COMPARATIVE EFFECT OF MYOFASCIAL RELEASE THERAPY AND POST ISOMETRIC RELAXATION IN POST-TRAUMATIC ELBOW STIFFNESS

1_ Dr. Sibga Maqsood Consultant Physical Therapist
2_ Subhan-ur-Rehman Burki, Assistant Professor, Northwest Institute of Health Sciences, BSPT, PPDPT, MSPT, CHPE, CHR, Physiotherapist DHQ Hospital Khushab at Joharabad
3_ Dr. Abeer Bhatti Physiotherapist DHQ Hospital Khushab at Joharabad
4_ Dr. Syed Areeb Muneer Clinical Physiotherapist
5_ Dr. Kashmala Zia Assistant Professor, Northwest Institute of Health Sciences
6_Hanan Azfar Consultant physiotherapist at Bhatti Hospital Gujranwala
7_ Aleesha Kasif Physiotherapist at Bhatti Hospital Gujranwala
8_ Laraib Fatima Consultant Physiotherapist
9_ Hafiza Mubashra Zahid Consultant Physiotherapist

Introduction

Being one of the most mobile joints, Elbow requires limb and thus could influence the activities of daily living unrestrained and pain-free movement for normal of the individual. In addition, postoperative pain plays a function since it allows human to freely move their role in this disability. Optimal mobility for joint is hands in various directions (1, 2). An elbow may be necessary to overcome stiffness and thereby enhance considered as a stiff elbow when the range of motion functional movement (4). The major symptoms faced by of elbow joint is reduced or limited affecting the usual PTES patients are usually pain, swelling, stiffness, and activities of daily living (9). This is most likely caused limited range of motion in the damaged elbow. Activities in part by the extremely congruent architecture that cause the elbow to flex, extend, pronate, or supinate required for stability as well as capability to hold loads may be specifically difficult or impossible for the by a lengthy lever. Post-traumatic elbow contracture is individual to conduct. The symptom severity depends on the condition when injured people have limited range the degree of the initial damage and the level of joint of motion, joint pain and functional impairment stiffness. The elbow joint is a compound hinge joint following a traumatic injury. Elbow stiffness can be a connecting the upper arm (humerus) to the two forearm result of different types of traumatic injuries, including bones: radius and ulna. The elbow is a very important part elbow fractures, dislocations, ligamentous injuries, and of the upper extremity. The upper extremity is a chain of soft tissue scratches. Stiffness is a clinical condition connected structures from the shoulder to the hand, which which affects the patient's whole upper limb includes the elbow and the wrist. It permits movement in function. It can be caused by many elbow flexion and extension of the arm including some rotation disorders. Yet, elbow stiffness can also be caused by of the forearm. The joint is critical for various simple atraumatic etiologies, including osteoarthritis, activities including eating and typing to more complex inflammatory joint disease, ulnar nerve entrapment, activities such as throwing a ball or lifting objects. The tumor, infection, metabolic disease (e.g., hemophilia) basic function of the elbow is to correctly position and congenital conditions (arthrogryposis) (3). This hand. The forearm will act as a lever arm and the space condition can limit daily activities and eventually lead will act as a fulcrum for the forearm, which will allow to permanent disability without proper perform powerful grasping and finer hand and wrist treatment. These injuries involve the disruption of the movements (12).The four elbow joints work together to normal anatomic architecture of the elbow that causes give the hand and wrist more mobility. The formation of scar tissues, joint capsule contracture. The main stabilizers of the elbow are the lateral and adhesions that restrain joint mobility. medial collateral ligament complexes. The typical valgus Stiffness, pain and reduction in range of motion are angle in females ranges from 13° to 16°, whereas in males commonly complaint of the patients who underwent it is between 11° and 14°.There is usually a narrow the operating trial because of immobilization. Patients anterior part of the joint capsule (29) may encounter functional impairment if the disease is complicated by contracture or stiffness (11).

Methodology Study Design

Randomized Clinical Trial

Sampling Method

Purposive Sampling Method

Setting

Patients were selected from Outdoor Patient Department of following hospitals

- Allied Hospital, Faisalabad
- Aziz Fatima Hospital, Faisalabad
- Madinah Teaching Hospital, Faisalabad

Duration

The study was completed within the period of 4 months after the approval of synopsis

Interventional Period

4 weeks consisting of 3 sessions per week of total 12 sessions on alternative days per week

Sample Size

Sample size was 34 subjects by using the Formula by Charan and Biswas in 2013. The formula was used to calculate sample size (14).

