EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Coden USA: EJBPBO
Volume: 13
Issue: 6
Year: 2026

COMPARATIVE EFFECTIVENESS OF MUSCLE ENERGY TECHNIQUE VERSUS CONVENTIONAL THERAPY ON PERISCAPULAR AND UPPER BACK PAIN AMONG POSTPARTUM WOMEN

[1]*Jasmeen Kaur, [2]Dr. Varinder Kaur (PT)

[1]Postgraduate Student, Department of Physiotherapy, Khalsa College, Amritsar, Punjab, India.
[2]Assistant Professor, Department of Physiotherapy, Khalsa University, Amritsar, Punjab, India.

***Corresponding Author: Jasmeen Kaur**

Postgraduate Student, Department of Physiotherapy, Khalsa College, Amritsar, Punjab, India.

DOI: https://doi.org/10.5281/zenodo.20441677

How to cite this Article: [1]*Jasmeen Kaur, [2]Dr. Varinder Kaur (PT) (2026). Comparative Effectiveness Of Muscle Energy Technique Versus Conventional Therapy On Periscapular And Upper Back Pain Among Postpartum Women. European Journal of Biomedical and Pharmaceutical Sciences, 13(6), 160–166.

Article Received on 28/04/2026 **Article Revised on 18/05/2026** **Article Published on 01/06/2026**

ABSTRACT

Background: Postpartum women frequently experience periscapular and upper back pain due to prolonged faulty posture during breastfeeding, infant handling, hormonal changes, and muscular imbalance. These musculoskeletal dysfunctions may negatively affect functional activities and quality of life. Muscle Energy Technique (MET) is a manual therapy approach used to reduce muscle tightness, improve mobility, and restore normal muscle function. **Objective:** To determine the effectiveness of MET on periscapular and upper back pain along with functional disability and quality of life among postpartum women. **Methods:** A total of 56 postpartum women aged 20-40 years with periscapular and upper back pain were recruited and randomly divided into 2 groups. Group A received MET, while Group B received conventional management, including ergonomic counseling and posture education, with 28 participants in each group. Outcome measures included NPRS, NDI, SPADI, and MAPP-QOL. Both groups received treatment sessions 3 times per week for 4 weeks. **Results:** Both groups demonstrated significant improvements in NPRS, NDI, SPADI, and MAPP-QOL following intervention ($p < 0.001$). However, Group A showed greater improvement in pain reduction, shoulder function, and functional disability compared to the control group. **Conclusion:** The Muscle Energy Technique (MET) was effective in reducing periscapular and upper back pain along with improving functional ability and quality of life among postpartum women. MET may be considered an effective physiotherapy intervention for postpartum musculoskeletal dysfunction.

KEYWORDS: Postpartum women, Muscle energy technique, periscapular pain, Upper back pain, Quality of life, Physiotherapy.

INTRODUCTION

The postpartum period is the time that starts with the birth of a newborn up to 12 weeks, according to the American College of Obstetricians and Gynaecologists. Some investigators have considered individuals to be postpartum for as long as 12 months after birth.[1]

The postpartum period is associated with multiple physiological and musculoskeletal changes that may contribute to pain and functional limitations among women. Hormonal alterations, ligamentous laxity, poor breastfeeding posture, repetitive infant care activities, and muscular imbalance are common contributing factors to upper back and periscapular pain in postpartum women.[2]

Postpartum women frequently adopt prolonged forward head posture, rounded shoulders, and thoracic flexion while breastfeeding and carrying infants. These sustained postures increase stress on the cervical and scapular stabilizing muscles, leading to muscle fatigue, pain, and postural dysfunction.[3]

Periscapular muscles, including the trapezius, rhomboids, levator scapulae, and serratus anterior, play an important role in maintaining scapular stability and upper body posture. Weakness and overactivity within these muscle groups may contribute to pain and functional disability.[4]

