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Comparative Study

Effect of Dry Needling in Quadratus Lumborum on Cricket Fast Bowlers Suffering From Non Specific Low Back Pain

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Abstract
Objective: To determine the effect of dry needling in quadratus lumborum on cricket fast bowlers suffering from non specific low back pain.
Subjects and Method: In this pre and post experimental study, 36 cricket fast bowlers with Non specific LBP were treated.they were randomely distributed into two treatment groups:One taking DN on QL and conventional treatment and other taking only conventional treatment.Four variables were measured: For Pain using visual analog scale(VAS)scale, Pain pressure threshold(PPT) on QL muscle TrPs with an Algometer, Contralateral Lumbar side flexion(LSF) range with an Inclinometer and quality of life measure assessed with an Oswestry Disability Index(ODI).
Results: There were significant improvement in VAS,PPT,Contralateral LSF and ODI with in the group at first,second and third week of post intervention.Group 1 showed more significant improved than group 2.
Conclusion: Both the group Experimental and control are comparable in their effectiveness in reducing pain,improving pain pressure threshold, lumbar side flexion range and in Quality of life.Each group was individually effective but experimental group was comparatively more effective than conventional.

Key words: Dry Needling,Massage,Myofascial trigger point,Quadratus lumborum.

INTRODUCTION

Fast bowling is a dynamic activity requiring bowlers to run-up and repeatedly deliver the ball at high speeds. Non-specific"Low back pain means that there is no specific cause of the low back pain such as neoplasms, infection, osteoporosis, arthritic conditions, fracture, radicular syndrome or inflammatory processes[12.]

Fast bowlers with low back pain (LBP), asymmetry in Quadratus Lumborum muscle is found to be greatest according to MRI study of Hides et al (2008).Injuries to lower back are common among fast bowlers[2,1] young fast bowlers are more prone to overuse injury than their older counterparts. overuse injuries occurs as a result of repetitive micro trauma where a number of forces combine to produce a fatigue effect[2.]

Travell and simons defined the Myofascial trigger point is a "hyper irritable spot usually within a taught band of skeletal muscles or in the muscle fascia which is painful on palpation and gives rise to characteristic referred pain, motor dysfunction and autonomic phenomenon"[9]

Two main types of trigger points are: Active trigger points &Latent trigger points. Active trigger point is tender and the patient recognizes it on compression. [11]Latent trigger point is clinically inactive with respect to spontaneous pain and is more common than active trigger point..[19,23]

Diagnosis criteria for MTrPs: (Travell&Simons ,1983)[22,18,26]

- Taut band with the muscle
- Snapping palpation or needling of the tender spot elicits a local twitch response.
- A history of sudden onset following or during an acute overload stress, or a gradual onset with chronic overload of the muscle which has been affected.
- Localized increase sensitivity to pressure within the taut band
- Partiale or complete referred pain pattern of patients symptoms during manual stimulation
- Decrease Rom of muscle within MTrP

Treatments of MTrP can be divided into Non-invasive and Invasive method. Non-invasive:Stretching, massage, ischemic compression, laser therapy, heat or ice therapy, acupressure, ultrasound, transcutaneous electrical nerve stimulation, biofeedback, pharmacological treatments[8,9]. Invasive method: Dry needling(intramuscular stimulation) ,western acupuncture,

medical acupuncture,trigger point injections with local anesthetic,[4,8,9]

Dry needling is insertion of needles into tender points in the body without the inject of any substance. It is used to treat painful musculoskeletal disorders. Dry needling a MTrP is most effective when a local twitch responses (LTR) is elicited.[24,25,26]

Massage therapy is defined as "soft tissue manipulation using the hands or a mechanical device". and it is recognized as a safe therapeutic modality without risk or adverse effects. massage is a simple way of easing pain ,while at the same time aiding relaxation and pramoting a feeling of well being and a sense of recieving good care.[16].

Massage therapy technique:Cyrix, effleurage, petrissage, friction, kneading, or hacking.[16]

Hence the purpose of the present study to know the effect of dry needling in quadratus lumborum on cricket fast bowlers suffering from non specific low back pain, which may help the clinician and comprehensive treatment plan.

