



EFFECT OF TENDON GLIDE WITH MWM (MOBILIZATION WITH MOVEMENT) ON DE QUERVAINS TENOSYNOVITIS IN MOBILE USERS

Original Research

Rubina Zulfqar^{1*}, Faiza Mohsin², Nimra Seher³, Kashaf Farooq², Rida Wahid², Aneela Umar⁴

¹Assistant Professor, The University of Faisalabad, Pakistan.

²The University of Faisalabad, Pakistan.

³Riphah International University, Pakistan.

⁴Lecturer, Riphah International University, Faisalabad, Pakistan.

Corresponding Author: Rubina Zulfqar, Assistant Professor, The University of Faisalabad, Pakistan. drubnazulfqar355@gmail.com

Acknowledgement: The authors sincerely acknowledge all participants and supporting staff for their contributions to this study.

Conflict of Interest: None

Grant Support & Financial Support: None

ABSTRACT

Background: De Quervain's tenosynovitis is an inflammatory condition affecting the abductor pollicis longus and extensor pollicis brevis tendons, commonly resulting from repetitive thumb movements such as text messaging. This repetitive strain can lead to pain, functional limitations, and reduced quality of life. Physiotherapy is a non-invasive management approach that includes mobilization with movement (MWM) and tendon gliding exercises, aimed at reducing pain and improving mobility and function.

Objective: The objective of this study was to evaluate and compare the effects of mobilization with movement (MWM) alone and MWM combined with tendon gliding exercises on pain, functional ability, and quality of life in individuals with De Quervain's tenosynovitis associated with mobile phone overuse.

Methods: A total of 32 female participants aged 18–25 years with positive Finkelstein tests and meeting inclusion criteria were randomly allocated into two groups using a lottery method. Group A received MWM combined with tendon gliding exercises, while Group B received MWM alone. The intervention was delivered over four weeks, consisting of three sessions per week, with three sets of exercises per session. Pain levels were assessed using the Visual Analog Scale (VAS), range of motion (ROM) was measured using goniometry, and hand function was evaluated using the Michigan Hand Questionnaire (MHQ). Outcome measures were recorded at baseline, after two weeks, and after four weeks.

Results: Both groups demonstrated significant within-group improvements in VAS, ROM, and MHQ scores. Group A's mean pain scores decreased from 4.93 ± 1.57 to 1.80 ± 0.774 , while Group B's scores reduced from 4.86 ± 1.50 to 1.80 ± 0.941 . ROM for thumb extension improved from 39.6 ± 7.93 to 47.8 ± 3.18 in Group A and from 40.0 ± 7.56 to 46.2 ± 4.25 in Group B. The MHQ scores increased from 45 ± 12.1 to 59 ± 12.8 in Group A and from 43.3 ± 13.5 to 54 ± 22.0 in Group B. However, independent sample t-tests revealed no statistically significant differences between the groups ($p > 0.05$).

Conclusion

Both mobilization with movement alone and in combination with tendon gliding exercises were effective in reducing pain, improving functional ability, and enhancing quality of life in patients with De Quervain's tenosynovitis. The findings suggest that MWM alone is as effective as the combined approach, providing flexibility in therapeutic choices based on individual patient needs.

Keywords: De Quervain's tenosynovitis, Finkelstein test, Michigan Hand Questionnaire, mobilization with movement, paraffin therapy, tendon gliding, visual analog scale.

INTRODUCTION

De Quervain's tenosynovitis is a painful condition affecting the wrist and forearm, particularly around the thumb, caused by inflammation of the abductor pollicis longus and extensor pollicis brevis tendons and their synovial sheaths (1). This condition is often characterized by the thickening of these tendons' sheaths and the accumulation of mucopolysaccharides, leading to functional impairments in individuals engaged in repetitive hand and wrist activities (2, 3). It is prevalent among various populations, including mothers of young children, mechanics, golfers, computer users, and notably, mobile phone users, where it is colloquially referred to as "texting tenosynovitis," "gamer's thumb," or "WhatsAppitis." This condition is more common in women, potentially due to the anatomical angulation of the dorsal retinacular tunnel. The prevalence of this disorder is particularly concerning in mobile phone users, where excessive texting, prolonged usage, and altered wrist positions have been identified as significant contributors (4, 5).

