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Effect of myofascial release on spinal adjustment in treatment of postural scoliosis: A randomized controlled clinical trial

Wpływ rozluźnienia mięśniowo-powięziowego na korektę kręgosłupa w leczeniu skoliozy posturalnej: randomizowane, kontrolowane badanie kliniczne

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Abstract

Background. Scoliosis is lateral curvature of the normal vertical line of the spine. Myofascial pain syndrome is a chronic regional pain, caused by trigger points in skeletal muscle.
Purpose. To assess the effect of myofascial release (MFR) on spinal adjustment in treatment of postural scoliosis.
Methods. A randomized controlled clinical trial. Thirty Egyptian female students were assigned randomly in to two groups. The control group received therapeutic exercises (stretching and strengthening exercises of the back) for 6 weeks (n = 15), and the experimental group received MFR and the same exercises for 6 weeks (n = 15). The following parameters including pain level assessed by visual analog scale (VAS), functional disability assessed by Oswestry disability index (ODI), lumbar range of motion (flexion, extension, and side bending to the convex side) and Cobb's angle assessed by X-ray were measured before and after 6 weeks of treatment.
Results. The results showed significant improvements in pain level, functional disability, and lumbar range of motion in all directions in the study group compared with those in the control group ($p < 0.05$); however, the Cobb's angle showed no significant differences between the two groups after treatment ($p < 0.05$).
Conclusion. Myofascial release is an effective method for spinal adjustment in treatment of postural scoliosis.

Keywords

myofascial release, spinal adjustment, postural scoliosis

Streszczenie

Informacje wprowadzające. Skolioza to boczne skrzywienie normalnej pionowej linii kręgosłupa. Zespół bólu mięśniowo-powięziowego to przewlekły ból miejscowy, wywoływany przez punkty spustowe w mięśniach szkieletowych.
Cel. Ocena wpływu rozluźnienia mięśniowo-powięziowego (MFR) na korektę kręgosłupa w leczeniu skoliozy posturalnej.
Metody. Randomizowane kontrolowane badanie kliniczne. Trzydzieści egipskich studentek zostało losowo przydzielonych do dwóch grup. Grupa kontrolna wykonywała ćwiczenia terapeutyczne (ćwiczenia rozciągające i wzmacniające plecy) przez 6 tygodni (n = 15), a grupa badana była poddawana MFR i wykonywała te same ćwiczenia przez 6 tygodni (n = 15). Następujące parametry, w tym poziom bólu oceniany za pomocą wizualnej skali analogowej (VAS), niepełnosprawność funkcjonalna oceniana za pomocą wskaźnika niepełnosprawności Oswestry (ODI), zakres ruchu lędźwiowego (zgięcie, wyprost i zgięcie boczne do strony wypukłej) oraz kąt Cobba oceniany w badaniu rentgenowskim mierzono przed i po 6 tygodniach leczenia.
Wyniki. Wyniki wykazały znaczną poprawę w zakresie poziomu bólu, niepełnosprawności funkcjonalnej i ruchu lędźwiowego we wszystkich kierunkach w grupie badanej w porównaniu z grupą kontrolną ($p < 0,05$); jednak kąt Cobba nie wykazał istotnych różnic między dwiema grupami po leczeniu ($p > 0,05$).
Wniosek. Rozluźnianie mięśniowo-powięziowe jest skuteczną metodą korekty kręgosłupa w leczeniu skoliozy posturalnej.

Słowa kluczowe

rozluźnianie mięśniowo-powięziowe, korekta kręgosłupa, skolioza posturalna

Introduction

Scoliosis defined by research society (SRS) as lateral curvature of the normal vertical line of the spine [1]. The prevalence is higher in girls than in boys because of the growth spurt before skeletal maturity and anterior spinal overgrowth at girls [2].

Clinically, scoliosis is classified as structural or functional depending on whether the deviation with bending is fixed. Functional scoliosis is characterized by a temporary curve without rotation in the spine, while structural scoliosis is a disorder that is permeant curve associated with rotation in the spine. The most common used measure of spinal disorders is the Cobb angle, which is determined using radiographs to measure the spinal curvature in the frontal plane [3].

In USA and UK, surgery is the first line of management for patients with severe curvatures, and bracing and instructions for those with mild-to-moderate curvatures. Scoliosis-specific exercises (SSE) in mainland Europe, are used to treat patients with mild to moderate curvatures [4, 5], with or without bracing, in an attempt to decrease the need for surgical intervention [6–8]. Surgery is costly and carries high risk, so if surgery can be avoided by slowing the progression or reversing the curvature through the use of SSE, this is an optimal treatment option [5].

Spinal manipulation therapy (SMT) is commonly used in treating musculoskeletal disorders such as scoliosis. It has a significant effect on pain, flexibility, and mobility [9, 10]. Manual therapy is a skilled hand of manipulative therapy, including massage, chiropractic, osteopathy, etc., aimed to improve range of motion of the joint, modulate tissue/muscle extensibility, enhance soft tissue restriction in movement, relieve pain, and promote psychological status [11].

