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ORIGINAL ARTICLE

Comparison of Dry Needling and Dry Cupping in Positional Fault of Pelvis Due to Myofascial Trigger Points in Quadratus Lumborum

HUMA AKHTAR[1], RABIYA NOOR[2], AGHA SALMAN KHAN[3], FARZANA SAQIB[4], NAMRA SALEEM[5], SADAF WARIS[6]
[1]*Department of physical Therapy (KUHS) University of Management and Technology Sialkot campus Jinnah Road Kharota Syedan Sialkot Pakistan*
[2]*Riphah International University, Lahore campus Madar e Millat Road, 28M near Kotlakhpat, Riphah International University Lahore campus*
[3]*A.R hospital Al Rehman Garden phase 2, Lahore House no 351, B Block, street 1D Al Rehman Garden phase 2 Near faizpur interchange Lahore*
[4]*Sports and spine Professionals House E 1021 Block F Street 7 Nishat colony Lahore cantt*
[5]*Sughra Physiotherapy and poly clinic 102 Saleem block, Ittefaq town, Multan Road, Lahore*
[6]*Senior Lecturer Avicenna Medical and Dental College, Lahore*
Corresponding author: Sadaf Waris, Email: dr.sadaf54@gmail.com, Cell: 03088112501

ABSTRACT

Objective: Quadratus Lumborum is actively used in our daily life for example in sitting and climbing stairs and trigger points are common in this region. The objective of this study was to find the effectiveness of dry needling and dry cupping in positional faults of pelvis due to myofascial trigger points in quadratus lumborum and to check if any of the techniques is superior to the other so that the best treatment option should be selected for patients.

Methodology: This was a randomized clinical trial. A rehabilitation camp was arranged in Physiotherapy department of Islam Central Hospital, Sialkot Pakistan. 26 participants (by keeping 10% attrition rate) fulfilled the inclusion criteria. Convenient Random sampling method was done to divide the participants equally into 2 groups. Group A was treated by dry needling and Group B was treated by dry cupping. A conventional physiotherapy treatment (hot pack and stretching) was also given to both groups. The outcome measures of the study were numeric pain rating scale for subjective pain assessment, algometer for pressure pain threshold, pelvic goniometer for functional positional fault and measuring tape for muscle length. Participants were treated twice a week over a period of 3 weeks. Pre and Post treatment readings were taken in 1st and 6th session over a 3 week period. A follow up reading was also taken after 1 month for checking prolonged treatment effects.

Results: To analyze data independent t-test (for Inter group comparison) and Repeated measure Anova (for Intra group comparison) were used. The research accepted Alternate hypothesis as the P value for all parameters was <0.005.

Conclusion: The study concluded that dry needling was statistically superior to dry cupping for the treatment of pain and for improving pelvic positional fault. So, it should be applied to patients for the treatment of trigger points.

Keywords: Dry needling, Dry cupping, Myofascial trigger points, Quadratus lumborum, positional fault of pelvis.

INTRODUCTION

According to an estimate 60-80 percent of the individuals suffer from low back pain in their life span and among them ninety percent of the time this pain can be due to prolonged sitting, lifting, climbing stairs, bending, poor posture and formation of myofascial trigger points in muscles; most commonly in paraspinal muscles, Quadratus lumborum and gluteas medius[1]. So, prolonged sitting can contribute in the development of low back pain which ultimately results in an altered control of trunk muscles[2]. EMG studies told us the role of quadratus lumborum in producing torque at spinal curve and activation of this muscle ipsi-laterally and contra-laterally during side bending of the spine[3]. Any spasm and trigger in this muscle will cause an altered core stability and postural fault of pelvis, thus causing lateral pelvic tilt[4]. Spasm in Quadratus lumborum is one of the causes for downward drop of pelvis on the side opposite to the effected side[5, 6].

Myofascial trigger points are the tensed surfaces found in the tight band of skeletal muscles. These points are painful when an external pressure is applied on them, this pain can be referred to surrounding areas leading to motor dysfunction[7]. 'Jump sign' can be seen in patients when a compressive force is applied on these tight trigger points[8]. High energy work and prolonged stresses on the muscles can give rise to the formation of Trigger points[9].