De Quervain's tenosynovitis often presents with pain, swelling, and inflammation in the first dorsal compartment of the wrist, accompanied by symptoms such as numbness, tingling, burning, and decreased grip strength (3, 6). These symptoms can hinder daily activities and significantly affect quality of life. The exact etiology remains unclear, but it is frequently associated with acute trauma, repetitive microtrauma, or unaccustomed physical activities. Risk factors are broadly classified into modifiable factors, such as overuse, poor ergonomics, and nutritional deficiencies, and non-modifiable factors, including age, gender, and hormonal influences. Among modifiable factors, mobile phone usage has emerged as a critical contributor, with frequent texting and gaming resulting in repetitive strain injuries involving tendons, ligaments, and nerves (7-9).

Management of De Quervain's tenosynovitis typically includes a combination of pharmacological interventions, physical therapy, and, in severe cases, surgical procedures. Conservative approaches like manual therapy and exercise programs aim to reduce inflammation and restore function. Mobilization with movement (MWM), a technique developed by Brian Mulligan, has been extensively employed to address peripheral joint dysfunctions, offering potential benefits in alleviating pain and improving joint mobility (10, 11). Similarly, tendon gliding exercises, which involve specific thumb and wrist movements, are recognized as essential in rehabilitating hand injuries. These exercises promote the smooth gliding of tendons, alleviate stiffness, and prepare the hand for functional activities, akin to how aerobic exercises benefit the heart (12, 13).

This research seeks to explore the combined efficacy of tendon glide exercises and MWM in the management of De Quervain's tenosynovitis among mobile phone users. The objective is to evaluate whether these therapeutic techniques can alleviate symptoms, enhance functionality, and improve quality of life in individuals affected by this condition. By addressing this research gap, the study aims to contribute to the growing need for effective, non-invasive strategies to manage this increasingly prevalent musculoskeletal disorder.

METHODS

A randomized clinical trial was conducted at the University of Faisalabad to investigate the effects of tendon gliding exercises and mobilization with movement (MWM) on De Quervain's tenosynovitis. The target population included young adult females aged 18 to 25 years, as this group has a higher prevalence of mobile phone usage and an increased risk of developing De Quervain's tenosynovitis. A total of 30 participants were selected using a simple random sampling technique and were randomly assigned to two treatment groups (Group 1 and Group 2), each comprising 15 participants. Allocation to the groups was performed using a lottery method to ensure randomization, and participants were blinded to their group assignments to minimize bias.

Inclusion criteria required participants to be females aged 18–25 years with a positive Finkelstein test, thumb pain and stiffness lasting at least two weeks, pain intensity greater than 2 on the Numeric Pain Rating Scale (NPRS), and a history of sending at least 50 text messages per day. Exclusion criteria included the use of medications such as NSAIDs or steroids, a history of hand surgery or fractures, arthritis, pregnancy, tablet usage, or any integumentary conditions affecting the hand. Participants provided informed consent after being thoroughly briefed on the nature, objectives, duration, and potential risks and benefits of the study. They were assured that their data would be used solely for research purposes.

Baseline assessments included the measurement of pain intensity using NPRS and range of motion (ROM) using universal goniometry. Hand function was evaluated using the Michigan Hand Questionnaire (MHQ), and a self-designed screening form was utilized to gather injury-related information. Measurements of pain and ROM were conducted at baseline, after the second week, and after the fourth week, while the MHQ was completed only at baseline and after the final session.

Participants in Group 1 received MWM as the intervention, with treatment administered for a total of four weeks across six sessions (three sessions per week). Each session involved three sets of 10 repetitions of specific thumb joint mobilization techniques, including ulnar glides to improve flexion, radial glides to enhance extension, dorsal glides to increase abduction, and volar glides to improve adduction. Group 2 received the same MWM treatment as the baseline intervention, supplemented with tendon gliding exercises designed to target the adductor pollicis longus and extensor pollicis brevis tendons. These exercises were performed twice daily in each session, consisting of 10 repetitions per session with each position held for five seconds. The treatment for Group 2 also spanned four weeks, with three sessions conducted each week.