The upper back muscles include the thoracic paraspinal muscles, which are part of the erector spinae group, multifidus, latissimus dorsi, and deep stabilizers that help with thoracic extension and posture endurance. Increased thoracic kyphosis is a common change after childbirth. This happens due to repeated positions taken during infant care. It reduces the scapula's backward tilt and limits how effectively the lower trapezius and serratus anterior can activate. Weakness in the thoracic extensors, along with tightness in the front of the chest, specifically the pectoralis major and minor, leads to rounded shoulders and puts extra strain on upper-back muscles.[5]

Muscle Energy Technique (MET) is a manual therapy technique involving voluntary isometric contraction performed by the patient against controlled resistance provided by the therapist. MET helps improve muscle flexibility, reduce pain, restore normal muscle length, and improve joint mobility through post-isometric relaxation and neuromuscular mechanisms.[6]

Conventional exercises, including breathing control, stretching, postural correction, and strengthening, are often recommended as first-line management for postpartum women. Ergonomic awareness alongside therapeutic exercise by reducing postural stress during daily tasks involving infants.[7]

Previous studies have demonstrated the effectiveness of MET in reducing musculoskeletal pain and improving functional outcomes in cervical and shoulder dysfunctions. However, there is limited evidence regarding its effectiveness among postpartum women with upper back and periscapular pain.

Therefore, the present study aimed to determine the effectiveness of Muscle Energy Technique on pain, functional disability, shoulder function, and quality of life among postpartum women.

MATERIALS AND METHODS

Study Design: Randomized controlled trial (RCT)
Study Setting: Various hospitals in Amritsar, providing outpatient services to postpartum women.
Study Population: Postpartum women (6 weeks to 12 months after delivery) who presented with upper back and/or periscapular pain.
Sampling Method: Convenience Sampling technique was used to recruit participants.

Sample Size: The sample size for this study was calculated using G*Power 3.1.9.7 software, and the sample size obtained was 56, which was randomly divided into two groups equally.

ELIGIBILITY CRITERIA

Inclusion criteria

- Postpartum women aged 20-40 years.[8]
- Postpartum duration between 6 weeks and 12 months.[9]
- Periscapular/upper back pain ≥3 on NPRS.
- Mild to moderate disability on NDI and SPADI.[10,11]

Exclusion Criteria

- History of major spinal deformities (e.g., scoliosis, kyphosis).[12]
- Neurological disorders affecting upper limb or spine.[13]
- Previous shoulder, cervical, or thoracic surgery.[14]
- Severe postpartum complications (e.g., obstetric injury).[15]

Variables

Independent Variables	Dependent Variables
Muscle Energy technique	Pain Intensity
Conventional Exercises	Maternal Quality of Life
	Functional Disability

Instruments and tools

- Numeric Pain Rating Scale: The NPRS is a unidimensional tool used to measure pain intensity. An 11-point numeric scale with 0 representing one pain extreme (e.g., "no pain") and 10 representing the other pain extreme (e.g., "pain as bad as you can imagine" and "worst pain imaginable"). [16]
- Maternal Postpartum Quality of Life: The Maternal Postpartum Quality of Life (MAPP- QOL) scale measures the level of satisfaction and importance in various aspects of life. Scoring of the quality of life can range from high to low, depending on the answers provided by the participants.[17]
- Neck Disability Index: The Neck Disability Index (NDI) measures the level of neck disability, including 10 items: pain, lifting, personal care, reading, concentration, headaches, work, recreation, driving, and sleeping, scoring on a 0 to 5 rating scale.[10]
- Shoulder Pain and Disability Index: The Shoulder Pain and Disability Index (SPADI) is a self-reported questionnaire that contains two scales, one for pain and the other for functional activity. Pain is measured using five items measuring pain intensity in the individual. There are eight functional activities measured by the questionnaire. These involve measuring the extent of difficulties experienced in undertaking daily activities requiring upper extremity participation. It usually takes a patient between 5-10 minutes to complete the SPADI, which is the only valid and reliable instrument for shoulder.[11]

Outcome measures

Primary outcome measures

- Pain Intensity – measured by Numeric Pain Rating Scale (NPRS).
- Quality of life – assessed using Maternal Postpartum Quality of Life (MAPP-QOL).