Sample size = 2 S.D2 (Zα/2 + Zβ)2 / d2

Sample size= 17 per group

According to the formula, the estimated number of participants to sample for both groups was thirty eight.

By taking visual analogue scale as outcome measure of interest, data was taken from Mean Group of A = 4.644 Mean group B = 3.117 S.D=16943 Zα/2 type I error of 5%= 1.96

Zβ keeping power of study at 80 % = 0.84 Keeping allocation ratio 1:1

Selection Criteria

Inclusion criteria

Participants that are between 15 to 50 years old.

Individuals who were presented with elbow pain and stiffness subsequent to either injury or surgery.

Restricted ROM and stiffness: Existence of limited range of motion (ROM) and stiffness in the elbow joint.

Both male & female patients: Involving participants despite their gender.

Exclusion Criteria

Acute stage of fracture: The individuals suffering from the elbow fracture in acute phase.

Open wound: The presence of a wound on the elbow.

Acute infection to the elbow region: Patients with acute infections implicating the elbow area.

Cervical radiculopathy & any other upper limb dysfunction: Symptoms that are typical to cervical radiculopathy or to other lesions that can cause weakness in the upper limb.

Neurological impairments: Those with the neurological condition that involves elbow dysfunction.

Pregnant females: All interventions might be dangerous to pregnant women along with the fact that they are prone to risks.

Refusal to consent: Participants in research who do not express willingness to give their informed consent to take part or decline their consent to take part (EDM).

Psychological condition: Participants with psychological conditions that can affect the outcome of the study, participating in parts or the whole of the study.

Co-morbidity: Subjects involved in the trial that have high amounts of co-morbidities that can possibly cause a bias in the measurement of outcomes and make extra risk.

Accident or orthopedic surgery history related to spine, SIJ, or hip joints within three months before the study [22]

Patients who have undergone treatment for the same condition in the preceding three months, regardless

Data Collection Tools

Numeric Pain Rating Scale (NPRS):

Trained assessors will accurately measure participants' ROM for various movements including the Numeric Pain Rating Scale (NPRS) will be utilized flexion, extension, pronation, and supination. ROM to assess pain intensity experienced by participants in measurements obtained using the goniometer provide the resting position. The NPRS is a validated tool objective data on changes in joint mobility over time commonly used in clinical practice and research to and serve as a reliable indicator of treatment quantify pain levels on a numerical scale ranging from 0 effectiveness in improving elbow function. By assessing to 10, with 0 indicating no pain and 10 representing the ROM at baseline and regular intervals throughout the worst imaginable pain. Participants will be asked to rate study period, researchers can monitor progress, identify their pain intensity at rest by selecting the number that treatment responders, and tailor interventions to best corresponds to their level of discomfort. Pain optimize patient outcomes using the NPRS will provide valuable

Data Collection Procedure

Insights into changes in pain intensity over time and the at the 2-week assessment, participants will complete the effectiveness of interventions in alleviating pain in LES questionnaire under the guidance of trained individuals with post-traumatic elbow stiffness.

Liverpool Elbow Score (LES):

The Liverpool Elbow Score (LES) is a validated standardized manner, and participants will provide questionnaire designed to assess various aspects of ratings based on their perceived functional status and elbow function and disability. Participants will complete ability to perform specific activities related to elbow the LES questionnaire, providing ratings on different function. Baseline functional status measured at the start functional domains such as pain, stiffness, range of the study will be compared to functional status at the motion, strength, and activities of daily living. The LES 2-week time point to assess changes in functional provides a comprehensive evaluation of functional status improvement following interventions. and enables quantification of improvements in elbow function following interventions. By capturing patients' subjective experiences and perceptions of their functional abilities, the LES facilitates a holistic assessment of treatment outcomes and guides clinical decision-making in the management of post-traumatic elbow stiffness.

Universal Goniometer:

The Universal Goniometer will be used to measure active range of motion (ROM) in the elbow joint. The goniometer is a standardized tool utilized in clinical

Treatment plan

Exercise Plan (Baseline Treatment)

Active Range of Motion Exercises (10 repetitions in each direction):

Participants will engage in active range of motion the baseline treatment plan aims to address pain (ROM) exercises to improve joint flexibility and reduction and improve soft tissue flexibility, as well as mobility. These exercises involve moving the elbow enhance joint mobility and function in individuals with joint through its full range of motion within a pain-free post-traumatic elbow stiffness. It consists of the range. Participants will perform 10 repetitions of active following components:

Ice Pack Application (30 minutes):

ROM exercises in each direction, including flexion, extension, pronation, and supination.

