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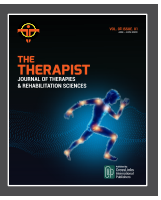

Original Article

Effects of Instrument-Assisted Compressive Versus Decompressive Myofascial Release in Patients with Non-Specific Low Back Pain

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ABSTRACT

Non-specific low back pain, a common condition, affects vast majority of the population worldwide and can be treated with soft tissue mobilization either with compression or decompression. **Objective:** To compare the effects of instrument-assisted compressive versus decompressive myofascial release on pain intensity, lumbar range of motion, and disability in non-specific low back pain. **Methods:** This quasi-experimental study was conducted at Laeeque Rafiq Hospital from February 2023 to April 2023. Two groups were included: one received instrument-assisted compressive myofascial release (Ergon tool), and the other received decompressive myofascial release with dry cupping. The study followed the patients for three weeks, collecting measurements of pain intensity, lumbar flexion and extension range of motion (ROM), and disability scores of low back pain. Data analysis were performed using SPSS 21.0. **Results:** There were a total of 44 patients. 23 patients were assigned to the compressive myofascial release technique group and 21 patients to the decompressive myofascial release group. Pain severity and disability score in the decompressive myofascial release group reduced significantly compared to the compressive myofascial release group at the end of the third week and first week respectively (p-value=0.02 and p-value=0.05 respectively). Lumbar flexion and extension ROM improved significantly in the compressive release group as compared to the decompressive release group after 1st and 2nd week respectively (p-value=0.01 and p-value=0.04 respectively). **Conclusions:** Decompressive myofascial release reduces low back pain and disability, while compressive myofascial release improves lumbar range of motion.

INTRODUCTION

Non-Specific Low back pain (LBP), a common condition seen in the general population causes medical, social, and economic problems worldwide, affecting more than 50% of adults in their lives [1, 2]. The lifetime prevalence of non-specific low back pain is estimated to range from 60% to 70% in developed nations [1, 3]. The use of manual therapy techniques to treat low back pain has grown in popularity over the years. Myofascial release (MFR) is one common type of manual therapy that targets muscles and the fascia. Despite its origins in the 1940s, the term "myofascial release" was first used in 1981 in a manual called "Myofascial Release" conducted at Michigan State University [4, 5]. The two most common techniques for mobilizing fascia and muscle (myofascial mobilization or release) are decompressive and compressive myofascial release. [6, 7]. Myofascial decompression (MFD) is a negative pressure

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soft tissue mobilization technique that uses suction to mobilize skin, muscles and fascia. This is usually accomplished with the aid of suction cups. This helps to mobilize the muscles and the fascia. The most commonly employed technique for decompressive myofascial release is dry cupping [8, 9]. Contrary to that, positive pressure can also be applied to mobilize myofascia, with the help of specially designed instruments (e.g. Ergon's tool) [10]. After applying pressure, the instrument is moved in several directions, according to the targeted area and the myofascial is mobilized or released. This technique is also known as instrument-assisted soft tissue mobilization (IASTM) or augmented soft tissue mobilization (ASTM) [11, 12]. The efficacy of both decompressive (dry cupping) and compressive myofascial release (IASTM) on low back pain have been evaluated by previous studies [13-16]. Dry cupping was found to be more efficient than sham cupping at reducing pain and functional disability, according to a 2021 study that examined its effects on persistent nonspecific low back pain [14]. The effectiveness of cupping therapy and instrument-assisted soft tissue mobilization technique in treating active myofascial trigger points (MTrPs) in the low-back region of amateur football players was compared in a randomised controlled trial. When compared to cupping, the IASTM technique had a significantly greater effect on pain reduction during MtrP compression. [17]. A 2022 study conducted in India to determine whether or not a single session of cupping and instrument-assisted soft tissue mobilization (IASTM) therapy would be sufficient to temporarily reduce pain intensity and functional disability in patients with nonspecific low back pain. The patients improved significantly in terms of pain severity and disability [18]. A randomized pilot study conducted on 24 patients with trigger points and nonspecific neck pain concluded that dry cupping has beneficial effects in improving pain in the patients [19]. The aim of our study was to compare the effects of compressive (IASTM) and decompressive (dry cupping) myofascial release technique in non-specific low back pain patients and find out if there is any difference in the effects of two techniques.

