muscle may be lead to distal component changes and visa versa.

Keywords: Core Muscle,Foot Posture,College Students,Endurance

INTRODUCTION:

Foot posture plays an important role in the quality of daily living.[1] The structure of the feet is such that it permits the functions of both the stability and the mobility depending on the tasks which are imposed on it.[1]

Kinetic chain & core:
Core stability can be defined as the ability of the Lumbopelvic-Hip Complex to prevent buckling of the Vertebral Column and return it to equilibrium following perturbation by using Strength, Endurance and Motor Control in a functional manner through all the planes of motion and action despite changes in the center of gravity.[1]

Experimental

Material

Pen, paper, pencil

Foot posture index questionnaire

Stop watch

Plinth or high level bed

METHODOLOGY:

Sample size: 50
Sampling design : Convient sampling
Study design: An observational study
Setting: Ahmedabad
Population: Age group between 18 to 25 years

PROCEDURE:

- Selection
- Fifty subjects with the age group between 18 to 25 years participate in this study.
- Core Endurance :
- 60 degree flexion endurance test,
- trunk extensor endurance test,
- Right side plank test
- left side plank test.
- Time noted in sec.
- Foot posture:
- Foot posture index.

Flexor endurance test position:

Extensor endurance test position

Lt. & Rt. Side Plank Endurance test position:

RESULTS:

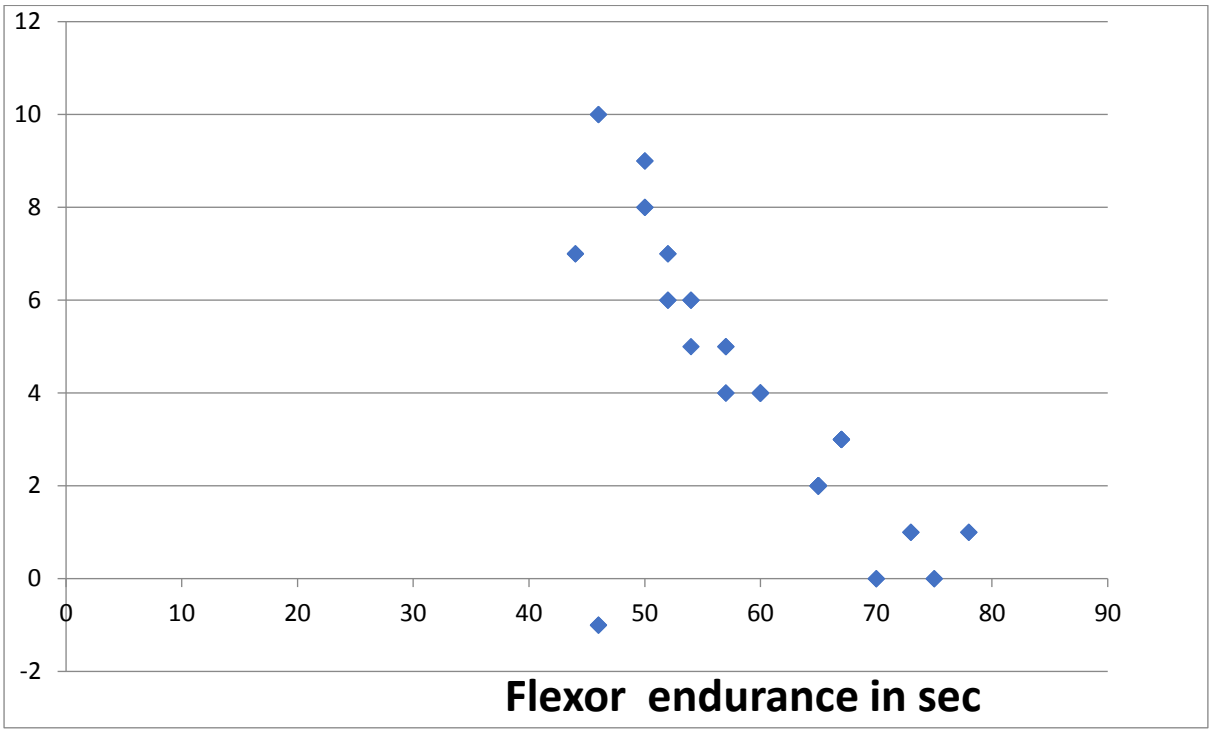
Descriptive analysis of data was expressed in mean and standard deviation for various parameters.Correlation were expressed in term of r value and P value.P value less than 0.05 was considered to be significant.