RESULTS

The results of the study revealed significant improvements in pain reduction for both groups from baseline to the end of the intervention period. In Group A, which received mobilization with movement (MWM) alone, the mean pain scores, measured using the Numerical Pain Rating Scale (NPRS), showed a progressive decline over the four weeks. The mean score decreased from 4.93 ± 1.57 at baseline to 3.40 ± 1.12 after the second week and further to 1.80 ± 0.774 after the fourth week. A similar trend was observed in Group B, which received MWM combined with tendon gliding exercises. The mean NPRS scores in Group B reduced from 4.86 ± 1.50 at baseline to 3.66 ± 1.11 after the second week and further to 1.80 ± 0.941 by the end of the fourth week. Within-subject analysis revealed a statistically significant reduction in pain in both groups ($p < 0.05$), demonstrating the effectiveness of the interventions. However, the comparison between groups showed no statistically significant differences at any time point ($p > 0.05$), suggesting that both interventions were equally effective in alleviating pain.

The analysis of hand functionality using the Michigan Hand Questionnaire (MHQ) pain scores further supported these findings. At baseline, Group A exhibited a mean pain score of 45 ± 12.1 , while Group B had a similar score of 43.3 ± 13.5 . By the fourth week, both groups experienced notable improvements, with Group A achieving a mean score of 59 ± 12.8 and Group B 54 ± 22.0 . Although the improvements within each group were evident, the intergroup comparison remained statistically insignificant ($p > 0.05$). This finding suggests that while both interventions enhanced hand function, there was no clear advantage of one treatment over the other in terms of pain reduction and functional improvement. The results highlight the effectiveness of both MWM alone and MWM combined with tendon gliding in managing pain and improving hand functionality among participants with De Quervain's tenosynovitis.

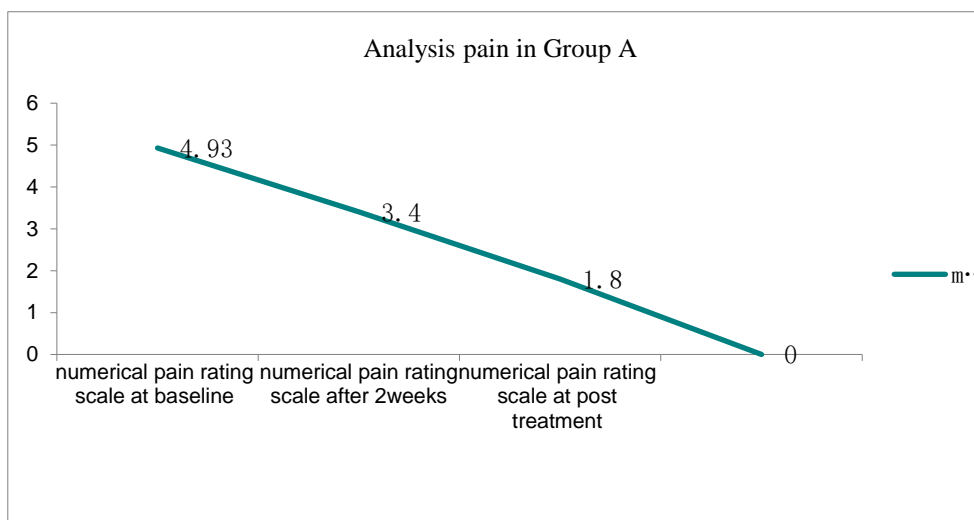


Figure 1 Estimated marginal means of pain in group A

The descriptive and inferential statistics of the pain of participants of group A from the initiation of intervention till the end of the last follow-up. It is evident from the table that mean pain level is reducing by each session ranging from 4.93 ± 1.57 at baseline to 3.4 ± 1.12 after 2nd week of treatment and to 1.8 ± 0.774 after 4th week of treatment among the subjects of group A. The p value of the test within the subject's effect was 0.000 which is less than selected alpha 0.05. which shows that there is significant improvement in Group A participants. Pain decreasing gradually after the treatment session in group B subjects.