Myofascial pain syndrome is a chronic regional pain it caused by trigger points in skeletal muscle. Myofascial trigger point is a hyperirritable spot within a taut band of muscle that is painful on pressure, stretch, overload, or contraction of the tissue which accompanied by referred pain [12].

Diagnosis is usually based on a comprehensive physical examination and clinical presentation. This condition is caused by muscle overuse, trauma, or psychological stress [13]. Treatment includes medical intervention, including medications such as analgesic drugs and muscle relaxants, and physical therapy [14].

Myofascial release is a manual procedure that utilizes a superintend pressure in a predetermined direction to stretch the myofascial length [15]. Myofascial release is a safe application, not a costly and long-term treatment with the aim of restoring the length of the fascia, decreasing functional limitations and reducing the pain level to enhance the function of the locomotor system [16]. Myofascial therapy has numerous clinical benefits for different populations, showing an improvement in range of motion and a decrease in pain level [17, 18], and reducing restrictions or adhesions of the fascial tissue [19]. Myofascial release techniques include; structural integration, osteopathy, massage, and trigger point release [20]. Most of them are passive techniques in which the patient depends totally on the therapist. In contrast to those techniques, a special technique within myofascial release (MFR) is self-myofascial release, which is performed independently by the patient, instead of the therapist [21]. Thus, this study was designed to investigate the effect of MFR on spinal adjustment in treatment of postural scoliosis.

Subjects and methods

Study Design

The study was designed as a randomized controlled clinical trial. The study was approved by the ethical committee of Faculty of Physical Therapy, Cairo University, Egypt. The Helsinki Declaration Criteria for human research were followed in this study. It was conducted between April 2018 and March 2022.

Participants

Thirty Egyptian female students diagnosed clinically with non-structural scoliosis with myofascial pain syndrome (according to location of trigger points at back muscles and aggravation of pain with back activities) were recruited from the outpatient clinic of the Faculty of Physical Therapy, Cairo University, Egypt. Females had scoliosis with at least three muscles affected by trigger points, habitual scoliosis (Cobb's angle ranged between 15–30°), C shape curve at thoracic region, and a history of back pain caused by scoliosis. Their age ranged from 18 to 25 years. They were excluded if had history of previous back surgery, structural idiopathic scoliosis, leg length discrepancy, or any other disorder in the vertebral column (disc prolapsed, or fracture).

Randomization

Each participant received information on the nature and importance of this study, and her freedom to withdraw from the research anytime as well as the confidentiality of any collected data. Using a computer-based randomization method, participants were randomly divided into two equal groups (control group and study group). Following randomization, no volunteers dropped out of the trial (figure 1).

Interventions

The control group included 15 participants receiving therapeutic exercises (stretching and strengthening exercises of the back) for six weeks. The control group included 15 participants receiving myofascial release and the same exercises for six weeks.

Therapeutic exercises

Both control and study groups received therapeutic exercises, in the form of stretching and strengthening exercises of the back, three sessions per week, for successive six weeks. To stretch tight structures of the curve on the concave side, the apex of the curve was shifted to the midline and passively over corrected the curve for 30 seconds of stretching, 3 repetitions with the participant prone, kneel-sitting, and side lying on the convex side. To elongate the trunk, the participant was standing, with her feet 6 inches from the wall. The arms were stretched overhead, keeping hands on the wall and heels on the floor, and hanging by the hands from stall bars so feet were off