According to Travel and Simons[10] Quadratus lumborum has 4 trigger points. 2 superficial triggers in cephalad direction and 2 deep triggers in caudal direction. The superficial cephalad trigger point is located underneath the 12th rib and it refers pain to Iliac crest, lower abdomen and to upper lateral side of groin. The deep cephalad trigger point is located lateral to the transverse process of 3rd vertebrae and it refers pain to the sacroiliac joint. The superficial caudal trigger is located above the iliac crest and it refers pain to the greater trochanter of femur and upper thigh and the deep caudal trigger point is located lateral to the transverse process of 5th vertebrae and it refers pain to the lower buttock[1].

A versatile treatment approach is there to treat myofascial trigger points including Dry needling, Dry cupping, Stretch and Spray, trigger point injections and transcutaneous electrical nerve stimulations[11]. We will compare Dry needling and Dry cupping for the treatment of myofascial trigger points in quadratus lumborum muscle.

However there is a very few literature to compare the effects of dry needling and dry cupping in positional faults of pelvis due to myofascial trigger points in quadratus lumborum. So the rationale of this study was to find the effectiveness of both the techniques on myofascial trigger points of quadratus lumborum and to check if any of this technique is superior to the other so that the best treatment option should be selected for patients with positional faults of pelvis due to myofascial points in quadratus lumborum, as this muscle is actively used in our daily life for example in sitting and climbing stairs and trigger points are common in this region.

MATERIALS AND METHODS

A randomized clinical trial registered under ClinicalTrials.gov with Protocol Id NCT04719689 was done to compare the effects of two treatment interventions; myofascial Dry Needling and Dry Cupping. A rehabilitation camp was arranged for patients having chronic low back pain in Physiotherapy department of Islam Central Hospital, Sialkot. Sample size was calculated by Epitool. 28 participants (by keeping 10% attrition rate)[12, 13] were evaluated and selected. Convenient Random sampling method was done. The inclusion criteria included 1) Age ranges from 18-45yrs for both males and females[14]. 2) On palpation the presence of atleast 1 active trigger point in quadratus lumborum[10]. 3) Patients presents with positional fault of pelvis (lateral tilt)[4]. 4) Patients having chronic LBP for atleast more than 6 months[15]. 5) Patients agree to get treatment sessions for the research work. Research excluded 1) Participants taking medications like analgesics, anti-coagulants, Non-steroidal anti-inflammatory drugs or muscle relaxants during this study or even 3 days before this study[1]. 2) Participants receiving any other treatment for the pain management, because it will affect the results of the study[1]. 3) Patients with bleeding disorders, local or systemic infection, acute muscle trauma. 4) Patients with comorbid conditions. 5) Patients with severe physical disability and true leg length discrepancy[16]. 6) Pregnant females.

Treatment Interventions: Firstly, we asked the patients to Sign the consent form. Then, a complete case history and physical examination was done to further evaluate the patient for any exception. The examiner palpated the most active quadratus lumborum TrP. The patient was then requested to complete a Numerical Pain Rating Scale under the supervision of researcher. Pressure pain threshold was checked with algometer. The therapist then took the measurement of spine lateral flexion and muscle length with goniometer and measuring tape. Data was recorded at 1st session. Participants, then, received treatment in the form of myofascial dry needling or dry cupping depending upon their allocated group. Finally, a conventional physiotherapy treatment (hot pack and stretching) was also given to both groups. The whole treatment took 40-45 mins for both groups. Participants were treated twice a week over a period of 3 weeks. Readings for NPRS, pressure pain threshold and measurements for muscle length and range of motion were taken again after 6th session. The patients then requested to attend a 7th follow up visit after 1 month where no treatment was administered, only readings of subjective and objective data were taken. All the data for NPRS, pressure pain threshold and measurements for muscle length and range of motion were taken again at this follow up session.