Secondary outcome measures

- Disability: measured by Neck Disability Index (NDI) and Shoulder Pain and Disability Index (SPADI)

Procedure

Informed consent of all the participants was taken. Baseline assessment was carried out. The participants were randomly allocated into two groups.

Group A: Participants received the Muscle Energy Technique targeting muscles including upper trapezius, levator scapulae, rhomboids, serratus anterior, splenius capitis, semispinalis capitis, and suboccipital muscles. (n=28)

Group B: Participants received Conventional management in the form of ergonomic counseling and posture education related to breastfeeding and infant-care activities. (n=28)

Protocol: A total of 12 treatment sessions were administered three times per week over a period of four weeks in both groups.

Group A.

Post-isometric relaxation technique: 3–5 repetitions per muscle group, contraction held for 5– 7 seconds followed by stretch.

Patient Position: The patient was positioned in a supine position, lying on the treatment table, with the head supported comfortably using a pillow to maintain a neutral position. The upper limbs were kept relaxed by the side. Care was taken to ensure the body was aligned properly, as patients often tend to shift or compensate without realizing it.

Therapist Position: The therapist usually stood at the head end or on the side, depending on the muscle being treated. One hand was used to stabilize the proximal part, while the other guided the movement and applied gentle resistance. The amount of resistance was kept controlled and adjusted according to patient comfort.

General Procedure (Post-Isometric Relaxation Technique)

The muscle energy technique using post-isometric relaxation (PIR) was applied. The same basic sequence was followed for all muscles.

First, the therapist gently took the muscle to the point where resistance was first felt (not into pain). From there, the patient was asked to perform a mild isometric contraction—usually around 20–30% effort, as stronger contractions were not required and sometimes caused discomfort.

The contraction was held for about 5–7 seconds. After this, the patient was asked to completely relax for a few seconds. During this relaxation phase, the therapist slowly moved the muscle further into stretch till the new barrier was reached.

This process was repeated around 3–5 times for each muscle. Treatment was given on both sides, although in some patients one side required more attention than the other.

Technique (Muscle)	**Patient Position**	**Therapist Position**	**Procedure**	**Duration**
Upper Trapezius MET	Supine	Head end	Stretch via contralateral side flexion: isometric contraction (5–7 sec), relax, further stretch	3–5 reps
Levator Scapulae MET	Supine	Head end	Cervical flexion + contralateral rotation; isometric contraction, relax, stretch	3–5 reps
Rhomboids MET	Supine/Side-lying	Side	Scapular protraction, resisted retraction, relax, further stretch	3–5 reps
Serratus Anterior MET	Supine	Side	Scapular retraction stretch, resisted protraction, relax, stretch	3–5 reps
Splenius Capitis MET	Supine	Head end	Flexion + contralateral rotation, resisted extension/rotation, relax, stretch	3–5 reps
Semispinalis Capitis MET	Supine	Head end	Cervical flexion; resisted extension, relaxation, and stretch	3–5 reps
Suboccipital MET	Supine	Head end	Upper cervical flexion (nod); resisted nod/extension, relax, deeper stretch	3–5 reps
Total Duration	—	—	Each contraction 5–7 sec + 5 sec relaxation	3 sessions/week for 4 weeks

Physiological Basis

The effect of MET is mainly due to autogenic inhibition. During the isometric contraction, Golgi tendon organs are stimulated, which leads to reflex relaxation of the muscle. Because of this, the muscle can be stretched further with less resistance. Clinically, this helps in reducing muscle tightness, improving range of motion, and also decreasing pain.