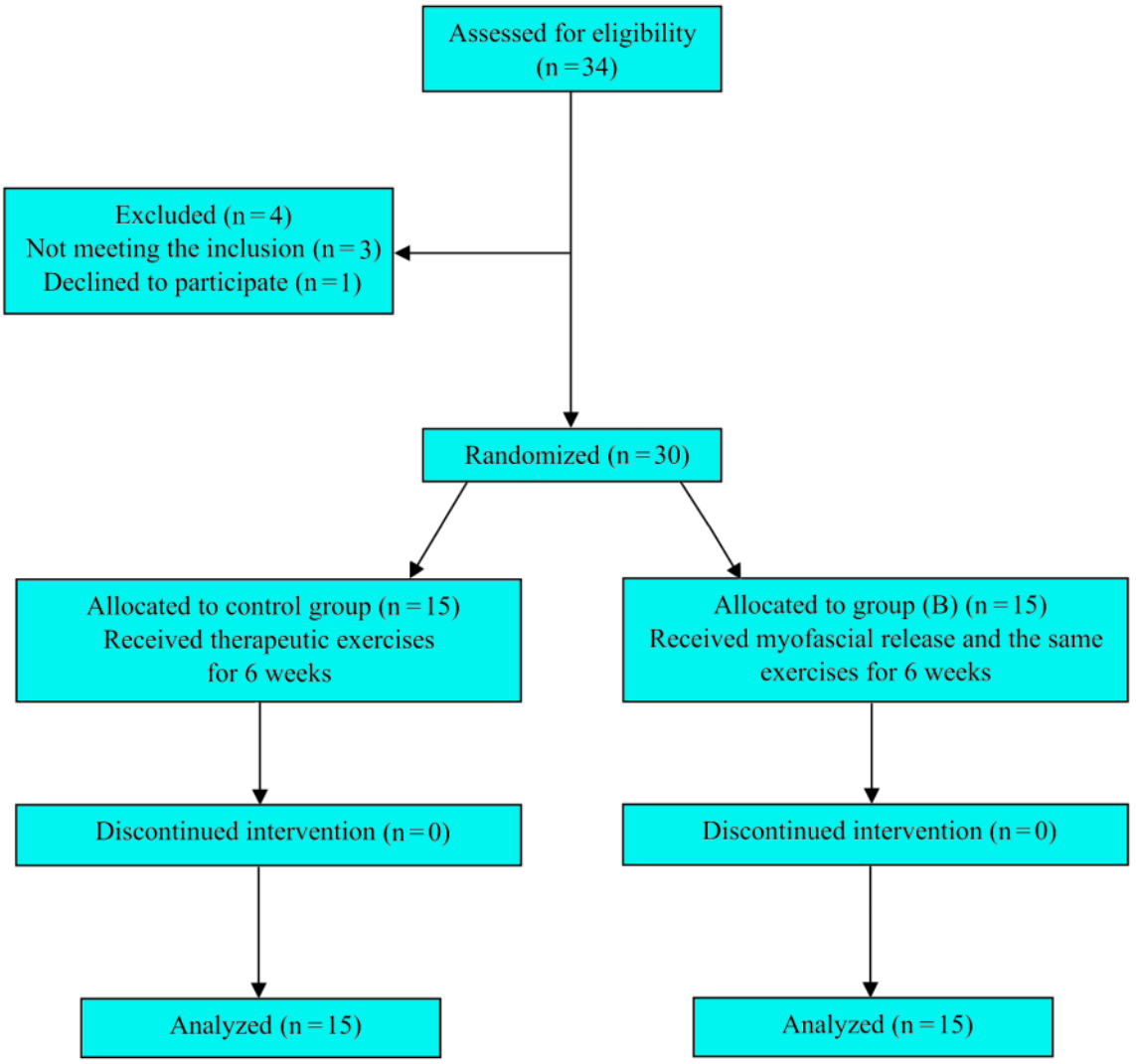

Figure 1. Participants' flow chart

the floor. To strengthen back and trunk musculature on the convex side of the curve, the participant's position was side-lying on the concave side of the curve. The participant was stabilized at the iliac crest by the therapist. With top arm down to the knee, the participant rotated the trunk, lifted up the head and shoulders (lateral trunk bending), and lowered the arm across the chest. The difficulty of the above-mentioned exercise was progressed by having the participant clasp hands behind the head and then laterally flex the trunk against gravity. The exercise lasted for 6 to 10 seconds, for 10 repetitions [22].

Myofascial release (MFR)

Each participant in the study group received MFR for iliocostalis thoracis, iliocostalis lumborum, quadratus lumborum, iliopsoas and rectus abdominis muscles in the concavity side, 2 sessions per week, for 6 weeks [23]. First of all, the trigger points were detected by palpating a taut band within the muscle belly at the concave side, which was tender and referred pain to characteristic regions. The steps of MFR included progressive pressure technique, myofascial stretching exercise, and home exercise program. For progressive pressure technique application, a sustained gentle pressure for 90 seconds to 120 seconds was applied using the thumb or four fingers, moving inward toward the center of the trigger point. Once tissue resistance was felt, the therapist stopped and waited until resistance dissipated (melting away). This cycle was repeated several times. Ultimately, either further relaxation of the tissue was felt or no new benefits were achieved. For effective trigger point therapy, it was followed by myofascial stretching exercises to maintain the degree of relaxation and bring the muscle to an ergonomically correct state. The stretch was very slow in rate and exceeded 30 seconds. Deep relaxation was very important for effectiveness of the technique through deep breathing. Moreover, a myofascial stretch (MFS) program for iliocostalis thoracis, iliocostalis lumborum, quadratus lumborum, iliopsoas and rectus abdominis muscles was given to the participant as a home exercise program and repeated four to six times daily with two repetitions each time. For iliocostalis thoracis and iliocostalis lumborum, the MFS position was long sitting with trunk flexion, reaching with the arm to the opposite side while therapist facilitated stretching. For quadratus lumborum MFS, the participant was in semi prone position with the leg in extension and adduction or in semi supine with the

leg in flexion and adduction. The therapist supported the area of the lower thoracic cage and iliac crest with both hands while spreading the hands apart. For iliopsoas MFS, the participant was in supine position. The affected leg was suspended off the table while the unaffected leg with knee flexed stabilized the pelvis. The therapist gently facilitated hip extension. An alternative position for iliopsoas MFS was a half-kneeling position. The knee of the affected side was on a pillow. The arm was flexed to 180 degrees. The therapist was standing behind the participant and assisted forward movement to facilitate further stretch of the iliopsoas by extending the hip and slightly extending the lumbar spine. For rectus abdominis MFS, extension of the trunk was performed using a therapeutic exercise ball or a pillow. While the therapist facilitates stretching. Based on the previous evidence that MFR developed an improvement within 3 sessions, the exercise started at the 4th session.