Dry Needling: Dry needling helps in the reduction of local and refereed pain pattern, increases range of motion, activates muscle contraction, and reduces chemical environment for trigger points[17]. In this procedure we insert solid needle into the muscle, thus eliciting local twitch response which helps in the reduction of muscle tenderness and pain, overall it improves range of motion. [18, 19]. A research comparing the effects of deep dry needling to superficial dry needling resulted in deep dry needling giving better analgesic effects than superficial dry needling[20]. For dry needling of the deep tender points in quadratus lumborum, the needle was aimed straight downward into the tender spot in the direction of a transverse process of lumbar spine. As the fibers of iliocostal portion of quadratus lumborum are present near the iliac crest, and its superficial as well so dry needling at this area was performed easily and under palpatory control. Dry needling for cephalad trigger points of the L1 spinous process was avoided as there is a risk of piercing the lung, because at this position the muscle and the diaphragm attach to the 12th rib[10]. The needle stayed in the muscle for 7-10 minutes thus reproducing the patient's symptoms. This phenomenon lead to the elimination of TrPs, thus in return decreases muscular pain and tenderness[10]

Dry Cupping: Dry cupping is a Chinese method that has been used for more than 2000 years[21]. It is very useful in decreasing pain and tenderness and improving range of motion in patients with chronic low back pain[22]. In this procedure specific cups are placed over the tender skin surface and a sub atmospheric pressure is created by suction[23]. Dry cupping involves negative pressure mechanism[24]. Negative pressure allows the expansion of tissues, endothelial holes in blood capillaries and the lymphatic capillaries, so the metabolic waste moves into the lymphatic capillaries. The pumping mechanism further increases lymphatic flow and blood circulation, resulting in the reduction of swelling and chemical environment for trigger points[25]. The technique was performed by using a small round cup made of glass or plastic and a manual hand pump to create suction. When the cup was fit over the skin according to the skin surface area the therapist made it sure that its air tight so that a perfect vacuum effect was created. When the suction was performed the skin was drawn into the cup. To cover a larger surface area, lubricants can also be used so that the skin efficiently drawn into the cup. The cup was left in place for 5-20 min or more. The longer a cup is left on the skin, the more of a circular mark is created. So we performed cupping for 10 mins.

Outcome Measures: The outcome measures of the study were numeric pain rating scale for subjective pain assessment, algometer for pressure pain threshold, pelvic goniometer for functional positional fault and measuring tape for muscle length.

Numerical Pain Rating Scale (NPRS): The Numerical Pain Rating Scale (NPRS) is an 11 point pain scale that is completed by a patient himself, under the supervision of researcher. Participants were requested to highlight the severity of pain ranges from 0-10. The scale elaborates 0 with 'no pain' and 10 with 'worst imaginable pain' that has been experienced by the patient. 2-3 point elaborates 'mild pain' and a score of 7 or higher elaborates 'severe pain'[26].

Pain pressure threshold: Pain pressure threshold is defined as the minimal amount of pressure applied that produces pain[27]. It is also called 'pressure threshold meter'. It consists of a rubber disc attached to the pole of a pressure (force) gauge. The tool was calibrated in kilograms and pounds. Pain pressure threshold was objectively measured using a pain pressure algometer on the most active quadratus lumborum TrP with the participants positioned in a lateral recumbent position.

Goniometer: A goniometer is a device that measures angles or allows an object to be rotated to a certain position. It was used for measuring lateral flexion of lumbar spine by Quadratus lumborum. We placed the goniometer at the spinous process of the S1 vertebrae and the spinous process of the C7 vertebrae[28] and its readings were recorded at the conclusion of the lumbar lateral flexion range of motion.

Measuring tape: Measuring tape is the least expensive and the easiest way to check spinal movements and muscle. This is a very common method to access ROM at clinical practice. We marked a point on the lateral thigh where the third fingers can touch when standing upright. Another point was marked at the end of spinal lateral flexion. Using a tape measure, we recorded the distance between skin marks on the thigh[29].

RESULTS

Shapiro Wilk Test was applied for checking Normality. Descriptive analysis in terms of Mean±SD was done. Group A had 57.14% males and 42.86% females. Group B had 35.71% males and 64.29% females. Socio demographics of both groups were analyzed. Age, Height, Weight and body mass index of participants were checked, descriptively.