Commercial ice packs will be applied to the affected Group A (MFR): Participants in Group A will receive the elbow joint for a duration of 30 minutes. The ice pack baseline treatment described above along with will be positioned to cover the entire elbow region, Myofascial Release Therapy (MFR). MFR involves particularly focusing on areas experiencing pain or applying sustained pressure to myofascial tissues to inflammation. The application of ice packs helps release adhesions and improve tissue mobility. Manage micro-trauma incurred during mobilization and Treatment sessions will be conducted three times a week reduces inflammation. It also aids in maintaining the for two weeks, with each session lasting approximately gained range of motion by enhancing tissue plasticity.

Maitland Mobilization:
30 minutes.
Group B (PIR): Participants in Group B will undergo the Maitland mobilization techniques, including medial same baseline treatment as Group A, supplemented with glide and lateral glide, will be employed to reduce pain Post-Isometric Relaxation (PIR) techniques. PIR and improve soft tissue flexibility. Mobilization grades I, involves contracting a muscle at submaximal effort, II, and III will be utilized to gradually increase joint followed by relaxation and passive stretching of the mobility and alleviate stiffness. These techniques muscle to enhance flexibility. Treatment sessions will be involve skilled manual manipulation of the elbow joint conducted three times a week for two weeks, with each by a trained therapist to restore normal movement session including three repetitions of PIR exercises. patterns and improve tissue extensibility.
Isometric Exercises of Elbow Joint (10 repetitions):
Participants will perform isometric exercises targeting the muscles around the elbow joint. Isometric contractions involve contracting the muscles without joint movement. This helps strengthen the muscles surrounding the elbow joint and stabilizes the joint during movement. Each isometric exercise will be performed with 10 repetitions, holding each contraction for a duration of 30 seconds.

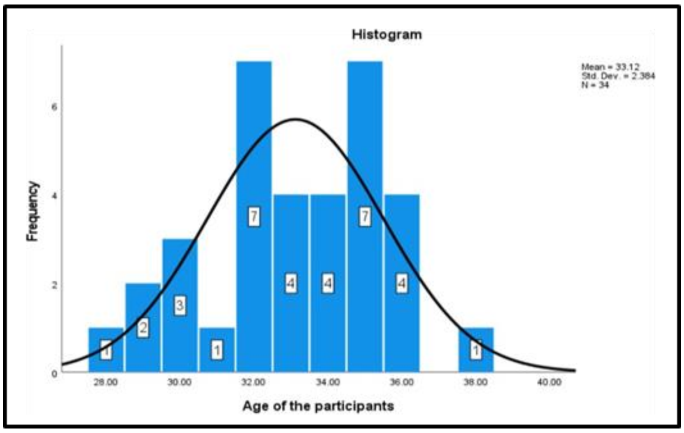
Ethical Consideration

A data collection letter was obtained from the university. Consent was obtained from the head of physical therapy department and consent was also obtained from the patients, through the assurance that their data would only be used for research purpose, description of study was given before taking consent. Provision of all information to the patients provided regarding this study in effective way like what would be the benefit of treatment and no harm to them regarding this treatment.

Results

Table 1

23.5% lied in the 21-25 years category, 20.6% lied in the 26-30 years category, 29.4% participants lied in the 31-35 years category and the rest 26.5% lied in 36-40 years category.



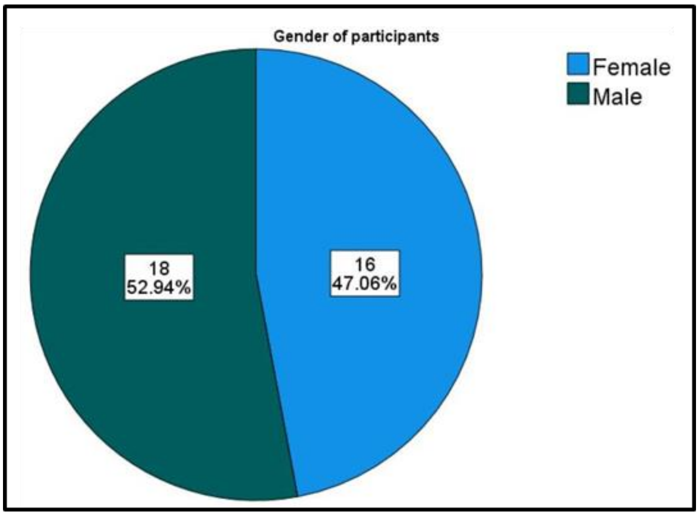
Graph is showing the mean age of participants which is