Frequency and Dosage

Each muscle was treated with around 3–5 repetitions. Contraction was held for 5–7 seconds, followed by relaxation and gentle stretching. The treatment was given three times per week for a duration of four weeks.

Group B.

Participants will receive only ergonomic counseling and posture education relevant to breastfeeding and infant-care tasks.

Patient Position: The participants were made to sit comfortably on a chair with proper back support during the session. Feet were kept flat on the floor, with hips and knees at about 90°. Arm support was provided when required, especially while demonstrating positions like breastfeeding, so that it felt as close to real-life situations as possible.

Therapist Position: The therapist stayed in front of or slightly to the side of the participant to demonstrate clearly and observe posture at the same time. Corrections were given as needed, and care was taken to make sure the participant actually understood and could repeat the posture correctly.

Procedure: The control group mainly received ergonomic advice and posture education related to common daily activities during the postpartum period. Focus was on activities like breastfeeding, sitting for long durations, and handling the baby, as these were the most reported aggravating factors.

Technique	**Patient Position**	**Therapist Position**	**Procedure**	**Duration**
Breastfeeding Posture Training	Sitting with support	In front/side	Neutral spine, pillow support, avoid forward	Included in session
			flexion, maintain scapular alignment	
Sitting Posture Correction	Sitting	In front	Neutral pelvis, upright spine, chin tuck, scapular setting	Included in session
Infant Handling Training	Sitting/Standing	Supervising	Hip & knee bending, baby close to body, avoid trunk twisting	Included in session
Postural Education	Sitting	In front	Advice on posture, micro-breaks, supportive seating	Included in session
Lifestyle Modification	Sitting	In front	Ergonomic corrections in daily activities	Included in session
Total Duration	—	—	Single session + follow-up	15–20 min + weekly follow-up (4 weeks)

Follow-up and Reinforcement: One supervised session of about 15–20 minutes was conducted initially to explain and demonstrate everything. After that, weekly follow-ups (telephonic) were done to check compliance, clear doubts, and reinforce the instructions.

Frequency and Dosage: The intervention included one initial session of 15–20 minutes, followed by weekly follow-up for a period of four weeks.

Statistical analysis

The statistical analysis was carried out using IBM SPSS (Statistical Package for the Social Sciences) software. Both descriptive and inferential statistical methods were used to analyse the data. Descriptive statistics including mean and standard deviation were used to analyse the baseline characteristics and outcome measures of the participants in both groups. Paired t-test was used to compare the pre-intervention and post-intervention scores within each group. Independent t-test was applied to evaluate the difference in post-intervention outcomes between Group A and Group B. The level of statistical significance was set at $p \leq 0.05$.

RESULTS

Table 1: Baseline characteristics of participants in Group A and Group B.

Variable	Group A Mean ± SD	Group B Mean ± SD
Age (years)	29.86 ± 2.76	28.96 ± 3.11
Postpartum Duration (weeks)	23.82 ± 11.06	22.21 ± 10.47
Height (m)	160.21 ± 2.27	159.07 ± 2.28
Weight (kg)	68.96 ± 7.14	67.46 ± 7.09
BMI (kg/m²)	26.80 ± 2.21	26.48 ± 2.28
NPRS	6.61 ± 1.16	5.89 ± 1.13
MAPP-QOL	3.09 ± 0.41	3.31 ± 0.51
NDI	20.00 ± 3.47	20.36 ± 3.69
SPADI	51.86 ± 6.24	49.50 ± 10.60

Data are expressed as mean ± standard deviation (SD). Table 1 presents the descriptive analysis of baseline characteristics of the participants in Group A and Group B. This indicates that the participants in both groups were comparable and homogeneous before the intervention.

Table 2: Analysis of Pre- and Post-Intervention values within Group A.