A between group analysis for Pain was analyzed by an Independent Sample T test. Mean± SD score of Pain with NPRS in Group A at baseline was 5.92±1.84. Mean± SD score of Pain with NPRS in Group A after 3 weeks was 3.50±1.01. A follow up reading of Mean± SD score of Pain with NPRS in Group A was 2.50±1.45. Mean± SD score of Pain with NPRS in Group B at baseline was 5.89±1.79. Mean± SD score of Pain with NPRS in Group B after 3 weeks was 4.64±1.39. A follow up reading of Mean± SD score of Pain with NPRS in Group B was 2.85±1.35.

Table 1: Socio Demographics of Both Groups:

Study Groups		N	Mean	Std. Deviation	P-Value
Group A- Dry Needling	Age of Participants	14	33.57	6.68	0.533
	Height in Cm	14	171.85	8.60	0.041
	Weight in Kg	14	72.00	10.32	0.184
	Body Mass Index of Participants	14	24.50	3.93	0.418
Group B- Dry Cupping	Age of Participants	14	33.85	7.97	0.159
	Height in Cm	14	173.00	5.88	0.087
	Weight in Kg	14	71.00	15.19	0.719
	Body Mass Index of Participants	14	23.60	4.33	0.146

A between group analysis for Pressure Pain Threshold was analyzed by an Independent Sample T test. Mean± SD score of PPT with Algomter in Group A at baseline was 3.06±0.89. Mean± SD score of PPT with Algometer in Group A after 3 weeks was 3.44±0.95. A follow up reading of Mean± SD score of PPT with Algometer in Group A was 4.46±0.91. Mean± SD score of PPT with

Algometer in Group B at baseline was 3.75±0.92. Mean± SD score of PPT with Algometer in Group B after 3 weeks was 3.08±0.77. A follow up reading of Mean± SD score of Pain with PPT with Algometer was 3.46±0.82.

Table 2: Independent Sample T test of Pre, Post and follow up Mean± SD score of Pain, Pressure pain threshold, Spinal side flexion and muscle length.

Variables		Group A- Dry Needling (N=14)	Group B- Dry Cupping (N=14)	P value
		Mean± SD	Mean± SD	
Pain with NPRS	Pre treatment	5.92±1.84	5.89±1.79	0.01
	Post treatment	3.50±1.01	4.64±1.39	0.08
	Follow up	2.50±1.45	2.85±1.35	0.50
Pressure Pain Threshold with Algometer	Pre Treatment	3.06±0.89	3.75±0.92	0.88
	Post Treatment	3.44±0.95	3.08±0.77	0.10
	Follow up	4.46±0.91	3.46±0.82	0.00
Spinal Side Flexion with Goniometer	Pre Treatment	25.50±2.53	28.35±2.81	0.22
	Post treatment	25.35±2.64	26.07±2.75	0.48
	Follow up	30.35±2.81	27.07±2.89	0.00
Muscle Length with Measuring tape	Pre treatment	5.17±2.04	6.17±1.39	0.03
	Post treatment	4.14±1.08	4.42±1.15	0.00
	Follow up	6.64±1.32	4.50±0.91	0.00

Table 3: Repeated Measure ANOVA of Pre, Post and follow up Mean±SD of Pain with NPRS

Variables		Treatment group		P value
		Dry Needling (n=14) Mean± SD	Dry Cupping (n=14) Mean± SD	
Pain with NPRS	Pre Treatment	5.92±1.84	7.50±1.01	P<0.005
	Post Treatment	4.89±1.79	5.64±1.39	
	Follow up	2.50±1.45	2.85±1.35	
Pressure Pain Threshold with Algometer	Pre-treatment	3.06±0.89	2.44±0.95	P<0.005
	After 3 weeks	3.75±0.92	3.08±0.77	
	Follow up	4.46±0.91	3.46±0.82	
Spinal Side Flexion with Goniometer	Pre-treatment	25.50±2.53	25.35±2.64	P<0.005
	After 3 weeks	28.35±2.81	26.07±2.75	
	Follow up	30.35±2.81	27.07±2.89	
Muscle Length with Measuring Tape	Pre-treatment	5.75±2.04	4.14±1.08	P<0.005
	After 3 weeks	6.17±1.39	4.42±1.15	
	Follow up	6.64±1.32	4.50±0.91	

A between group analysis for Spinal Side Flexion was analyzed by an Independent Sample T test. Mean± SD score of Spinal Side Flexion with goniometer in Group A at baseline was 25.50±2.53. Mean± SD score of Spinal Side Flexion with goniometer in Group A after 3 weeks was 25.35±2.64. A follow up reading of Mean± SD score of Spinal Side Flexion with goniometer in Group A was 30.35±2.81. Mean± SD score of Spinal Side Flexion with goniometer in Group B at baseline was 28.35±2.81. Mean± SD score of Spinal Side Flexion with goniometer in Group B after 3 weeks was 26.07±2.75. A follow up reading of Mean± SD score of Spinal Side Flexion with goniometer was 27.07±2.89.