The graphical representation was done by scatter graph.

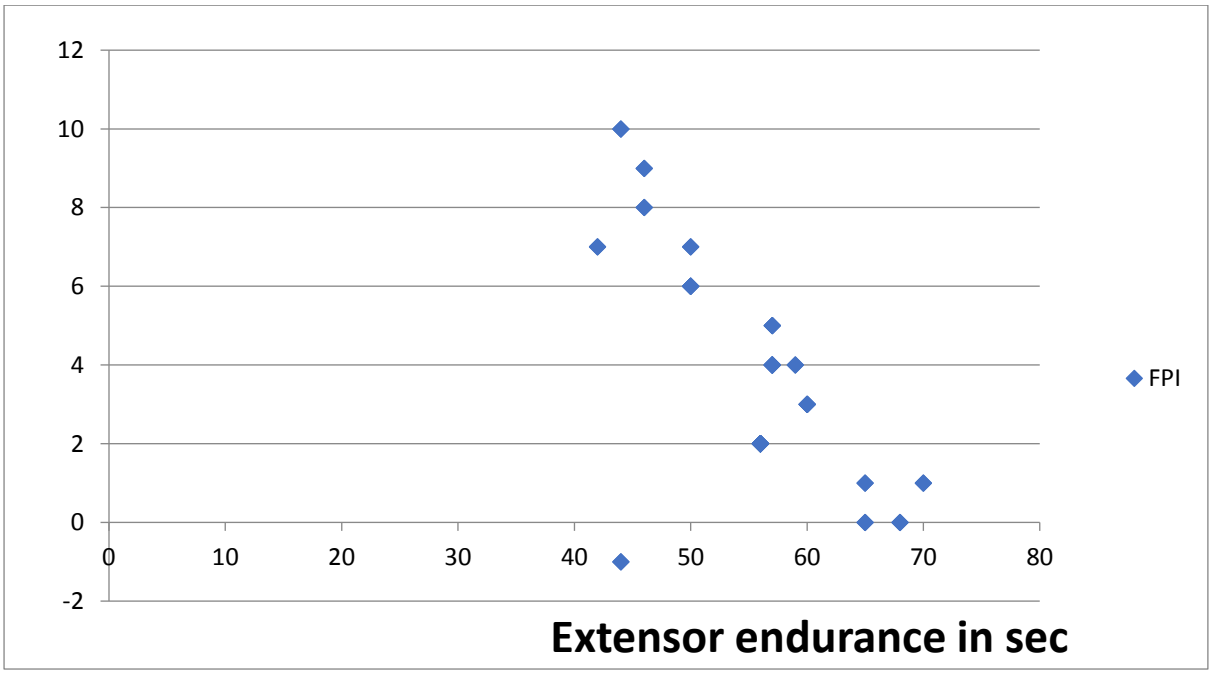
Table 1 : DESCRIPTIVE ANALYSIS

	MEAN	**STANDARD DEVIATION**
Age	22.34	1.7333
Flexor endurance test	60.1	9.2609
Extensor endurance test	55.34	7.3640
Rt. Side plank test	51.78	7.3326
Lt. side plank test	49.08	6.7698
Foot posture Index	3.78	2.8734