Outcome measures

Pain level assessment

Pain intensity was evaluated for both control and study groups at baseline and post-treatment using the visual analogue scale. It is presented as a 10-cm line ranging between '0' (no pain) and '10' (worst pain). Participants were instructed to place a mark on the line (measured in centimeters) [24].

Functional disability assessment

Functional disability of each participant in the two groups was assessed before and after therapy by Oswestry disability index (ODI). It is a validated, 10-point questionnaire. It is called the 'gold standard' [25], for measuring disability and quality of life disorders for adults with low back pain, The ODI can be used to measure both chronic and acute conditions. It has high test reliability [26] and takes a short time to complete. The 10 ODI criteria for assessing participants were pain intensity, ease of personal care, lifting, working, sitting, standing, sleeping, sex life, social life and travelling. Each point of the 10 questions was scored from 0 to 5, giving a maximum score of 50. The total score was then converted into a percentage by multiplying it by 2. Scores indicated the level of severity, with 0–20, minimal disability; 21–40, moderate disability; 41–60, severe disability; 61–80, crippling back pain; 81–100, these patients were bedbound or had an exaggerating of their symptoms [27, 28].

Range of motion assessment

The lumbar range of motion was assessed in the directions of flexion, extension, and side bending to the convex side for all participants in the two groups before and after therapy. The range of motion of lumbar flexion and extension was measured through Modified-Modified Schober test, which is one of the common methods for measuring lumbar range of motion because of its simplicity. Along with these qualities, it gives accurate measurements, can be used everywhere and materials used are affordable and available [29]. It's reliable, valid and convenient for both therapist and patient as it does not need any fixation and landmarks are easy to palpate. An inferior mark was put at a midline point on posterior superior iliac spine (PSIS). Then, the final mark (superior mark) was marked on the lumbar spine 15 cm above the midline PSIS mark (inferior mark) [30]. The therapist aligned the tape measure between two marks with zero at inferior mark and 15cm at superior mark. The measurement tape was kept firmly against the patient skin while the patients were asked to bend forward with the instruction "Bend forward as far as possible you can while keeping the knee straight". The measuring tape was fixed against the patients back during the movement. The same procedures of the flexion technique were used for assessing lumbar extension. While holding the tape measure placed firmly against the patient's skin, the therapist gave instruction: "Place the palms of your hands on your buttock and bend backward as far as possible you can". When the patients bent backward into full lumbar extension, the new distance between the superior and inferior skin marks was measured using the tape and the marks were used to indicate the range of motion of lumbar extension [31].

For measuring the range of motion of side bending to the convex side, fingertip-to-floor distance (FFD) test was used to measure it through measuring the distance from the tip of the index finger to the floor at maximal lateral flexion. FFD has high levels of intra-rater reliability (ICC = 0.84–0.86) and concurrent validity (r = 0.84–0.99). So, it is reproducible and a valid measure of lateral flexion range of motion. Patients stood barefoot with hip and feet distance apart, besides the contralateral greater trochanter and base of fifth metatarsal contact the wall. The patient's arm adjacent to the wall was abducted and the elbow comfortably flexed, so the patient did not push away from the wall. Then, the patient was instructed to 'move your fingers down the outside of your leg as far as possible while maintaining to look straight ahead'. The patient-maintained touch the wall with both feet flat on the floor at all times. Then, the distance from the tip of the index finger to the floor was measured by the tape. The patient was instructed to flex laterally the trunk without flexion or extension of trunk or hip. Consecutive times and the mean value for each side were considered as the lateral flexion range of motion [32].

Cobb's angle measurement

The Cobb's angle was assessed for each participant in the two groups before and after treatment. For the Cobb's angle measurement, posterior and lateral view, by loaded X-ray was measured from standing position, to take the view from the occiput to the sacrum and to determine the location and severity of curve [33].

Statistical analysis

All statistical measures were performed through the Statistical Package for Social Studies (SPSS version 18 for windows). Prior to final analysis, data were screened for normality assumption, and presence of extreme scores. This was done as a pre-requisite for parametric calculation of the analysis of difference and analysis of relationship measures. Results were expressed as mean ± standard deviation (SD). To determine similarity between the groups at baseline, subjects' age, body mass, and height were compared using independent t tests. A 2x2 mixed design MANOVA was performed to evaluate the effect of time (before versus after) and treatment (between gro-

ups), as well as the interaction between time and treatment on mean values of pain level, functional disability, lumbar flexion, lumbar extension, bending to convex side, and Cobb's angle. For subsequent multiple comparisons, post hoc tests with the Bonferroni correction were used. p value ≤ 0.05 was considered significant for all statistical tests.

Results

There were statistically non-significant differences (p>0.05) between subjects in both groups concerning age, body mass, and height (Table 1). There were also no statistically significant differences between groups for any outcome variables at baseline (pre-intervention) (Table 2).