METHODS

It was a quasi-experimental study conducted at Laeeque Rafiq Hospital Multan after approval. All patients were informed about the treatment protocol and informed consent was received. Patients were eligible for this study if they were 25 to 60 years old, having nonspecific LBP with pain intensity score of 4 or more in the Numeric Pain Rating Scale (NPRS). Exclusion criteria included the following: patients who had a contraindication to cupping therapy or IASTM, were undergoing physical therapy at the time, had any systemic illness that could interfere with the assessments, showed symptoms of serious spine pathology, such as fractures, inflammatory diseases, infections, or tumors, and were unwilling to participate in the study. The study duration was from February 01, 2023, to April 31, 2023. Hot-pack was applied to lower back area for 10-15 minutes to both groups. For myofascial decompression using dry cupping, patients were asked to lie prone. On each side of the paraspinal region, four to six plastic cups were applied to the skin. A mechanical device was used to partially evacuate the air from the cups. A comfortable level of negative pressure was established. The treatment took 15 minutes. The lower back region was targeted during compressive myofascial release using an Ergon tool. It also took 10-15 minutes. Sample size was calculated as follows: For detecting a true difference in means of the groups compared of 4 points on the numeric pain score, and assuming a pooled standard deviation of 5 points, the study would require a sample size of approximately 25 for each group (i.e. a total sample size of 50 with equal group sizes) to achieve a power of 80% and a level of significance of 5% (two sided) [20]. Consecutive sessions were given for first week (5 days), on alternate days for next 2 weeks (3 days per week). Patients were evaluated before the treatment, after first week, after second week and after third week of treatment. The outcome measures used were Numeric Pain Rating Scale (NPRS) for pain intensity, Oswestry Disability Index (ODI) for disability score and lumbar flexion and extension range of motion (ROM). The treatment effects of the both techniques at each interval (1st, 2nd and 3rd week of treatment) were compared using independent sample t-test. The analysis was made to compare two techniques of soft tissue mobilization and find out if there is any difference between two groups receiving different treatments. The difference between two groups at specific time interval was calculated using independent t-test whereas the difference between two groups over time was calculated by linear regression analysis. A p-value of 0.05 or less was regarded as significant. SPSS version 21.0 was used to analyze the data.

RESULTS

Fifty-five patients were assessed for eligibility. 4 patients declined to participate in the study. 26 patients were assigned to the compressive (IASTM) myofascial release group and 25 were assigned to the decompressive (dry cupping) myofascial release group. Seven patients did not come for follow-up sessions (Figure 1: CONSORT diagram). In total, data of 44 patients were analyzed (23 patients in IASTM group and 21 patients in dry cupping group). The baseline characteristics of patients taking part in this study are provided in Table 1.

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Table 1: Baseline characteristics of enrolled patients

Characteristics	Compressive myofascial release group (n=23)	Decompressive myofascial release (n=21)
Age (Mean ± SD)	38.09 ± 6.4	36.7 ± 5.6
Gender		
Male	16 (69.5%)	16 (76.2%)
Female	7 (30.5%)	5 (23.8%)
Low back pain duration		
< 1 week	8 (34.88%)	6 (28.57%)
1-2 weeks	5 (21.74%)	4 (19.05%)
2 -4 weeks	5 (21.74%)	5 (23.81%)
> 4 weeks	5 (21.74%)	6 (28.57%)