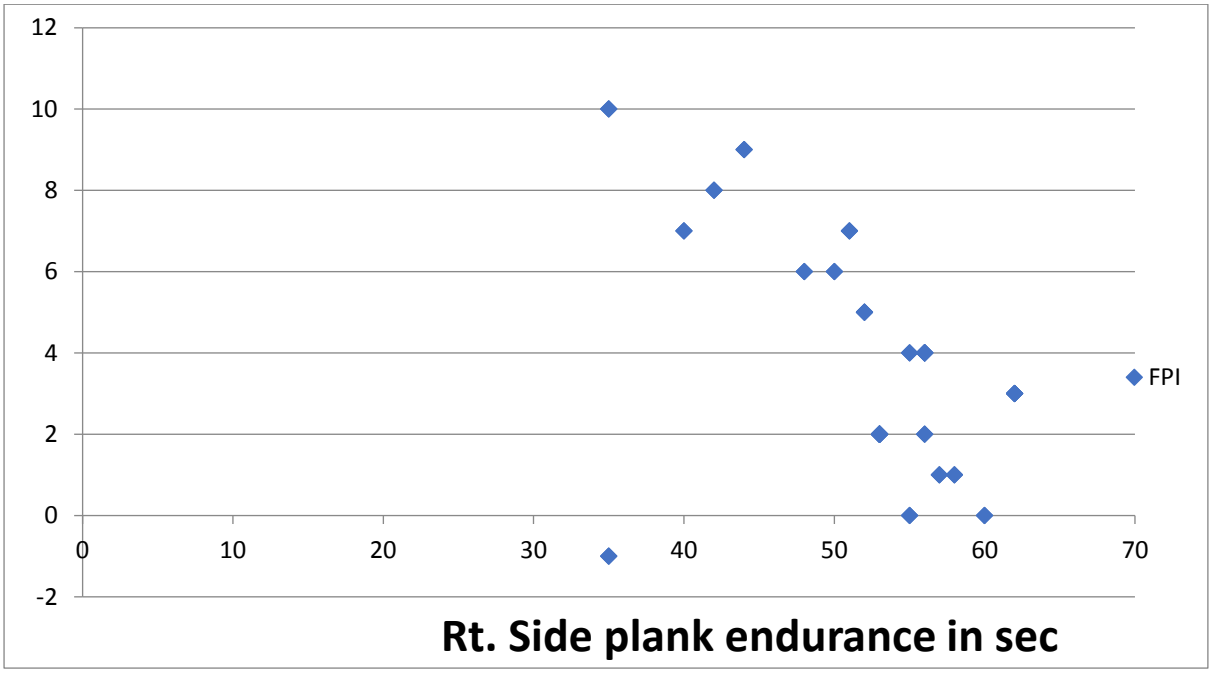
Graph 1 shows correlation between flexor endurance and FPI