Regarding within-group comparison, the pain level, functional disability, and bending to convex side showed statistically significant reductions (p < 0.05) within both groups, the range of motion of lumbar flexion and extension revealed statistically significant increases (p < 0.05) within both groups, and the Cobb's angle exhibited statistically non-significant differences within both groups (p < 0.05) (Table 2, Figure 2).

Regarding between-group comparison post-treatment, there were significant reductions in pain level, functional disability, and bending to convex side (p < 0.05), and significant increases in range of motion of lumbar flexion and extension (p < 0.05) in favor of the study group. However, there was no significant difference in Cobb's angle between both groups (p < 0.05) (Table 2).

Table 1. Physical characteristics of patients in both groups

	Group (A) (n = 15)	Group (B) (n = 15)	P value
Age [years]	25.4 ± 4.8	26.5 ± 6.6	0.179^{NS}
Body mass [kg]	75.3 ± 7.8	73.4 ± 5.96	0.303^{NS}
Height [cm]	166.7 ± 4.3	167.7 ± 6.85	0.639^{NS}

NS, p > 0.05 = non-significant, p = probability

Table 2. Pain level, functional disability, lumbar range of motion, and Cobb's angle for both groups

		Control group (n = 15)	Study group (n = 15)	p value*
Pain level [cm]	Pre-treatment	6.46 ± 1.30	5.80 ± 1.56	0.14^{NS}
	Post-treatment	5.73 ± 1.38	1.21 ± 0.86	0.001^{S}
	p value**	0.006^{S}	0.001^{S}	
Function disability [%]	Pre-treatment	30.73 ± 8.3	28.73 ± 8.59	0.49^{NS}
	Post-treatment	26.60 ± 7.03	8.8 ± 3.38	0.001^{S}
	p value**	0.002^{S}	0.001^{S}	
Lumbar flexion [cm]	Pre-treatment	7.73 ± 3.53	5.40 ± 3.94	0.60^{NS}
	Post-treatment	9 ± 2.80	13.4 ± 2.35	0.001^{S}
	p value**	0.008^{S}	0.001^{S}	
Lumbar extension [cm]	Pre-treatment	5.73 ± 1.94	5.86 ± 2.03	0.83^{NS}
	Post-treatment	6.26 ± 1.57	8.66 ± 2.05	0.001^{S}
	p value**	0.015 S	0.001^{S}	
Bending to convex side [cm]	Pre-treatment	41.46 ± 4.18	41.13 ± 4.59	0.07^{NS}
	Post-treatment	40.26 ± 4.21	37.66 ± 5.09	0.008^{S}
	p value**	0.018^{S}	0.001^{S}	
Cobb's angle [°]	Pre-treatment	19 ± 4.22	17.8 ± 3.94	0.4^{1NS}
	Post-treatment	18 ± 4	16.7 ± 2.84	0.40^{NS}
	p value**	0.43^{NS}	0.42^{NS}	

** Between-group comparison; ** Within-group comparison of the results pre- and post-treatment*
NS, p < 0.05 = non-significant, S, p<0.05 = significant, p = probability.