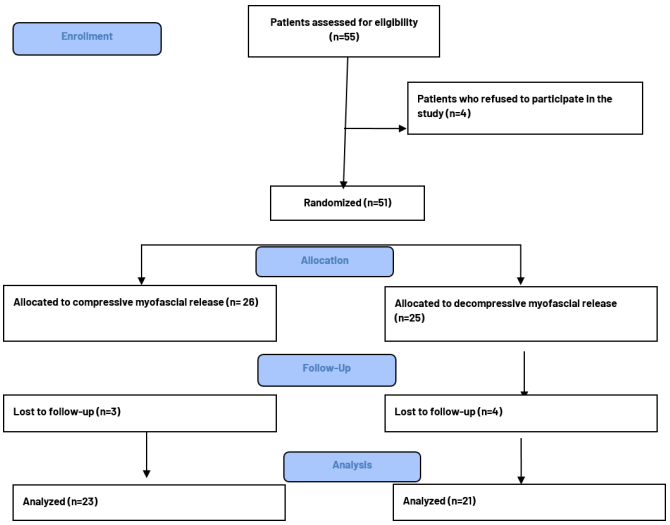

Figure 1: CONSORT flow diagram

Comparison between pain score by numeric pain rating scale data before and after follow-up sessions of 1 week, 2 weeks and 3 weeks between two groups have been provided in the Table 2. There was a statistically significant difference between two groups at the end of 3 weeks' session (p=0.02). Pain was reduced more in the decompressive myofascial release group (2.62 ± 0.9) as compared to the compressive myofascial release group (3.09 ± 1.4) at the end of three weeks. The group mean difference was 0.93 (CI 0.13-1.74). Linear regression analysis showed statistically significant difference between two groups over time (p-value=0.003)(Table 2).

Table 2: Comparison of Numeric Pain Rating Scale (NPRS) score between two groups

Parameter	Pre-intervention baseline (Mean ± SD)	One-week after intervention (Mean ± SD	Two-weeks after intervention (Mean ± SD)	Three weeks after treatment (Mean ± SD)	Group difference over time p-value*
Compressive myofascial release (n=23)	6.43 ± 0.9	4.4 ± 0.9	3.8 ± 1.3	3.09 ± 1.4	0.003
Decompressive myofascial release (n=21)	6.9 ± 1.2	4.67 ± 1.1	3.71 ± 1.2	2.62 ± 0.9	
Group mean difference change from pre-intervention baseline		0.28 (-0.20-0.77)	0.62 (-0.16-1.41)	0.93 (0.13-1.74)	
p-value#		0.24	0.11	0.02	

*Compares two groups over time, calculated by linear regression

#Compares two groups at specific intervals, calculated using independent t-test

Comparison between Oswestry Disability Index (ODI) score before and after follow-up sessions of 1 week, 2 weeks and 3 weeks between two groups are given in the Table 3. There was statistically significant difference between two groups at the end of 1st week sessions (p=0.05). The mean difference between two groups after first week of treatment 1.04 (CI -0.03-2.12). Table 3.

Table 3: Comparison of Oswestry Disability Index (ODI) score between two groups

Parameter	Pre-intervention baseline (Mean ± SD)	One-week after intervention (Mean ± SD	Two-weeks after intervention (Mean ± SD)	Three weeks after treatment (Mean ± SD)	Group difference over time p-value*
Compressive myofascial release (n=23)	28.8 ± 4.4	26.4 ± 4.5	22.8 ± 3.9	20.17 ± 4.5	0.15
Decompressive myofascial release (n=21)	33.1 ± 6.7	29.6 ± 5.8	26.2 ± 5.1	24.2 ± 5.4	
Group mean difference change from pre-intervention baseline (confidence interval)	-	1.04 (-0.03-2.12)	0.81 (-0.89-2.53)	0.19 (-1.90-2.29)	
p-value#		0.05	0.34	0.8	

*Compares two groups over time, calculated by linear regression

#Compares two groups at specific intervals, calculated using independent t-test

Lumbar flexion range of motion (ROM) data before and after follow-up sessions of 1 week, 2 weeks and 3 weeks of two groups have been provided in the Table 4. There was a statistically significant difference between two groups at the end of 1st week sessions (p=0.014). Lumbar flexion ROM was increased more in the compressive myofascial release group as compared to the decompressive myofascial release group at the end of first week. The group mean difference was 1.6 (CI -0.3-3.5). Linear regression analysis

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showed statistically significant difference between two groups over time (p-value=0.02) (Table 4).