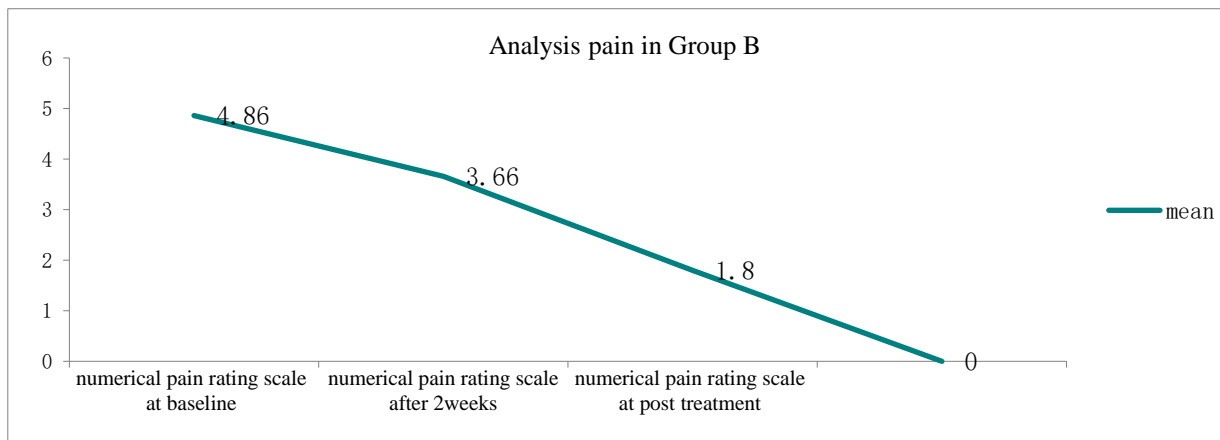


Figure 2 Estimated marginal means of pain in group B

Descriptive and inferential statistics of the pain of participants of group B from the initiation of intervention till the end of the last follows-up. It is evident from the table that mean pain level is reducing by each session ranging from 4.86 ± 1.40 at baseline to 3.66 ± 1.11 after 2nd week of treatment and to 1.80 ± 0.94 after 4th week of treatment among the subjects of group B. The p value of the test within the subject's effect was 0.000 which is less than selected alpha 0.05, which shows that there is significant improvement in Group B participants.

Table 1: Analysis of pain in Group A, B: Independent sample T test

parameters	Groups	Mean	Standard deviation	N	2 tailed significance
Numerical pain rating scale at baseline	A	4.93	1.57	15	.904
	B	4.86	1.50	15	.904
Numerical pain rating scale after 2nd week	A	3.40	1.12	15	.519
	B	3.66	1.11	15	.519
Numerical pain rating scale after 4th week	A	1.80	.774	15	1.000
	B	1.80	.941	5	1.000

Table 1 presents the analysis of pain reduction in Group A and Group B using the Numerical Pain Rating Scale (NPRS) at three time points: baseline, after the second week, and after the fourth week. At baseline, the mean pain scores were comparable between Group A (4.93 ± 1.57) and Group B (4.86 ± 1.50), with no significant difference ($p = 0.904$). After two weeks, the mean pain scores decreased to 3.40 ± 1.12 in Group A and 3.66 ± 1.11 in Group B, again showing no significant difference ($p = 0.519$). By the fourth week, both groups achieved further pain reduction, with identical mean scores of 1.80, but slightly different standard deviations (0.774 for Group A and 0.941 for Group B), with no statistical significance ($p = 1.000$). These results suggest that both interventions were similarly effective in reducing pain over the four-week period.

Table: 2 Pain Score of MHQ in Group A, B

Parameters	Groups	Mean	Standard deviation	N	2 tailed significance
Pain score of MHQ at baseline	A	45	12.1	15	.725
	B	43.3	13.5	15	.725
Pain score of MHQ after 4th week	A	59	12.8	15	.454
	B	54	22.0	15	.456

Table 2 illustrates the pain scores from the Michigan Hand Questionnaire (MHQ) in Group A and Group B at baseline and after the fourth week. At baseline, the mean MHQ pain scores were 45 ± 12.1 for Group A and 43.3 ± 13.5 for Group B, with no significant difference ($p = 0.725$). After the fourth week, both groups showed improvement, with Group A achieving a mean score of 59 ± 12.8 and Group B a score of 54 ± 22.0 , yet the difference remained statistically insignificant ($p = 0.454$). These findings indicate comparable improvements in pain perception across both groups over the four-week treatment period.

DISCUSSION

The randomized clinical trial conducted on 30 participants sought to evaluate the effectiveness of mobilization with movement (MWM) alone and MWM combined with tendon gliding exercises in reducing pain, improving range of motion (ROM), and enhancing hand function in individuals with De Quervain's tenosynovitis (14, 15). Participants were randomly allocated into two groups, and the outcomes were assessed at baseline, after the second week, and after the fourth week. Pain reduction was measured using the Numerical Pain Rating Scale (NPRS), ROM was assessed for thumb extension and abduction, and functional improvement was evaluated using the Michigan Hand Questionnaire (MHQ). The results demonstrated significant improvements within both groups across all measures, indicating the potential efficacy of both interventions. However, intergroup comparisons showed no statistically significant differences, suggesting that MWM alone and MWM combined with tendon gliding yielded comparable outcomes (13, 16).