METHODS

After approval from Research Review Committee and institutional Ethical Committee of Indian Spinal Injuries Centre,New Delhi. Subjects with Non specific low back pain cricket fast bowlers were screened for inclusion criteria: Age group of 18-26years[2],Myofascial trigger point pain present at contralateral quadratus lumborum[1,5,]9,Lower Back pain more than 3 months[5,9]Decreased lower back ROM due to muscle tightness.[5,9,16,]35,Normal neurological examination,Palpable taut band on quadratus lumborum[9,26].

Exclusion criteria:Subjects diagnosed Fibromyalgia[9,26], Presence of active infection and inflammation[9,26],Bleeding disorder9,Local or systemic infections[9,26],Any participant taking anticoagulant medication[26].Patients with neurological signs (Positive signs in straight leg raising test, femoral nerve stretch test, Jackson test, or Spurling test;Paresthesia;abnormal reflexes)[9,26] Participant received treatments such as massage, acupuncture and nerve block, for their back pain at other hospitals or clinics within 1 month from the start of the study[26]systemic pain, rheumatoid arthritis, tumour, or infection in the spinal cord and intervertebral disc, and other diseases inducing systemic pain[26]psychiatric disorders[26] ,history of whiplash injury due to traffic accidents[26].Informed consent was taken from subjects who were randomize into two groups via random number generator software.

Baseline measurement are Visual analog scale,Pain pressure threshold,Oswestry Disability Index Lumbar side flexion were taken for every subjects.Subjects received the treatment protocol as per the group assigned to them. Group 1 received Dry needling and conventional therapy:, Group 2 received Conventional therapy. Conventional therapy consisit of hot pack,Active Quadratus lumborum stretching exercise, Relaxation massage(15-20 minutes).Treatment was given according to the assigned group for duration of 3 weeks and twice in week.

PROCEDURE

GROUP 1 PROTOCOL: Group 1 received Dry needling and conventional therapy. In which the subject position was to lie on the uninvolved side and raising the arm of the affected side to the top of the table, behind the head (this elevates the rib cage). The knee of the involved side was dropped onto the examination table behind the other knee, then active trigger point has been located ,the whole area was wiped with alcohol swab ,then the index and middle finger is to be placed on either side of the active trigger point.The needle was directed straight down towords the active trigger point in the direction of transverse processes in between the index and middle fingers. It was applied according to the fast-in and fast-out Hong's technique which is based on search for local twitch response followed by the cold pack and stretch technique for the treated muscle..Quadratus Lumborum was passively stretched in 3 sequences and cold pack was applied to the pain reference zone in 3 sweeps for each sequence. Group 2: Group 2 received only conventional treatment. Conventional therapy consisit of hot pack,Active Quadratus lumborum stretching exercise, Relaxation massage (Effleurage ,Petrissage ,Friction, kneading,or Hacking).[16]

Conventional treatment:subject position wassame as group1 in this treatmen .consist of Essentially massage therapy involves applying sustained pressure to the trigger point with sufficient force and for long enough to slow down the blood supply and force the tension out of the muscle. When performing massage, a downward pressure was applied with the thumb over the active trigger point. This pressure was relative to how much pain the patient could tolerate, since too much pain tends to cause tension in the muscle which would negate the treatment.[16] After session apply hot formantation for 10-12 mints. The downward pressure was maintained until the referred pain and local pain eased (Travell and Simons 2001).

Data analysis

Data was analysed with the help of statistical package for social sciences (SPSS) version 21.

The pre intervention scores were compared with post intervention scores at first week ,second week and third week for each group separately. The data was checked for normality using paired t tests. Paired t tests were used for analysis with p value adjusted for multiple comparisons using Bonferroni's correction as 0.05/3 = 0.016. In case of skewed data, Wilcoxon signed rank test would be used.

Results

Paired t test were for between group comparision was done to test the difference of pre intervention,and post intervention first week, post intervention second week, post intervention of third week in every outcome measure.

Total sample size was 36 constituting of two groups with each sample population of 18 subjects.out of these two groups 1

subjects from each group had withdrawn from study.