Table 4: Comparison of Lumbar flexion range of motion between two groups

Parameter	Pre-intervention baseline (Mean ± SD)	One-week after intervention (Mean ± SD	Two-weeks after intervention (Mean ± SD)	Three weeks after treatment (Mean ± SD)	Group difference over time p-value*
Compressive myofascial release (n=23)	24.5 ± 6.8	30.7 ± 5.6	34.6 ± 5.02	38.9 ± 5.1	0.02
Decompressive myofascial release (n=21)	27.4 ± 6.9	31.9 ± 6.1	36 ± 5.2	40.2 ±4.9	
Group mean difference change from pre-intervention baseline (confidence interval)	-	1.6 (-0.3-3.5)	1.2 (-1.1-4.01)	1.3 (-1.1-4.3)	
p-value#		0.014	0.065	0.10	

*Compares two groups over time, calculated by linear regression
#Compares two groups at specific intervals, calculated using independent t-test

Lumbar extension range of motion (ROM) data before and after follow-up sessions of 1 week, 2 weeks and 3 weeks of two groups have been provided in the Table 5. There was a statistically significant difference between two groups at the end of 2nd week sessions (p=0.014). Lumbar extension ROM was increased more in the compressive myofascial release group as compared to the decompressive myofascial release group at the end of second week. The group mean difference was 0.35 (-0.38-1.09). Linear regression analysis showed statistically significant difference between two groups over time (p-value=0.008) (Table 5).

Table 5: Comparison of lumbar extension range of motion between two groups

Parameter	Pre-intervention baseline (Mean ± SD)	One-week after intervention (Mean ± SD	Two-weeks after intervention (Mean ± SD)	Three weeks after treatment (Mean ± SD)	Group difference over time p-value*
Compressive myofascial release (n=23)	4.5 ± 2.3	6.8 ± 2.2	8.4 ± 2.9	9.9 ± 2.5	0.008
Decompressive myofascial release (n=21)	4.4 ± 2.3	6.3 ± 2.3	7 ± 2.3	8.8 ± 2.1	
Group mean difference change from pre-intervention baseline (confidence interval)	-	0.35 (-0.38-1.09)	0.57 (0.05-2.35)	0.65 (-0.35-2.28)	
p-value#		0.34	0.04	0.14	

*Compares two groups over time, calculated by linear regression
#Compares two groups at specific intervals, calculated using independent t-test

DISCUSSION

Our study found out that decompressive myofascial release technique on lower back resulted in significant decrease in pain and disability score whereas compressive myofascial release technique proved beneficial in improving lumbar flexion and extension range of motion in patients with non-specific low back pain. The efficacy of both decompressive (dry cupping) and compressive myofascial release (IASTM) on low back pain have been evaluated by previous studies and systematic reviews. A 2021 study by de Melo Salemi *et al.*, showed that that dry cupping was effective in reducing pain and functional disability in low back pain patients [14]. In our study, pain was reduced more in the group that was treated with dry cupping or decompressive myofascial release technique as compared to the other group. This is comparable to what has been reported in the literature. A randomized controlled trial (RCT) that compared the effectiveness of compressive myofascial release with decompressive myofascial release concluded that compressive myofascial release had greater effect on pain and myofascial trigger points in lower back area [17]. Our study showed that compressive myofascial release technique resulted in increased lumbar and flexion range of motion. Another study by Jain *et al.*, found beneficial effects of single session of decompressive myofascial release and compressive myofascial release on pain severity and disability in patients of low back pain [18]. Our study had longer follow-up sessions and found significant reductions in pain severity, especially in the group that was treated with decompressive myofascial release technique. Another study by Lee *et al.*, that evaluated effects of compressive myofascial release using Graston technique in chronic low back pain patients found significant improvements in lumbar ROM as well as decrease in pain intensity [13]. Our study also showed similar results. However, this study only reported outcomes at the end of 4 weeks whereas we reported outcomes at three intervals. Myofascial decompression by dry cupping has also resulted in beneficial effects in conditions other than non-specific lower back pain. Dry cupping's effects on pain and function in those with plantar fasciitis were examined in one study with 29 participants. For four weeks, the patients received treatments twice a week. In the population tested, dry cupping therapy was found to significantly reduce pain and increase function [21]. Our study was reported according to the guidelines mentioned in CONSORT statement [22]. The study duration of three weeks which is longer than the previous studies published is another strength of this study. However, this study also had few limitations. First, it did not include the random sampling of patients which may have some impact on the results. Second, the sample size was small and it would be difficult to generalize the results on a larger population. The reason of sample size being small can be linked to longer follow-up duration of this