A between group analysis for Muscle length with measurement tape was analyzed by an Independent Sample T test. Mean± SD score of Muscle length with measurement tape in Group A at baseline was 5.17±2.04. Mean± SD score of Muscle length with measurement tape in Group A after 3 weeks was 4.14±1.08. A follow up reading of Mean± SD score of Muscle length with measurement tape in Group A was 6.64±1.32. Mean± SD score of Muscle length with measurement tape in Group B at baseline was 6.17±1.39. Mean± SD score of Muscle length with measurement tape in Group B after 3 weeks was 4.42±1.15A follow up reading of Mean± SD score of Muscle length with measurement tape was 4.50±0.91.

Repeated Measure Anova for Pain was applied for an across the group analysis. The research accepted Alternate hypothesis as the P value for all parameter i.e., Pain, Pressure Pain Threshold, Spinal Side Flexion and Muscle length was less than 0.005.

DISCUSSION

The objective of this research was to compare the effectiveness of dry needling and dry cupping for positional fault of pelvis due to myofascial trigger points in Quadratus lumborum and to check if any of this technique is superior to the other so that the best treatment option should be selected for patients with positional faults of pelvis due to myofascial points in quadratus lumborum. For the purpose, a randomized control trial was conducted. 28 participants (by keeping 10% attrition rate). Numeric Pain Rating Scale was used for Subjective pain assessment. Algometer for Pressure pain threshold. Pelvic Goniometer and measuring tape was used for checking functional positional fault (due to spasm in Quadratus Lumborum) and to assess muscle length of Quadratus lumborum. Pre and Post treatment reading was taken in 1st and 6th sessions over a 3 week period. A follow up reading was also taken after 1 month for checking prolonged treatment effects of both techniques. To analyze pre post and follow up comparison for Pain, Pressure Pain threshold, Spinal side flexion and muscle length Independent t test (inter group comparison) and repeated measure Anova (intra group comparison) were used. The research accepted Alternate hypothesis as the P value for all parameter i.e Pain, Pressure Pain Threshold, Spinal Side Flexion and Muscle length was <0.005. It means that dry needling is more effective than dry cupping for long term treatment of pain management and postural faults when a follow up reading was taken after 1 month of treatment.

Literature shows that both the techniques are effective for reducing pain in myofascial trigger points[30]. The present study shows that there is significant decrease in Mean±SD in both groups when we applied Independent t test for between group analyses but statistically when within group analysis was done we concluded that results with dry needling were better than dry cupping. P value was also <0.005 so overall dry needling is preferable for long term treatment of trigger points in Quadratus lumborum.

A randomized clinical trial was conducted under the supervision of Adelaida Maria Castro-Sancheza and Hector Garcia- Lopez to check the improvement in spinal mobility after dry needling in patients with myofascial pain syndrome and fibromyalgia proved that there will be increase in spinal mobility when they treated quadratus lumborum, lattismus dorsi and multifidus[31]. When we analyzed the data of our research we concluded that there was slight increase in spinal mobility by dry cupping only after 3 weeks. There was no apparent change in mean readings after 1 month. So, according to our research dry cupping is not effective for long

term treatment of fibromyalgia and to improve spinal mobility. There was a significant increase in spinal mobility after 1 month when we applied dry needling.

CONCLUSION

The study concluded that both treatments were effective for managing pain in trigger points of quadratus lumborum. But dry needling was statistically superior to dry cupping for long term treatment of pain, increasing pressure pain threshold, improving spinal side flexion and for improving muscle length. Also, when we analyzed patients clinically, the group treated with dry needling reported more satisfaction than the group treated with dry cupping.

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