In VAS(Acc. to table 1&2)there is significant difference found both group after three weeks of intervention (p=0.000).In experimental group Mean±S.D. (1.14±0.618{postvas1}) ,(2.882±0.485{postvas2}) ,(4.059±0.748{post vas3}) showing a greater amount of improvement as compared to control groupMean±S.D.(0.882±0.332{postvas1}),(1.294±0.470{post vas2}),(1.706±0.47{post vas3}).

In PPT according to table 3&4, this present study result measure a significant difference (p=0.000) in the change in PPT i.e. post intervention score -pre intervention score in between groups, with experimental group [Mean±S.D.] (-0.37+-0.2339{postppt1}),(-0.6588±0.2575{postppt2}), (-0.9412±0.337{post ppt3}) showing a greater PPT in QL muscle as compared to controlgroup (Mean±S (-0.1176±0.1131{postppt1}),(-0.2941±0.1560{post ppt2}) (-0.3882±0.1691{post ppt3}).

In LSF according (table5&6) to present study result Change in contralateral lumbar side flexion range i.e. post intervention range score –pre intervention range was also found to be significant difference in both groups,with experimental group Mean±S.D.(-2.88±1.269{postLSF1}),(-5.84±1.7{post LSF2}), (-8.29+-1.7{post LSF3}) showing a greater amount of improvement as compared to control group Mean±S.D. (-2.11±0.697{post LSF1}),(-2.70±1.21 {post LSF2}), (-3.88±0.993{post LSF 3}).

In ODI according (Table 7&8) to present study result Change in oswestry disability index i.e. post intervention score pre intervention score was also found to be significant difference in both groups,with experimental group Mean+-S.D. (2.89±1.63{post ODI1}),(4.60±1.94{post ODI2})and (6.11±2.97{postODI3}) and experimental Mean±S.D.(5.07±1.4{Post ODI1}), (10.71±2.56{post ODI2}), (17.03±2.98{Post ODI3) Group with p=0.000.The greater amount of improvement found in dry needling group could be a result of factor related to improve quality of life. Result In both the groups mean values were found to have statistically significant difference but all over improvement in quality of life is greater in experimental group than control group.

Table 1: Comparision of pre and post intervention of VAS in group-1(N=17)

Parameter	Mean ±S.D.	t-value	P- value	N
Pre-VAS Post-VAS1	5.71 ±.686 4.29±.849	9.414	.000	17
Pre-VAS Post-VAS2	5.71±.686 2.82±.636	24.500	.000	17
Pre-VAS Post-VAS3	5.71±.686 1.65±.606	22.387	.000	17

NS- Non significant*-significant (p<_0.05)**-highly significant(p<_0.01)

Table 2: Comparision of pre and post intervention of VAS in group-2(N=17)

Parameter	Mean ±S.D.	t-value	P- value	N
Pre-VAS Post-VAS1	5.35±.606 4.47±.624	10.954	.000	17
Pre-VAS Post-VAS2	5.35±.606 4.06±.556	11.361	.000	17
Pre-VAS Post-VAS3	5.35±.606 3.65±.606	14.976	.000	17

NS- Non significant*-significant (p<_0.05)**-highly significant(p<_0.01)

Table 3: Comparision of pre and post intervention score of PPT in group-1

Parameter	Mean ±S.D.	t-value	P- value	N
PRE-PPT POST-PPT1	3.218±.4433 3.588±.3903	-6.533	.000	17
PRE-PPT POST-PPT2	3.218±.4433 3.876±.3345	-10.548	.000	17
PRE-PPT POST-PPT3	3.218±.4433 4.159±.1770	-11.502	.000	17

NS- Non significant*-significant (p<_0.05)**-highly significant(p<_0.01)

Table 4: Comparision of pre and post intervention score of PPT in group-2

Parameter	Mean ±S.D.	t-value	P- value	N
PRE-PPT POST-PPT1	3.400±.3142 3.518±.3395	-4.288	.001	17
PRE-PPT POST-PPT2	3.400±.3142 3.694±.3473	-7.773	.000	17
PRE-PPT POST-PPT3	3.400±.3142 3.788±.3018	-9.465	.000	17

NS- Non significant*-significant (p<_0.05)**-highly significant(p<_0.01)