Graph 2 shows correlation between Extensor endurance and FPI



Graph 3 shows correlation between Rt. Side plank endurance and FPI



Graph 4 shows correlation between Lt. Side plank endurance and FPI

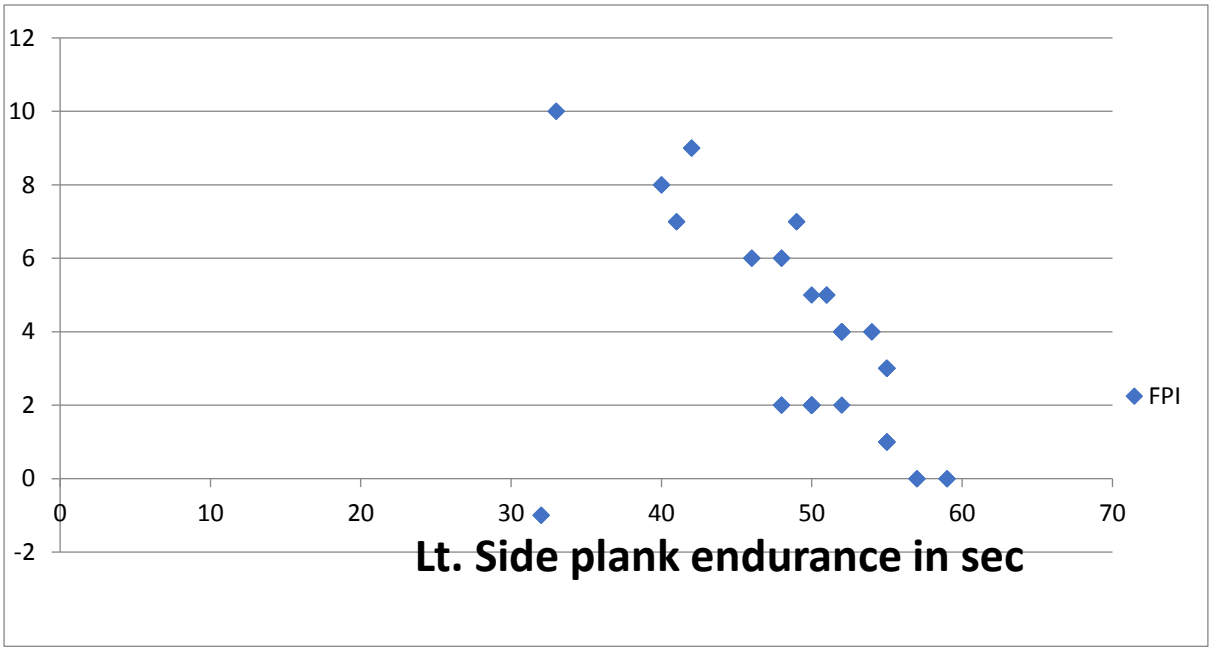


Table 2:Correlation between core endurance & foot posture

Variables	r value	P value	
Flexor endurance test & FPI	-0.7231	0.04	significant
Extensor endurance test & FPI	-0.6734	0.03	significant
Rt. Side plank test & FPI	-0.5098	0.005	significant
Lt. side plank test & FPI	-0.5037	0.005	significant

RESULTS:

Result shows there is a negative correlation between core endurance timing and foot posture index scoring.

DISCUSSION:

The Purpose Of the Study find out correlation between core muscle endurance and foot posture in college going students. The Presents Study Suggest that changes in foot posture causes changes in the kinetic chain of the entire lower extremity upto the lumbar, pelvic and the hip region.Dr. Anvita Telang at el , Conducted study on Comparison of Core Stability in Individuals with Flexible Flat Foot and Normal Foot and conclude that Individuals with flexible flat foot have reduced core Stability.[(1)]

CONCLUSION:

Individuals with altered foot posture will have an effect on the proximal segment through the kinetic chain phenomenon of the body, affecting the core endurance. Individuals with altered foot posture have reduced core endurance.

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"CORRELATION BETWEEN DOMINANT QUADRICEPS AND HAMSTRING MUSCLE GIRTH AND STRENGTH IN FOOTBALL PLAYERS. CORRELATION STUDY."

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Abstract:

Background

Football is a sport that involve, to varying degrees, kicking a ball to score a goal. Mainly lower limb muscles are involving, in football. The majority of research in this area has focused on the effects of strength activities involving a large number of muscle groups as apposed, to local muscular resistance exercise, so need of study is to correlated whether there will be any correlation between dominant quadriceps and hamstrings muscle girth and strength in football players. For girth measurement we have used measure tape and we measure strength by using in football player.

Aim:

The aim of this study is to find out correlation between dominant quadriceps and hamstring muscle girth and strength in football players.

Objectives: To find out quadriceps and hamstring girth in football player. To find out the muscle strength in football players. To find out correlation between muscle girth and strength in football player.

Method Primary data was collected from 30 football players and they were selected for the study based on inclusion and exclusion criteria. This study is correlation study design

and 30 subjects were selected in rku campus, Rajkot. Than girth and strength is measured.

Result

The data was assessed using unpaired pearson test; the study showed that there has been a significant correlation between dominant hamstring and quadriceps muscle strength and girth.

Conclusion:

On the basis of result of the present study it can be concluded that there is a strong positive correlation between dominant quadriceps and hamstring muscle strength and muscle girth.

Keywords: quadriceps and hamstring muscle, strength, girth, modified sphygmomanometer test (MST)

INTRODUCTION:

Physical education has an important role in our society. Play, game; sports are sub discipline of physical education. strength, power, speed, agility endurance, are very essential for any type of games and sports.

Strength is conditional component in the field of games and sports or movement activity. strength is the ability to overcome the resistance or the ability to act against the resistance.

The measurement around or circumference that is girth. The girth is measures are with the measure tap at right angles to the long axis of the bone or body segment. useful attention must be given to the girth specification. Muscle girth helps to provide source and strength to the athletes and the all players

There is strong correlation between the size of muscle fibers and strength they are capable of developing the stronger muscle fibers that is linked to a motor neuron, the motor force will be generated by a nerve impulse. developing muscle mass by performing weight training exercise with weight that is around 80 percentage of maximum strength.