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study. Our study also did not shed light on within group differences and we only reported differences between the groups. This study also had a smaller number of females (27%) and majority were males. Future researches should focus on large sample size, with randomization of patients and inclusion of equal or nearly equal number of male and female patients.

CONCLUSIONS

Both compressive and myofascial release techniques are beneficial for patients with non-specific low back pain; Decompressive myofascial release with dry cupping resulted in reduction in pain severity and disability whereas compressive myofascial release improve lumbar flexion and extension range of motion.

Authors Contribution

Conceptualization: SS, ZBR
Methodology: SS, RMA
Formal analysis: SS, SM, MJ, TG
Writing-review and editing: SS, SM, RMA, UF, AI, MJ, ZBR, TG

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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REFERENCES

[1] Maher C, Underwood M, Buchbinder R. Non-specific low back pain. The Lancet. 2017 Feb; 389(10070) :736-47. doi: 10.1016/S0140-6736(16)30970-9.

[2] Chenot JF, Greitemann B, Kladny B, Petzke F, Pfingsten M, Schorr SG. Non-specific low back pain. Deutsches Ärzteblatt International. 2017 Dec; 114(51-52): 883. doi: 10.3238/arztebl.2017.0883.

[3] Urits I, Burshtein A, Sharma M, Testa L, Gold PA, Orhurhu V, *et al*. Low Back Pain, a Comprehensive Review: Pathophysiology, Diagnosis, and Treatment. Curr Pain Headache Rep. 2019 Mar; 23(3): 23. doi: 10.1007/s11916-019-0757-1.

[4] Beardsley C and Škarabot J. Effects of self-myofascial release: a systematic review. Journal of Bodywork and Movement Therapies. 2015 Oct; 19(4): 747-58. doi: 10.1016/j.jbmt.2015.08.007.

[5] McKenney K, Elder AS, Elder C, Hutchins A. Myofascial release as a treatment for orthopaedic conditions: a systematic review. Journal of Athletic Training. 2013 Jul; 48(4): 522-7. doi: 10.4085/1062-6050-48.3.17.

[6] Kim J, Sung DJ, Lee J. Therapeutic effectiveness of instrument-assisted soft tissue mobilization for soft tissue injury: mechanisms and practical application. Journal of Exercise Rehabilitation. 2017 Feb; 13(1): 12. doi: 10.12965/jer.1732824.412.

[7] Wood S. Efficacy of Myofascial Decompression for Musculoskeletal Conditions (Doctoral dissertation, Victoria University). 2021. Available at: https://vuir.vu.edu.au/42510/.

[8] Wood S, Fryer G, Tan LL, Cleary C. Dry cupping for musculoskeletal pain and range of motion: a systematic review and meta-analysis. Journal of Bodywork and Movement Therapies. 2020 Oct; 24(4): 503-18. doi: 10.1016/j.jbmt.2020.06.024.

[9] Al-Shidhani A and Al-Mahrezi A. The role of cupping therapy in pain management: A literature review. Pain Management-Practices, Novel Therapies and Bioactives. 2020 Sep. doi: 10.5772/intechopen.87267.