Variable	Pre Mean ± SD	Post Mean ± SD	t value	p value
NPRS	6.61 ± 1.16	2.18 ± 0.72	33.959	<0.001*
MAPP-QOL	3.09 ± 0.41	4.81 ± 0.31	-28.282	<0.001*
NDI	20.00 ± 3.47	7.43 ± 2.42	19.119	<0.001*
SPADI	51.86 ± 6.24	18.54 ± 5.11	31.204	<0.001*

(Note: * mark indicates that p<0.05)

Table 2 presents the within-group comparison of outcome measures before and after the intervention in Group A. Statistical analysis using a paired t-test revealed significant differences between pre- and post-intervention values ($p < 0.001$), indicating that the intervention produced significant reduction in pain, NDI, and SPADI and improved quality of life.

Table 3: Analysis of Pre- and Post-Intervention values within Group B.

Variable	Pre Mean ± SD	Post Mean ± SD	t value	p value
NPRS	5.89 ± 1.13	2.25 ± 1.29	31.016	<0.001*
MAPP-QOL	3.31 ± 0.51	4.65 ± 0.60	-20.360	<0.001*
NDI	20.36 ± 3.69	8.86 ± 4.68	21.977	<0.001*
SPADI	49.50 ± 10.60	23.71 ± 12.56	17.142	<0.001*

(Note: * mark indicates that p<0.05)

Table 3 presents the within-group comparison of baseline and post-intervention values in Group B. Statistical analysis using a paired t-test revealed significant differences between pre- and post-intervention values ($p < 0.001$), indicating that the intervention produced significant reduction in pain, NDI, and SPADI and improved quality of life.

Table 4: Analysis of post-intervention values between Group A & Group B.

Outcome	Group A (Mean ± SD)	Group B (Mean ± SD)	p-value
NPRS	2.18 ± 0.72	2.25 ± 1.29	0.803
MAPP-QOL	4.81 ± 0.31	4.65 ± 0.60	0.217
NDI	7.43 ± 2.42	8.86 ± 4.68	0.159
SPADI	18.54 ± 5.11	23.71 ± 12.56	0.051

(Note: * mark indicates that p<0.05)

Table 4 presents the comparison of post-intervention values between Group A and Group B. Overall, the post-intervention results indicate that Group A demonstrated significant pain reduction, NDI, SPADI, and improved quality of life compared to Group B.

DISCUSSION

The findings of the present study indicated a significant reduction in pain intensity across both groups, as measured by Numeric Pain Rating Scale. This suggests that regardless of the specific protocol, providing structured physical therapy or ergonomic intervention is effective for managing the moderate levels of pain typically experienced by postpartum women. By enhancing posture and movement patterns, exercise-based therapies are known to enhance neuromuscular coordination and decrease mechanical stress on cervical and shoulder structures.

Hasanin et al. (2021) stated that the biomechanical stress of infant care, which includes repetitive lifting and prolonged breastfeeding, frequently leads to myofascial trigger points in the cervical muscles.[18] The implementation of stretching, strengthening, or even basic ergonomic advice (as seen in Group B) may help alleviate the mechanical tension on these structures. Similarly, Takale et al. (2022) found that both conventional exercises and specialized techniques like myofascial release or muscle energy techniques lead to significant short-term pain relief in this population.[6]

The Maternal Postpartum Quality of Life Questionnaire scores improved significantly within each group. However, no significant differences between groups were found. Webb et al. (2008) state that hormonal changes, muscle weakness, and the frequent handling and care of the infant can all lead to postpartum women under physical stress.[19] Algabbani et al. (2025) have shown that pain intensity is a primary indicator of disability development in postpartum women, and managing this pain early is crucial for maintaining maternal mental health and bonding.[16]