The sphygmomanometer is a portable, easily obtained, and commonly acquired by health care professionals for the measurement of blood pressure. This is quick and easy. The modified sphygmomanometer test has the potential to be used within clinical contexts because it uses

portable and low-cost equipment that is easily accessible to healthcare professionals and provides objective measurements of strength.

Many studies prove the reliability and validity of sphygmomanometer for muscular strength. The muscle strength with the modified sphygmomanometer test for wrist extensor, knee extensor, hip flexor, plantar

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Many studies prove the reliability and validity of sphygmomanometer for muscular strength. The muscle strength with the modified sphygmomanometer test for wrist extensor, knee extensor, hip flexor, plantar

METHODOLOGY:

Study design: correlation study

Sample size: 30

Study population: male football players

Study setting: RK university, Rajkot

Study duration: 1 week

Sampling method: convenient sampling

GIRTH MEASUREMENT:

- Girth measurement was taken by measure tap (lower limb circumference)
- The girth of dominant quadriceps and hamstring muscle was measured with measure tap at the maximum girth of the quadriceps and hamstring.
- And future strength measurement done through modified sphygmomanometer test.

MODIFIED SPHYGMOMANOMETER TEST:

The tested leg stabilized by the stabilization belt and asked the patient to do isometric flexion for hamstring muscle strength and isometric extension for quadriceps

Measurement of quadriceps strength by modified sphygmomanometer test

Measurement of hamstring strength by modified sphygmomanometer test.

RESULT:

Statistical Analysis:

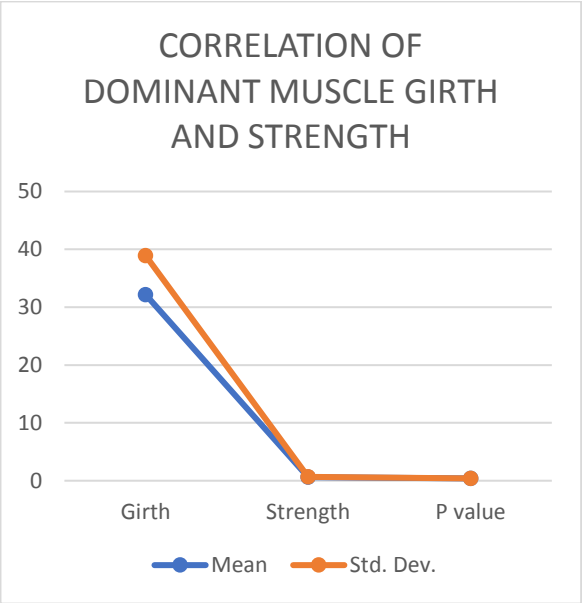
- Statistical analysis was done using SPSS (version 20). Microsoft Excel and Microsoft Word were used to generate graph, tables and master chart. Through descriptive statistics, the mean, median and standard deviation was obtained. The data obtained were tested using pearson and the following result was generated.
- The aim of the study was to find out the correlation between the dominant quadriceps and hamstring muscle girth and strength this include 30 male football players from rk. University.
- The girth of dominant quadriceps and hamstring muscle was measured with measure tap at the maximum girth of muscle.
- The strength of dominant muscle is measured with modified sphygmomanometer test.

The statistical analysis was done by graph pad prism with pearson

- correlation test for dominant quadriceps and hamstring girth and strength.

	girth (cm)	strength	P value
mean	32.17	.596	0.400
Std.dev.	6.747	.068	

(MEAN VALUE OF DOMINANT QUADRICEPS AND HAMSTRING MUSCLE GIRTH AND STRENGTH)



CORRELATION BETWEEN DOMINANT QUADRICEPS AND HAMSTRING MUSCLE GIRTH AND STRENGTH IN FOOTBALL PLAYERS

DISCUSSION:

The propose of the study was to find out whether there is any correlation between girth and strength of dominant quadriceps and hamstring muscles in football player.

here this study we had taken a sample of 30 to measure of the strength and girth of dominant muscles, the score was analyzed by using pearson correlation test the result had so strong correlation between the strength and girth of dominant muscle.

Statistically it is approved and clinically observed there is a suspect structural and functional change in muscle which shows that there is in increase muscle and strength.

CONCLUSION:

On the basis of result of the present study it can be concluded that there is a strong positive correlation between dominant quadriceps and hamstring muscle strength and muscle girth.