Table 2

Paired Sample T test used within group difference of Elbow Flexion before and after treatment

Isometric Relaxation then myofascial release therapy group. Within group difference Repeated Measure ANOVA was applied. Myofascial release therapy group show paired difference of elbow flexion is (26.470±13.005) with 34.47±4.51 in group A and 32.58±4.36 in group B. significant p value (.000) and paired difference of Post-Minimum age is 27 and maximum age is 40 in group A. Isometric Relaxation (36.470±8.740) with significant p value Minimum age is 25 and maximum age is 40 in group B. (.000). Improvement in elbow flexion was notice in Post-

Assessments			Treatment Groups	
			Myofascial Release Therapy	Post-Isometric Relaxation
		N	Mean ±SD	Mean ±SD
Elbow Flexion – Before Treatment		17	6.764±1.921	000±2.423
Elbow Flexion – After Treatment		17	3.235±12.862	.470±8.055
Paired Sample T test	Paired Differences		26.470±13.005	.470±8.740
	P value		.000	.000



Pie chart show frequency distribution of gender in which N=34, 18 (52.94%) male and 16 (47.06%) were female

Table 3

Paired Sample T test used within group difference of Elbow Extension before and after treatment

Assessments			Treatment Groups	
			Myofascial Release Therapy	Post-Isometric Relaxation
		N	Mean ±SD	Mean ±SD
Elbow Extension-Before Treatment		7	45.588±2.032	5.882±2.315
Elbow Extension - After Treatment		7	29.000±5.711	4.647±5.098
Paired Sample T test	paired Differences		16.588±7.045	-21.235±5.142
	p-value		.000	.000

Within group difference Repeated Measure ANOVA was applied. Myofascial release therapy group show paired difference of elbow extension is (-16.588±7.045) with significant p value (.000) and paired difference of Post- Isometric Relaxation (-21.235±5.142) with significant p value (.000). Improvement in elbow extension was notice in Post-Isometric Relaxation then myofascial release therapy group.

Table 4: Between groups comparison of Liverpool elbow score before and after treatment.

		Treatment Groups			Independent Sample T-test	
			Myofascial Release Therapy	Post-Isometric Relaxation		
Outcome Measure	Assessment	N	Mean± SD	Mean ±SD	Mean Difference	P value
Liverpool Elbow Score	Before Treatment	17	4.588±1.325	235±1.251	-.647	.153
	After Treatment	17	2.882±3.533	117±4.755	11.235	<.001

Between groups comparison Independent sample t test was applied. Before treatment Liverpool Elbow Score show mean ±SD of Myofascial Release Therapy group (14.588±1.325) and Post-Isometric Relaxation group (15.235±1.251) with mean difference (-.647), and p value (.153) shown non- significant differences between groups before treatment. After treatment Liverpool elbow score show mean ±SD of Myofascial Release Therapy group (22.882±3.533) and Post-Isometric Relaxation group (34.117±4.755) with mean difference (-11.235), and p value (<.001) shown significant differences between groups after treatment. Post-isometric relaxation therapy shown more improvement in Liverpool elbow score as compared with myofascial release therapy group.

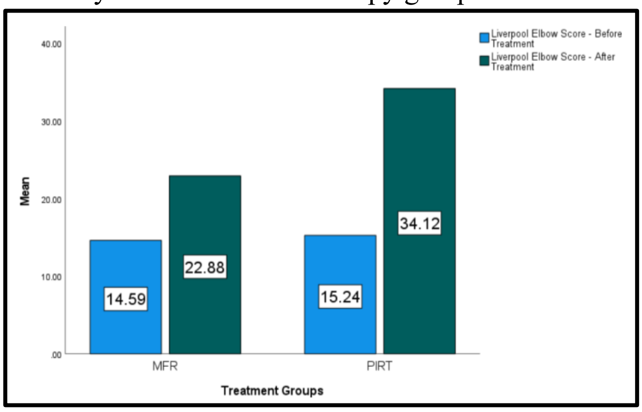


Figure: Bar Chart show difference between both groups before and after treatment of Liverpool elbow score.