The findings revealed a consistent reduction in pain levels within both groups, with significant improvements observed after two and four weeks of intervention. Group A demonstrated a reduction in mean pain scores from 4.93 to 1.80, while Group B showed a similar decrease from 4.86 to 1.80. ROM improvements were also noted, with Group A participants achieving an increase in mean thumb extension from 39.6 to 47.8 degrees, while Group B displayed comparable gains. Functional improvements measured by the MHQ showed that both groups experienced increased scores, indicating enhanced hand functionality (1, 17). Despite these positive findings, the intergroup analysis revealed no statistically significant differences, suggesting that the addition of tendon gliding exercises did not provide a clear advantage over MWM alone within the duration of the study. The strengths of this study lie in its randomized design, inclusion of objective and subjective outcome measures, and consistent follow-up assessments, which enhance the reliability of the findings. However, the small sample size limited the ability to detect subtle intergroup differences and generalize the results to broader populations. Additionally, the short duration of the study may not have captured the long-term effects of the interventions, leaving the potential for sustained benefits unexplored. Another limitation was the exclusive inclusion of female participants, which, while addressing the higher prevalence in women, restricts the applicability of findings to males (17-19).

A recent comparative study highlighted the relative efficacy of physical therapy versus corticosteroid injections for De Quervain's tenosynovitis. Conducted with 74 patients, the study divided participants into two groups: Group A received physiotherapy (including tendon gliding, self-administered friction massage, and thumb spica splints), while Group B was treated with a single corticosteroid injection (betamethasone with lidocaine). At two-month follow-up, Group B demonstrated significantly greater reductions in pain scores (from 8.03 ± 1.09 to 1.65 ± 1.44) compared to Group A, which showed a smaller decrease (from 7.37 ± 1.35 to 7.00 ± 1.38). Pressure pain threshold also improved significantly in Group B, with more modest changes in Group A. These findings suggest that corticosteroid injections may offer superior short-term relief compared to physiotherapy. However, physiotherapy remains a non-invasive and safer

option for patients preferring to avoid injections. The study emphasizes the importance of tailoring interventions to individual patient needs, balancing efficacy and patient preference (20).

The study highlights the importance of conservative management approaches in addressing De Quervain's tenosynovitis and demonstrates the potential of MWM, with or without tendon gliding, as effective interventions. Nevertheless, the lack of significant differences between the groups emphasizes the need for further research with larger sample sizes, longer follow-up durations, and diverse populations to establish the relative efficacy of these interventions. Additionally, exploring other relevant outcomes, such as patient satisfaction and long-term functional recovery, could provide a more comprehensive understanding of treatment effects and guide clinical decision-making.

CONCLUSION

The findings of this study demonstrate that both mobilization with movement alone and mobilization with movement combined with tendon gliding are effective treatment approaches for managing De Quervain's tenosynovitis. While mobilization with movement significantly reduces pain, the addition of tendon gliding exercises further supports functional improvement alongside pain relief. However, the outcomes indicate that the combined approach does not offer a distinct advantage over mobilization with movement alone. Therefore, either intervention can be confidently utilized based on patient preference, therapist expertise, or clinical context, as both yield comparable benefits in addressing pain and functionality in this condition.

AUTHOR CONTRIBUTIONS

Author	Contribution
Rubina Zulfqar*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Faiza Mohsin	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Nimra Seher	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Kashaf Farooq	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Rida Wahid	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Aneela Umar	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published