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"A COMPARATIVE STUDY OF BMI ON NUTRITION LEVELAMONG GOVERNMENT VERSUS PRIVATE SCHOOL CHILDREN: A CROSS SECTIONAL STUDY"

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Abstract:

BACKGROUND: BMI is a measurement of a person's leanness or corpulence based on their height, weight and is intended to quantify tissue mass. It is widely used as a general indicator of whether a person has a healthy body weight for their height. Specifically, the value obtained from the calculation of BMI is used to categorize whether a person is underweight, normal, overweight or obese depending on what range the value falls between.

AIM: The purpose of the study was to evaluate prevalence of underweight and overweight in school going children.

METHODOLOGY: According to the selection criteria 100 subjects were selected for the study and subject were explain about study procedure. We take height and weight of government and private school children. Then calculate BMI.

RESULT: Total 100 Subjects Were Taken in The Study. Data is expressed as mean, BMI; body mass index, N; no of subject, underweight (<18.5 kg/m2), normal (18.5 to 25 kg/m2) over weight (25to 30 kg/m2) and obese (>30kg/m2). For this study, a comparative study analysis is also done between the child going to the private school and thus going to the government school.

CONCLUSION: Here we come to know that more number of government students have an Underweight compare to private school. And no any overweight student found in government school. There are more number of overweight student in Private school found.

KEY WORDS: Height, Weight, BMI

INTRODUCTION:

One of the greatest problems for India is malnutrition among children. He country is still struggling with this problem. Malnutrition, the condition resultingfrom faulty nutrition, weakens the immune system and causes significant growth and cognitive delay. Growth assessment is the measurement that best defines the health and nutritional status of children, while also providing an indirect measurement of well-being for the entire population [1].

Malnutrition refers to the situation where there is an unbalanced diet in which some nutrients are in excess, lacking or in wrong proportion. Simply put, we can categorize it to be under-nutrition and over-nutrition. Despite India's 50% increase in GDP since 1991, more than one third of the world's malnourished children live in India [2].

Among these, half of them under 3 are underweight and a third of wealthiest children are over-nutriented. Nearly 70 years of Independence to India hasbrought about an improvement in the economic status of the country. HLs has also brought about a change in the outlook of the society. An increase in awareness of importance of education and the Government's school to provide free education and the introduction of Mid-Day meal scheme has increased the enrolment of children from lower economic group in schools. Mid-Day Meal Programme (MDMP) also known as "School Lunch Programme" has a major objective to attract more children for admission to Schools and retain them so that literacy improvement of children could be brought about.

The Meal should supply one third of the total energy requirement of the child. School education is provided by both Private and Government schools. Private schools cater to the education of children of the middle class society whereas the children of lower socioeconomic group go to Government schools.

You can use the body mass index (BMI) calculator for adults to calculate your BMI, provided you know you're:

Weight in kilograms (kg)

Height in centimetres (cm)

Your BMI will classify you as 'underweight', 'healthy weight', 'overweight' or 'obese', as defined by the World Health Organization. If your BMI is

1. under 18.5kg/m^2 – you are considered underweight and possibly alnourished

2.18.5 to 24.9kg/m^2 – you are within a healthy weight range for young andmiddle-aged adults

3.25.0 to 29.9kg/m^2 – you are considered overweight

4.over 30kg/m^2 – you are considered obese

Risks of being overweight (high BMI) and physically inactive.

If you are overweight (with a BMI over 25kg/m2) and physically inactive, youmay develop:

cardiovascular (heart and blood circulation) disease, gallbladder disease, highblood pressure (hypertension) , type 2 diabetes etc.

Risks of being underweight (low BMI) If you are underweight (BMI less than 18.5kg/m2), you may be malnourished and develop:

compromised immune function, respiratory disease,digestive diseases,cancer , osteoporosis.

METHOD

Study sample size: 100 subjects

Study population: 13 to 16 years of age

Study design: A Comparative study

Study setting: school of physiotherapy RK University

Study duration: 1 month

CRITERIA FOR SELECTION:

Inclusion criteria:

- Subject's willingly participation.
- Age group between 13 to 16 year.
- Males and female.
- Student of government and private school children.