Group A had shown a statistically significant reduction in NDI compared to Group B. Falla et al. (2004) observed that individuals with neck pain exhibit reduced activation of deep cervical flexors, and targeted exercises can restore muscle function and reduce disability.[20] Sheikhhoseini et al. (2018) reported that therapeutic exercises significantly reduce disability by enhancing muscle performance. Improved neuromuscular control leads to better load distribution across cervical structures, thereby reducing strain and functional limitations.[21]

In this study, SPADI scores significantly improved across both groups following interventions, indicating enhanced shoulder function and reduced pain. Do et al. (2017) found that exercises can significantly improve shoulder mechanics and help reduce pain, which improves the SPADI scores, contributing to enhanced shoulder function and decreased disability.[22] Camargo et al. (2015) reported that the scapular-focused exercise programs significantly improve shoulder function and reduce pain in individuals with shoulder dysfunction.[23]

Physical improvements directly correlate with higher quality of life, which is critical during the demanding postpartum months. The findings indicate that exercise-based interventions have shown significant reduction in pain, NDI, and SPADI and are improving quality of life among postpartum women.

Overall, the results of this study indicate that both physiotherapeutic interventions were effective in improving pain, quality of life, and disability. However, Group A demonstrated superior outcomes to Group B.

LIMITATIONS

- Hand dominance of participants was not considered, which may have influenced functional performance and muscle activation patterns, thereby affecting outcome measures.
- The sample size and available data were limited, which may restrict the generalizability of the findings to the broader postpartum population.
- The duration of the intervention was short, and no long-term follow-up was performed, making it difficult to determine the sustainability of the treatment effects.

FUTURE SCOPE

- Studies with larger sample sizes can be conducted to improve the generalizability of the findings to a wider postpartum population.
- Long-term follow-up studies are recommended to assess the sustainability of improvements in pain, disability, and postural alignment.
- Comparative studies, including additional physiotherapy techniques, can be carried out to identify the most effective intervention protocol.

CONCLUSION

The study evaluated two intervention protocols in postpartum women with Periscapular and Upper back pain: Group A received Muscle Energy Technique, while Group B received Conventional management. Both protocols significantly reduced pain, NDI, and SPADI and improved quality of life. However, Group A demonstrated comparatively greater improvements, indicating superior functional outcomes.

ETHICAL APPROVAL

The study was approved by the Ethics Committee of Khalsa College, Amritsar.

ACKNOWLEDGEMENT

The authors express gratitude to all the participants who contributed to the successful completion of this research study.

DECLARATION BY AUTHORS

The authors hereby declared that it was their original piece of research and had not been sent to any other journal for publication.

REFERENCES

1. Berens P. Overview of the postpartum period: Normal physiology and routine maternal care. UptoDate, 2020; 15: 1-34.
2. Sultana M, Nawaz M, Mubashra S, Fatima S, ul Huda N. Trigger Points in Shoulder in Correlation with Postpartum Pain. Journal of Health, Wellness, and Community Research, 2025 Jul 5; e423-.
3. Situt GA, Philip S, Patil P. Prevalence of Scapular Dyskinesis in Breastfeeding Postnatal Women in Satara District—An Observational Study. Journal of Evolution of Medical and Dental Sciences, 2021