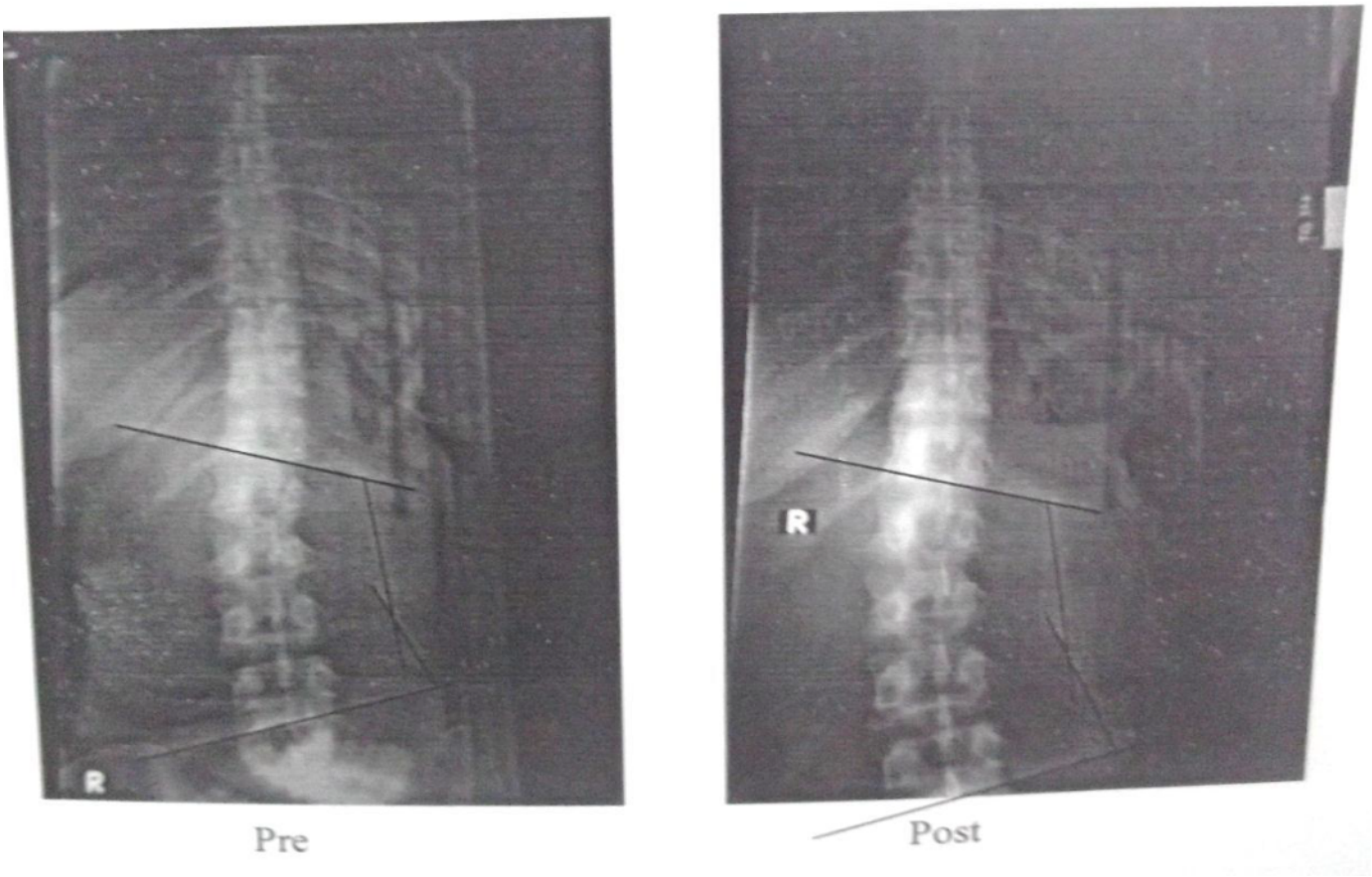

Figure 2. Case study before and after treatment

Discussion

Functional scoliosis is one of the most common causes of inappropriate back function. Myofascial release reported to be effective in the treatment of patients with postural scoliosis. This study was conducted to investigate the effectiveness of myofascial release (MFR) in the form of pressure release, stretching, and home program, two sessions per week, for successive 6 weeks, on improvement of pain, functional disability, back range of motion and Cobb's angle in postural scoliotic patients.

Thirty Egyptian female students who suffered from functional scoliosis, with Cobb's angle (15° to 30°), ranging from 18 to 25 years, were categorized randomly into two groups. Subjects in the control group (n = 15) received therapeutic exercises (stretching and strengthening exercises of the back), and subjects in the experimental group (n = 15) received MFR and the same exercises. Pain severity, functional disability, lumbar range of motion (flexion, extension, and side bending), and Cobb's angle were measured before and after 6 weeks of treatment.

All patients had symptoms of back pain in both groups. This agrees with Balne et al. [1] who reviewed that scoliosis causes changes in spinal alignment, mobility, flexibility recruitment of para spinal muscles and postural reflex mechanism.

Concerning pain level and functional disability, they showed statistically significant reductions within both groups. Also, they showed statistically significant reductions in favor of the study group when comparing the two groups post-treatment.

These results come in agreement with a previous study, which reported the effectiveness of manual therapy (myofascial release (MFR)) for scoliosis patients in improving centered symptoms (aesthetics, pain, disability, quality of life, etc), and secondarily in radiographic measurement (Cobb's angle, vertebral rotation, etc) according to the recommendation of the international Society on Scoliosis Orthopedic and Rehabilitation Treatment (SOSORT) and SRS [34]. Additionally, Boff et al. [35] found that the only significant difference was the general effect on disability, in which the spinal manipulation plus MFR had a remarkable improvement of −5 points compared to the spinal manipulation alone. Moreover, Ajimsha et al. [36] demonstrated that myofascial release plus segmental exercises were more effective compared to a myofascial release-sham intervention on the improvement of pain and disability.

The valuable effect of MFR on reducing pain and functional disability could be attributed to the role of MFR techniques in controlling inflammation and increasing blood flow, which could be directly relieve pain and improve the flexibility of myofascial tissue [37].

Concerning lumbar range of motion, it demonstrated statistically significant improvements in all directions within both groups. Also, comparing both groups after treatment showed statistically significant improvements in all directions of lumbar range of motion in favor of the study group.

These findings were consistent with a previous study that indicated pain reduction and increased lumbar flexion and pelvic inclination angle following MFR techniques. As a result, it co-

uld be concluded that the MFR techniques led to improved posture and increased the lumbar and pelvic range of motion by improving the shortness of lumbar fascial tissue. The study results also showed that physiotherapy treatment could reduce patients' pain and a little improve the range of motion of lumbar flexion, but does not affect the pelvic inclination angle. In contrast, physiotherapy treatment has few therapeutic effects than MFR techniques on patients with chronic non-specific low back pain [37].