Exclusion criteria:

- Any pathological condition.
- Age above 16 and under 13.

Result: The result is designed and reported based on the BMI index in four categories asbelow (table 1).

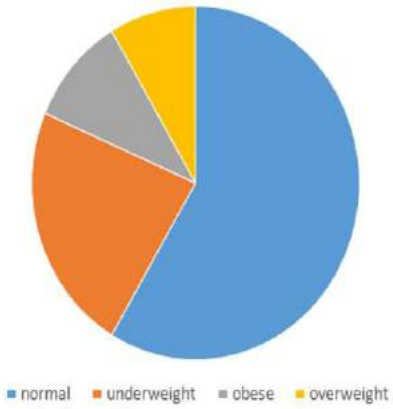

Table 1: distribution of BMI among the subjects.

The result is designed and reported based on the BMI index in four categories as below

Table 1: distribution of BMI among the subjects.

BMI Category	N	%	Mean BMI (kg/m2)	Mean Weight (kg)	Mean Height (m)
Underweight	34	34	15.23	32.24	145.15
Normal	47	47	23.46	38.26	134.17
Overweight	9	9	27.72	41.40	121.80
Obese	10	10	32.09	44.46	117.80

Table 2: distribution of BMI of subject school wise (n=100).

BMI Category	Private (N)	Private (%)	Gove. (N)	Gove. (%)	Total

Underweight	10	29.41	24	70.58	34
normal	28	59.57	19	40.42	47
Overweight	8	88.88	1	11.11	9
obese	5	50	5	50	10

Data is expressed as mean, BMI; body mass index, N; no of subject, underweight (<18.5 kg/m^2), normal (18.5 to 25 kg/m^2) over weight (25 to 30 kg/m^2) and obese (>30kg/m^2).

BMI below 18.5 is considered as underweight, BMI between 18.5 and 25 is considered normal, BMI between 25 and 30 is considered as overweight normal and BMI above 30 is considered as obese.

For this study, a comparative study analysis is also done between the child going to the private school and thus going to the government school. in this study we found that 29.41% of underweight subject are private school going. Similarly, 88.88% of overweight subjects are private school going group (Table 2). This shows the underweight and overweight are more prevalent among private school going children. This is mainly attributed to the social- economic stratification in india where rich and upper-middle- class children go to the private schools, similarly, this difference reflects on the diet and physical activity of children.

By this study we also come to know that 70.58% underweight students are found in government school (Table 2). And 11.11% overweight student found in government school.

PROCEDURE:

One hundred subjects were enrolled in this study. In thatParticipants age, height and weight was recorded.

First we take a 50 student from government school.

↓

We take height and weight of students.

↓

Then we calculate BMI of government school students.

↓

And then we take 50 students from private school.

↓

Same procedure as government we follow for privateschool student.

↓

We compare a BMI of government and private schoolstudents

Anthropometric examination is an almost mandatory tool in any research to assess health and nutritional condition in childhood. Physical measurements like body weight, height of children have been extensively used to define health and nutritional status of communities. this is a cross sectional study on children of Government and Private Schools in rajkot. the study is conducted on a total population of 100 children. Height and weight of all children was measured by a stadiometer and simple weighing machine.

BMI is intended for adults only, as children and adolescents are constantly growing. This makes it difficult to have set values for BMI cut-offs for young people. However, in adults who have stopped growing, an increase in BMI is usually caused by an increase in body fat.

DISCUSSION:

This study was conducted on 100 students between the age of 13 to 16 years in government and private schools in Rajkot city. Based on the BMI subjects were divided into 4 groups as normal, underweight, overweight and obese.

This study shows more number of underweight students are found in government school and more number of overweight students are found in private school.

This study records that 88.88% of overweight subjects were enrolled in private school. Majority of the private schools belong to the upper middle and upper socio-economic group having better resources and leisure amenities. On the other hand, the government school going students are from a lower socioeconomic group. We found 70.58% students from government are underweight. Other major factors and behaviors responsible for overweight and obesity are unhealthy food habits and lack of physical activity. These risk behaviors among overweight and obese children were compared with non-obese children.

CONCLUSION

Here we come to know that more number of government students have a underweight compare to private school. And no any overweight student found in government school. There are more number of overweight student in private school found.

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