REREFENCES

1. Donati D, Ricci V, Boccolari P, Origlio F, Vita F, Naňka O, et al. From diagnosis to rehabilitation of trigger finger: a narrative review. 2024;25(1):1061.
2. Seppi S, Vecchi S, Raccagni I, Novelli C, Pajardi GEJJoHT. Pre-and post-treatment in flexor tendon tenolysis: An observational study. 2024.
3. Karlibel İA, Aksoy MK, Alkan AJJoB. Paraffin bath therapy in De Quervain's tenosynovitis: a single-blind randomized controlled trial. 2021;65(8):1391-8.
4. Papacharalambous C, Savva C, Karagiannis C, Giannakou KJJoB, Therapies M. The effectiveness of slider and tensioner neural mobilization techniques in the management of upper quadrant pain: a systematic review of randomized controlled trials. 2022;31:102-12.
5. Joshi YS, Shridhar S, Jayaram M, Sharath UJJoHS, Nov R. A comparative study on the effect of scapular proprioceptive neuromuscular facilitation and maitland glenohumeral mobilization versus scapular mobilization and maitland glenohumeral mobilization in adhesive capsulitis. 2020;10(11):135-43.
6. Shakyawar A, Bajpai A, Sharma D, Shukla S. REHABILITATION APPROACH FOR ZONE III FLEXOR TENDON REPAIR: A CASE STUDY.
7. Karpuz S, Yilmaz R, Özkan M, Kaya İÇ, Bulut O, Erol K, et al. Effect of splinting and kinesiotaping treatments on functional status, sleep quality and median nerve cross-sectional area in carpal tunnel syndrome: A single blind prospective randomized controlled study. 2025.
8. Ying LY, Singh KJJoPSP. The Effect Of Nerve Gliding Exercise To Improve Range Of Motion And Grip Strength In Hand Exercise Program. 2022;6(3):4047-57-57.
9. Núñez de Arenas-Arroyo S, Cavero-Redondo I, Torres-Costoso A, Reina-Gutiérrez S, Álvarez-Bueno C, Martínez-Vizcaíno VJjoo, et al. Short-term effects of neurodynamic techniques for treating carpal tunnel syndrome: A systematic review with meta-analysis. 2021;51(12):566-80.
10. Salsabila AA, Dalla Soro CX, Alpiah DNJIJoSR. Effectiveness of Gliding Exercise Therapy In Carpal Tunnel Syndrome (CTS) Patients: Literature Review. 2024;2(4):141-9.
11. Ferrara PE, Codazza S, Maccauro G, Zirio G, Ferriero G, Ronconi GJOR. Physical therapies for the conservative treatment of the trigger finger: a narrative review. 2020;12(Suppl 1).
12. Manzoor A, Faisal H, Younas MJPJoPT. COMPARISON OF SHOULDER BLADE MOBILIZATION COMBINED WITH GLENOHUMERAL JOINT MOBILIZATION VERSUS GLENOHUMERAL JOINT MOBILIZATION ALONE ON PAIN, DISABILITY AND QUALITY OF LIFE IN PATIENTS WITH FROZEN SHOULDER. 2024.
13. Ghasemi A, Olyaei GR, Bagheri H, Hadian MR, Jalaei S, Otadi K, et al. The Effects of Radial Extra Corporeal Shock Wave and Low-power Laser Therapies on Clinical and Electrophysiological Parameters in Moderate Carpal Tunnel Syndrome: A Blinded Randomized Control Trial. 2023;21(3):513-24.
14. Cordella M, Pellicciari L, Scopece F, Fornaro R, Giovannico G, Lanfranchi EJJoHT. Evidence for exercise therapy in patients with hand and wrist tendinopathy is limited: A systematic review. 2023.
15. Hernández-Secorún M, Montaña-Cortés R, Hidalgo-García C, Rodríguez-Sanz J, Corral-de-Toro J, Monti-Ballano S, et al. Effectiveness of conservative treatment according to severity and systemic disease in carpal tunnel syndrome: a systematic review. 2021;18(5):2365.
16. Thomas STV, Subramani I, Chinnusamy S, Mani P. Effectiveness of mulligan's mobilization and lateral heel wedges on pain and physical function among knee osteoarthritis subjects: A simple experimental study. 2024.
17. Franceschi G, Scotto I, Maselli F, Mourad F, Gallotti MJJoFM, Kinesiology. Hands-On Versus Hands-Off Treatment of Hip-Related Nonspecific Musculoskeletal Diseases: A Systematic Review. 2024;9(4):262.
18. Ahmad M, Arab AJJM-CR, Rev. Ability of MRI diagnostic value to detect the evidence of physiotherapy outcome measurements in dealing with calf muscles tearing. 2022;6(10):1-6.
19. Minhas MS, Khan S, Majid M, ul Aine Q, Tahir R, Tariq KJJRCoRS. Comparing the effects of carpal bone mobilization and tendon gliding in patients with carpal tunnel syndrome. 2023;11(04).
20. Al-Bakheet M, Jaradat R, Khresat R, Al Boun S, Alshagoor B, Ranade SN. Physiotherapy vs corticosteroid injection as a first line conservative treatment for De Quervain's tenosynovitis. South Asian Journal of Medical Sciences. 2020;8(4):1086-1089.