Concerning Cobb's angle, it exhibited statistically non-significant differences within both groups. Also, there was no significant difference in Cobb's angle between both groups after treatment.

These results come in agreement with Thompson et al. [38], who present that the effect of bracing compared with SSE is unclear because of very-low-quality evidence with conflicting outcomes. In another study, rate of progression was reduced. Pain levels decrease along with improvements in flexibility and mobility with exercise program. Results of this study show scope for consideration of exercise program to improve pain, spinal mobility, flexibility along with a Cobb's angle improvement in adolescent and adult idiopathic structural scoliosis [1].

Schreiber et al. [39] found that there were important changes in the Cobb's angle readings, which is the most important indication of scoliosis diagnosis, in all three groups compared to that before the Schroth Rehabilitation Exercise (SRE) intervention. The most significant change particularly, in the moderate scoliosis or higher group with a Cobb's angle between 30° and 39°.

The limitations of the current study include its short period and the lack of mechanisms underlying its results. Therefore, longitudinal and follow-up studies are needed to investigate the long-term effect of MFR on spinal adjustment in treatment of postural scoliosis, with investigating the underling mechanisms.

Conclusion

On the basis of the present date, it is possible to conclude that initiating myofascial release is effective for spinal adjustment in the treatment of postural scoliosis.

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Piśmiennictwo/ References

1. Balne NK, Jabeen SA, Mathukumalli N. Efficacy of Physiotherapy on Spinal Mobility Parameters and Pain in Persons with Adolescent and Adult Idiopathic Structural Scoliosis. Indian Journal of Physiotherapy and Occupational Therapy. 2021;15(4):179–187.
2. Burwell RG. Aetiology of idiopathic scoliosis: current concepts. Pediatr Rehabil. 2003;6(3-4):137-170.
3. Hawes MC, O'brien JP. The transformation of spinal curvature into spinal deformity: pathological processes and implications for treatment. Scoliosis. 2006;1(1):3.
4. Lenssinck ML, Frijlink AC, Berger MY, Bierman-Zeinstra SM, Verkerk K, Verhagen AP. Effect of bracing and other conservative interventions in the treatment of idiopathic scoliosis in adolescents: a systematic review of clinical trials. Phys Ther. 2005;85(12):1329–1339.
5. Weiss HR, Goodall D. Rate of complications in scoliosis surgery - a systematic review of the Pub Med literature. Scoliosis. 2008;3:9.
6. Bettany-Saltikov J, Parent E, Romano M, Villagrasa M, Negrini S. Physiotherapeutic scoliosis-specific exercises for adolescents with idiopathic scoliosis. Eur J Phys Rehabil Med. 2014;50(1):111-121.
7. Negrini S, Minozzi S, Bettany-Saltikov J, Zaina F, Chockalingam N, Grivas TB. Cochrane Review. Braces for idiopathic scoliosis in adolescents. Evid Based Child Health. 2010;5:1681–1720.
8. Rigo M, Reiter Ch, Weiss HR. Effect of conservative management on the prevalence of surgery in patients with adolescent idiopathic scoliosis. Pediatr Rehabil. 2003;6(3-4):209–214.
9. Paige NM, Miake-Lye IM, Booth MS, Beroes JM, Mardian AS, Dougherty P. Association of spinal manipulative therapy with clinical benefit and harm for acute low back pain: systematic review and meta-analysis. JAMA. 2017;317(14):1451–1460.
10. Millan M, Leboeuf-Yde C, Budgell B, Descarreaux M, Amorim MA. The effect of spinal manipulative therapy on spinal range of motion: a systematic literature review. Chiropr Man Therap. 2012;20(1):23.
11. Physiopedia - universal access to physiotherapy and physical therapy knowledge [Internet]. Physio-pedia.com. Available from: https://www.physio-pedia.com/index.php?title1/4Manual_Therapy&ol.
12. Sharan D. Myofascial pain syndrome: Diagnosis and management. Indian Journal of Rheumatology 2014;9: S22-S25.
13. Kanhachon W, Boonprakob Y. Modified-Active Release Therapy in Patients with Scapulocostal Syndrome and Masticatory Myofascial Pain: A Stratified-Randomized Controlled Trial. Int J Environ Res Public Health. 2021;18(16):8533.