Table 5

Paired Sample T test used within group difference of Liverpool elbow score before and after treatment

Assessments			Treatment Groups	
			Myofascial Release Therapy	Post-Isometric Relaxation
		N	Mean ±SD	Mean ±SD
Liverpool elbow score – Before Treatment		7	.588±1.325	235±1.251
Liverpool elbow score – After Treatment		7	.882±3.533	117±4.755
paired Sample T test	Paired Differences		8.294±3.670	.882±4.807
	P value		.000	.000

Within group difference Repeated Measure ANOVA was applied. Myofascial release therapy group show paired difference of Liverpool elbow score is (8.294±3.670) with significant p value (.000) and paired difference of Post-Isometric Relaxation (18.882±4.807) with significant p value (.000). Improvement in Liverpool elbow score was observed more in Post-Isometric Relaxation then myofascial release therapy group.

Conclusion

It is concluded from the current study that Mayofasical Release Therapy in combination with Maitland Mobilization effective to treat Post-Isometric Elbow stiffness but combination of Maitland mobilization and Post-Isometric Relaxation (PIR) showed better results in the improvement of symptoms and standards of living

Limitations:

Currently, the literature on physiotherapy interventions for elbow stiffness is dominated by case reports, case series and retrospective studies. Nevertheless, there is a significant void of trials with well-designed randomized controlled designs and an appropriate sample size. As a result, there is a lack of sufficient enough scientific evidence that one aggravates to come up with a conclusion about the effectiveness of specific physiotherapy techniques in addressing elbow stiffness. Physiotherapy lacks universal techniques, hindering patient care. Unclear measurement standards and limited understanding of treatment mechanisms complicate outcome assessment, while narrow patient focus and short-term follow-up impede comprehensive evaluation. Methodological challenges in study design further confound effectiveness assessment.

Recommendations:

The current literature does not provide direct comparative studies assessing the effectiveness of myofascial release therapy over post-isometric relaxation as a treatment for post-traumatic elbow stiffness, thus the healthcare providers do not have evidence-based guidance for treatment selection. This gap needs to be closed to ensure the best clinical practice, cut down the cost of health care and identify the most effective and affordable approach to the health care provision. Direct comparisons would supply meaningful evidence on effectiveness of treatment, which in turn would help the doctors to decide on the best coupled with patient's conditions and preferences. Overall, filling this research gap is crucial for optimizing treatment efficiency and handing in better results to patients with post-traumatic elbow stiffness. To fill in these gaps we need to carry out RCTs with uniform protocols and outcome measures, involve patients into the research process, and conduct long-term follow-up studies, highlighting teamwork among researchers for improving physiotherapy for stiff elbow management.

Acknowledgement

Much of gratitude to be paid to Allah for choosing me to be the part of this auspicious institute "The University of Faisalabad".

My humble gratitude to me respected supervisor another members pd supervisory committee.

Special thanks to all participats of the research study for their cooperative attirude and to my colleagues who helped me out and facilitated me a lot in this work

References

1. Cusi MF. Paradigm for assessment and treatment of SIJ mechanical dysfunction. Journal of bodywork and movement therapies. 2015 Apr 1;14(2):152-61.

2. Parveen S, Javaid M, Bashir MS, Asghar HMU, Khan MI. Effects of Muscle Energy Technique with and without Functional Task Training on Pain and Disability in Sacroiliac Joint Dysfunction. Scientific Research Journal 2021