[10] Simatou M, Papandreou M, Billis E, Tsekoura M, Mylonas K, Fousekis K. Effects of the Ergon® instrument-assisted soft tissue mobilization technique (IASTM), foam rolling, and static stretching application to different parts of the myofascial lateral line on hip joint flexibility. Journal of Physical Therapy Science. 2020; 32(4): 288-91. doi: 10.1589/jpts.32.288.

[11] Cheatham SW, Lee M, Cain M, Baker R. The efficacy of instrument assisted soft tissue mobilization: a systematic review. The Journal of the Canadian Chiropractic Association. 2016 Sep; 60(3): 200.

[12] Ikeda N, Otsuka S, Kawanishi Y, Kawakami Y. Effects of instrument-assisted soft tissue mobilization on musculoskeletal properties. Medicine and Science in Sports and Exercise. 2019 Oct; 51(10): 2166. doi: 10.1249/MSS.0000000000002035.

[13] Lee JH, Lee DK, Oh JS. The effect of Graston technique on the pain and range of motion in patients with chronic low back pain. Journal of Physical Therapy Science. 2016; 28(6): 1852-5. doi: 10.1589/jpts.28.1852.

[14] de Melo Salemi M, Gomes VM, Bezerra LM, de Souza Melo TM, de Alencar GG, de Mélo Montenegro IH, *et al*. Effect of Dry Cupping Therapy on Pain and Functional Disability in Persistent Non-Specific Low Back Pain: A Randomized Controlled Clinical Trial. Journal of Acupuncture and Meridian Studies. 2021 Dec; 14(6): 219-30. doi: 10.51507/j.jams.2021.14.6.219.

[15] Teut M, Ullmann A, Ortiz M, Rotter G, Binting S, Cree M, *et al*. Pulsatile dry cupping in chronic low back pain–a randomized three-armed controlled clinical trial. BMC Complementary and Alternative Medicine. 2018 Dec; 18(1): 1-9. doi: 10.1186/s12906-018-2187-8.

[16] Grase M, Elhafez HM, Abdellatif MM, Genedi AF,

DOI: https://doi.org/10.54393/tt.v4i02.141

Mahmoud MA. Effect of instrument assisted soft tissue mobilization versus kinesiotape for chronic mechanical low back pain: a randomized controlled trial. Physiotherapy Quarterly. 2023 Apr; 31(2): 27-33. doi: 10.5114/pq.2023.125742.

[17] Fousekis K, Kounavi E, Doriadis S, Mylonas K, Kallistratos E. The effectiveness of instrument-assisted soft tissue mobilization technique (ergonš technique), cupping and ischaemic pressure techniques in the treatment of amateur athletes myofascial trigger points. Journal of Novel Physiotherapies. 2016 Jul; 3(2): 1-7. doi: 10.4172/2165-7025.S3-009.

[18] Jain P, Saharan AK, Vishnoi CS, Bhati MP, Sharma P. Single IASTM and cupping therapy session improves pain and disability in patients with non-specific low back pain. GSC Advanced Research and Reviews. 2022 Jun; 11(3): 045-50. doi: 10.30574/gscarr.2022.11.3.0146.

[19] Nasb M, Qun X, Ruckmal Withanage C, Lingfeng X, Hong C. Dry cupping, ischemic compression, or their combination for the treatment of trigger points: a pilot randomized trial. The Journal of Alternative and Complementary Medicine. 2020 Jan; 26(1): 44-50. doi: 10.1089/acm.2019.0231.

[20] Dhand NK and Khatkar MS. Statulator: An online statistical calculator. Sample Size Calculator for Comparing Two Independent Means. 2014. Available at: https://www.researchgate.net/deref/http%3A%2F%2Fstatulator.com%2FSampleSize%2Fss2PP.html.

[21] Ge W, Leson C, Vukovic C. Dry cupping for plantar fasciitis: a randomized controlled trial. Journal of Physical Therapy Science. 2017; 29(5): 859-62. doi: 10.1589/jpts.29.859.

[22] Cuschieri S. The CONSORT statement. Saudi Journal of Anaesthesia. 2019 Apr; 13(Suppl 1): S27. doi: 10.4103/sja.SJA_559_18.