14. Desai MJ, Saini V, Saini S. Myofascial pain syndrome: A treatment review. Pain Ther. 2013;2(1):21–36.
15. Bhat P V, Patel VD, Eapen C, Shenoy M, Milanese S. Myofascial release versus Mulligan sustained natural apophyseal glides' immediate and short-term effects on pain, function, and mobility in non-specific low back pain. PeerJ. 2021;9:e10706.
16. Pilat A. Myofascial induction approaches. In Fascia: The Tensional Network of the Human Body. The Science and Clinical Applications in Manual and Movement Therapy. London, UK: Churchill Livingstone; 2011.
17. Rodríguez-Huguet M, Gil-Salú JL, Rodríguez-Huguet P, Cabrera-Afonso JR, Lomas-Vega R. Effects of Myofascial Release on Pressure Pain Thresholds in Patients with Neck Pain: A Single-Blind Randomized Controlled Trial. Am J Phys Med Rehabil. 2018;97(1):16–22.
18. Ceca D, Elvira L, Guzmán JF, Pablos A. Benefits of a self-myofascial release program on health-related quality of life in people with fibromyalgia: A randomized controlled trial. J Sports Med Phys Fit. 2017; 57(7-8):993-1002.
19. Barnes MF. The basic science of myofascial release: Morphologic change in connective tissue. J Bodyw Mov Ther. 1997;1(4):231–238.
20. Simmonds N, Miller P, Gemmell H. A theoretical framework for the role of fascia in manual therapy. J Bodyw Mov Ther. 2012;16(1):83–93.
21. Kalichman L, Ben David C. Effect of self-myofascial release on myofascial pain, muscle flexibility, and strength: A narrative review. J Bodyw Mov Ther. 2017;21(2):446–451.
22. Ebnezar J. Essentials of orthopedics for physiotherapists. New Delhi, India: Jaypee Brothers Medical; 2017.
23. Kostopoulos D, Rizopoulos K. The manual of Trigger Point and Myofascial Therapy. Vol. 10. Astoria, New York: Slack; 2001.
24. Menezes Rde M, Andrade MV, Noronha KV, Kind P. EQ-5D-3L as a health measure of Brazilian adult population. Qual Life Res. 2015;24(11):2761–2776.
25. Fairbank JC, Pynsent PB. The Oswestry Disability Index. Spine (Phila Pa 1976). 1976; 25(22):2940–2952.
26. Irmak R, Baltaci G, Ergun N. Long term test-retest reliability of Oswestry Disability Index in male office workers. Work. 2015;53(3):639–642.
27. Yakut E, Düger T, Oksüz C, Yörükan S, Ureten K, Turan D, Frat T, Kiraz S, Krd N, Kayhan H, Yakut Y, Güler C. Validation of the Turkish version of the Oswestry Disability Index for patients with low back pain. Spine (Phila Pa 1976). 2004;29(5):581–585.
28. Vigatto R, Alexandre NM, Correa Filho HR. Development of a Brazilian Portuguese version of the Oswestry Disability Index: cross-cultural adaptation, reliability, and validity. Spine (Phila Pa 1976). 2007;32(4):481–486.
29. Battié M C, Bigos S J, Sheehy A. Spinal flexibility and individual factors that influence it. PhysTher. 1987;67(5):653–658.
30. Norkin CC, White DJ. Measurement of joint motion - a guide to goniometry. Philadelphia: F.A Davis Company; 2004.
31. Williams R, Binkley J, Bloch R, Goldsmith CH, Minuk T. Reliability of the Modified-Modified Schober and Double Inclinometer methods for measuring lumbar flexion and extension. Phys Ther. 1993;73(1):26–37.
32. Hecimovich MD, Hebert JJ. Reliability and concurrent validity of an alternative method of lateral lumbar range of motion in athletes. South African Journal of Sports Medicine. 2016;28(1):23–26.
33. Kisner C, Colby LA. Therapeutic exercise: foundations and techniques. Philadelphia: FA Davis Company; 2002.
34. Huang Q, Zhang L, Li Z, Kong L. Manual therapy for idiopathic scoliosis: A protocol for systematic review and meta-analysis. Medicine. 2020;99(34):e21782.
35. Boff TA, Pasinato F, Ben ÂJ, Bosmans JE, van Tulder M, Carregaro RL. Effectiveness of spinal manipulation and myofascial release compared with spinal manipulation alone on health-related outcomes in individuals with non-specific low back pain: randomized controlled trial. Physiotherapy. 2020;107:71-80.
36. Ajimsha MS, Daniel B, Chithra S. Effectiveness of myofascial release in the management of chronic low back pain in nursing professionals. J Bodyw Mov Ther. 2014;18(2):273–281.
37. Tamartash H, Bahrpeyma F. Evaluation of Lumbar Myofascial Release Effects on Lumbar Flexion Angle and Pelvic Inclination Angle in Patients with Non-Specific Low Back Pain. Int J Ther Massage Bodywork. 2022;15(1):15–22.
38. Thompson JY, Williamson EM, Williams MA, Heine PJ, Lamb SE; ACTIvATeS Study Group. Effectiveness of scoliosis-specific exercises for adolescent idiopathic scoliosis compared with other non-surgical interventions: a systematic review and meta-analysis. Physiotherapy. 2019;105(2):214–234.
39. Schreiber S, Parent EC, Khodayari Moez E, Hedden DM, Hill DL, Moreau M, Lou E, Watkins EM, Southon SC. Schroth Physiotherapeutic Scoliosis-Specific Exercises Added to the Standard of Care Lead to Better Cobb Angle Outcomes in Adolescents with Idiopathic Scoliosis - an Assessor and Statistician Blinded Randomized Controlled Trial. PLoS One. 2016;11(12):e0168746.