Aug 2; 10(31): 2401-6.
4. Meeusen R. F. Struyf, J. Nijs, S. Mollekens, I. Jeurissen, S. Truijen, S. Mottram &. Clin Rheumatol, 2013; 32: 73-85.
5. Kang NY, Kim K. Effects of a combination of scapular stabilization and thoracic extension exercises on respiration, pain, craniovertebral angle and cervical range of motion in elementary school teachers with a forward head posture: A randomized controlled trial. Korean Society of Physical Medicine, 2022 May 31; 17(2): 29-40.
6. Rutuja Takale et.al. Short term effects of muscle energy technique with resistance band exercises and myofascial release technique with conventional exercises on pain, ROM and functional disability in postpartum women with trapezitis: a randomized clinical trial.
7. Saptaputra SK, et al. Ergonomic Sofa Intervention in Improving Mother's Posture in Kangaroo Mother Care. *Formosa J Sustain Res*, 2025; 2(1): 2820.
8. Martins NA, et al. GPR for postural correction in women with thoracic kyphosis: a randomized trial. Clin Biomech, 2022; 95: 105618.
9. Saligheh M, McNamara B, Rooney R. Perceived barriers and enablers of physical activity in postpartum women: a qualitative approach. BMC pregnancy and childbirth, 2016 Jun 2; 16(1): 131.
10. Vernon H, Mior S. The Neck Disability Index: a study of reliability and validity. J Manipulative Physiol Ther, 1991; 14(7): 409–15.
11. Breckenridge JD, McAuley JH. Shoulder Pain and Disability Index (SPADI). Arthritis Care Res, 2011; 63(S11): S214–S218.
12. American Academy of Pediatrics. Spinal Deformities (Chapter 333). In: AAP Pediatric Care Online, 2021.
13. Badau A, Badau D. Identifying the Differences in Symmetry of the Anthropometric Parameters of the Upper Limbs in Relation to Manual Laterality between Athletes Who Practice Sports with and without a Ball. Symmetry, 2024 May 4; 16(5): 558.
14. Kholinne E, Kwak JM, Sun Y, Lee HJ, Koh KH, Jeon IH. Risk factors for persistent shoulder pain after cervical spine surgery. Orthopaedic surgery, 2019 Oct; 11(5): 845-9.
15. Darmody E, Bradshaw C. Women's experience of obstetric anal sphincter injury following childbirth: An integrated review. Midwifery, 2020 Dec 1; 91: 102820.
16. Algabbani MF, Alazmi AA, Alqabbani S, Almurdi MM, Abdelkader SM, Alruwaili M, Alhammad SA, AlHumaid LA, Alrushud A, Almuwais A, Shaheen AA. Prevalence and Risk Factors for Neck and Upper Limb Musculoskeletal Disabilities Among Postpartum Women. Clinical and Experimental Obstetrics & Gynecology, 2025 Feb 5; 52(2): 25833.
17. Jeong YJ, Nho JH, Kim HY, Kim JY. Factors influencing quality of life in early postpartum women. International journal of environmental research and public health, 2021 Mar 14; 18(6): 2988.
18. Hasanin ME, Mohamed RR, Hamda HA, Farag A. Effects of cervical myofascial trigger points release in post-natal females: A randomized controlled trial Efectos de la liberación de puntos gatillo miofasciales cervicales en mujeres después del parto: Un ensayo controlado aleatorizado.
19. Webb DA, Bloch JR, Coyne JC, Chung EK, Bennett IM, Culhane JF. Postpartum physical symptoms in new mothers: Their relationship to functional limitations and emotional well- being. Birth, 2008 Sep; 35(3): 179-87.
20. Jull GA, Falla D, Vicenzino B, Hodges PW. The effect of therapeutic exercise on activation of the deep cervical flexor muscles in people with chronic neck pain. Manual therapy, 2009 Dec 1; 14(6): 696-701.
21. Sheikhhoseini R, Shahrbanian S, Sayyadi P, O'Sullivan K. Effectiveness of therapeutic exercise on forward head posture: a systematic review and meta-analysis. Journal of manipulative and physiological therapeutics, 2018 Jul 1; 41(6): 530-9.
22. Do YL, Nam CW, Sung YB, Kim K, Lee HY. The effect of a corrective exercise program on forward head posture and rounded shoulder posture. *J Phys Ther Sci*, 2017; 29(10): 1824–1827.
23. Camargo PR, Alburquerque-Sendín F, Avila MA, Haik MN, Vieira A, Salvini TF. Effects of stretching and strengthening exercises, focusing on the scapula, in patients with shoulder impingement syndrome: a randomized controlled trial. *J Rehabil Med*, 2015; 47(5): 427– 432.