Oct 2.
3. Shawky H, Abd El Aziz K, Abd El Aty A. Effect of muscle energy technique on postpartum sacroiliac joint dysfunction: a randomized controlled trial. Turkish Journal of Physiotherapy and Rehabilitation. 2021 Jan 3;32(3):31672-9.
4. Farooq S, Zahid S, Hafeez S, Hassan D. Effectiveness of Mulligan mobilization and Kinesio-taping technique on the anterior innominate dysfunction in females. Journal of the Pakistan Medical Association. 2021 Jul 1;71(7):1716-9.
5. Laslett M, Aprill CN, McDonald B, Young SB. Diagnosis of sacroiliac joint pain: validity of individual provocation tests and composites of tests. Manual therapy. 2015 Aug 1;10(3):207-18.
6. Mulligan EP, McGuffie DQ, Coyner K, Khazzam M. The reliability and diagnostic accuracy of assessing the translation endpoint during the lachman test. International journal of sports physical therapy. 2015 Feb 10;10(1):52.
7. Son J-H, Park GD, Park HS. The effect of sacroiliac joint mobilization on pelvic deformation and the static balance ability of female university students with SI joint dysfunction. Journal of physical therapy science. 2014 Jun 30;26(6):845-8.
8. Smith RL, Sebastian BA, Gajdosik RL. Effect of sacroiliac joint mobilization on the standing position of the pelvis in healthy men. Journal of Orthopaedic & Sports Physical Therapy. 2018 Sep 1;10(3):77-84.
9. Kiapour A, Joukar A, Elgafy H, Erbulut DU, Agarwal AK, Goel VK. Biomechanics of the sacroiliac joint: anatomy, function, biomechanics, sexual dimorphism, and causes of pain. International journal of spine surgery. 2020 Feb 1;14(s1):S3-S13.
10. Guha K. The efficacy of maitland's mobilization on the individuals with sacroiliac joint dysfunction. IJMAES. 2016 March 1;2(1):86-93.
11. Peebles R, Jonas CE. Sacroiliac joint dysfunction in the athlete: diagnosis and management. Current sports medicine reports. 2017 Sep 1;16(5):336-42.
12. Chu ECP, Wong AYL. Change in pelvic incidence associated with sacroiliac joint dysfunction: a case report. Journal of Medical Cases. 2022 Jan 2;13(1):31.
13. Samir SM, ZakY LA, Soliman MO. Mulligan versus Maitland mobilizations in patients with chronic low back dysfunction. Int J Pharm Tech Res. 2016 May 1;9(6):92-9.
14. Charan J, Biswas T. How to calculate sample size for different study designs in medical research? Indian journal of psychological medicine. 2013 Apr 3;35(2):121-6.
15. Rana K, Bansal N. Comparative analysis on the efficacy of GD Maitland's concept of mobilization & muscle energy technique in treating sacroiliac joint dysfunction. Indian Journal of Physiotherapy and Occupational Therapy-An International Journal. 2013 Apr 1;3(2):18-21.
16. Vaseghnia A, Shadmehr A, Moghadam BA, Olyaei G, Hadian MR, Khazaeipour Z. The Therapeutic Effects of Muscle Energy Technique on Sacroiliac Dysfunction in Young Women. Crescent Journal of Medical and Biological Sciences. 2021 Jan 1;8(2):127-33.
17. Wang W-F, Lien W-C, Liu C-Y, Yang C-Y. Study on tripping risks in fast walking through cadence- controlled gait analysis. Journal of Healthcare Engineering. 2018 May 24;2018.
18. Pirker W, Katzenschlager R. Gait disorders in adults and the elderly: A clinical guide. Wiener Klinische Wochenschrift. 2017 Feb 1;129(3-4):81-95.
19. Vaidya A, Babu VS, Mungikar S, Dobhal S. Comparison between muscle energy technique and Mulligan's mobilization with movement in patients with anterior innominate iliosacral dysfunction. Int J Health Sci. 2019 Jan 3;1(9)
20. Added MAN, de Freitas DG, Kasawara KT, Martin RL, Fukuda TY. Strengthening the gluteus maximus in subjects with sacroiliac dysfunction. International Journal of Sports Physical Therapy. 2019 Jul 19;13(1):114.
21. Dogan N, Sahbaz T, Diracoglu D. Effects of mobilization treatment on sacroiliac joint dysfunction syndrome. Revista da Associação Médica Brasileira. 2021 Oct 22;67:1003-9.
22. Lopomo N, Zaffagnini S, Signorelli C,

Bignozzi S, Giordano G, Marcheggiani Muccioli GM, et al. An original clinical methodology for non-invasive assessment of pivot-shift test. Computer methods in biomechanics and biomedical engineering. 2014 Dec 1;15(12):1323-8.
23. Carreon LY, Glassman SD, McDonough CM, Rampersaud R, Berven S, Shainline M. Predicting SF- 6D utility scores from the Oswestry disability index and numeric rating scales for back and leg pain. Spine. 2019 Sep 1;34(19):2085-9.
24. Yates M, Shastri-Hurst N. The Oswestry disability index. Occupational Medicine. 2017 Apr 1;67(3):241-2.
25. Mehta S. The efficiency of mobilization technique and stabilization exercise in patients with pelvic girdle pain. IJAR. 2023 Jan 1;9(1):320-4.