Table 5: Comparision of pre and post intervention range of LSF in group-1

Parameter	Mean ±S.D.	t-value	P- value	N
PRE-LSF POST-LSF1	16.06±1.853 18.94±1.952	-9.365	.000	17
PRE-LSF POST-LSF2	16.06±1.853 21.88±1.616	-14.402	.000	17
PRE-LSF POST-LSF3	16.06±1.853 24.35±.786	-20.733	.000	17

NS- Non significant*-significant (p<_0.05)**-highly significant(p<_0.01)

Table 6: Comparision of pre and post intervention LSF range in group-2

Parameter	Mean ±S.D.	t-value	P- value	N
PRE-LSF POST-LSF1	16.71±1.490 18.82±1.237	-12.534	.000	17
PRE-LSF POST-LSF2	16.71±1.490 19.71±1.543	-9.200	.000	17
PRE-LSF POST-LSF3	16.71±1.490 20.59±1.176	-16.126	.000	17

NS- Non significant*-significant (p<_0.05)**-highly significant(p<_0.01)

Table 7: Comparision of pre and post intervention ODI score in group-1

Parameter	Mean ±S.D.	t-value	P- value	N
PRE-ODI POST-ODI1	38.7647±3.92555 33.6941±3.61844	14.925	.000	17
PRE-ODI POST-ODI2	38.7647±3.92555 28.0506±2.85039	17.239	.000	17
PRE-ODI POST-ODI3	38.7647±3.92555 21.7259±1.88596	23.570	.000	17

NS- Non significant*-significant (p<_0.05)**-highly significant(p<_0.01)

Table 8: Comparision of pre and post intervention ODI score in group-2

Parameter	Mean ±S.D.	t-value	P- value	N
PRE-ODI POST-ODI1	35.1900±4.97497 32.2959±4.54237	7.283	.000	17
PRE-ODI POST-ODI2	35.1900±4.97497 30.5841±4.25447	9.779	.000	17
PRE-ODI POST-ODI3	35.1900±4.97497 29.0724±3.89527	8.466	.000	17

NS- Non significant*-significant (p<_0.05)**-highly significant(p<_0.01)

DISCUSSION

The aim of study was to know The Effect of dry needling in quadratus lumborum on cricket fast bowlers suffering from non specific low back pain. The result of this study reveals significant improvement in mean differences of experimental group for all four variables i.e. VAS,PPT,LSF and ODI than the conventional group after 3 weeks of intervention.

In VAS, the present study, shows that in experimental group,VAS score from pre-intervention to post intervention is significant better reduction than in control group after 3 weeks of intervention. Our results are supported by some study done which are followed. Study done by Chang zerm hong study in 2004, hypothesized that the strong pressure stimulation to the MTrP loci can provide very strong neural impulses to the dorsal horn cells in the spinal cord to break the vicious cycle of the "MTrP circuit", similar to hyper-stimulation analgesia. The techniques of dry needling include intramuscular stimulation (IMS) to a motor point, twitch-obtaining intramuscular stimulation, electrical twitch-obtaining intramuscular stimulation.[33,34]Local vasodilation to increase circulation, thereby removing metabolites (Rachlin 1994). According to Travell and Simons 1983, Removal of any nerve sensitising substances by local hemorrhage, this reduces the irritability of the trigger point and also tends to inactivate any neural feedback mechanisms that were maintaining the trigger point such as local vasoconstriction. According to Hong and david g. simmons in[32], reason for the positive change in Pain relief and deactivation of active myofascial trigger point by using "fast -in, fast-out" needling movement technique in which found that , significant and immediate pain relief could be achieved after MTrP injection .The rapid insertion of the needle tip into a sensitive, painful site in MTrP region may facilitate the elicitation of an local twitch response(LTR) that may not be observed if the needle tip approaches that site slowly.[32] Anderson etal 1997,dry needling results in the release of endogenous opiates or enkephalins, the most important being the B-Endorphins. This substance plays a major role in the descending pain inhibitory system and is

important for pain control as well as the regulation of blood pressure.[9,17]

In PPT, the result of the present study In PPT, the present study, shows that in experimental group,PPT score from pre-intervention to post intervention is significant better reduction than in control group after 3 weeks of intervention . Our results are supported by some study done which are followed. study done by S.j.aboodarda et al.[39] they found results as our in which determine the acute effect of rolling massage on pressure pain threshold (PPT) in individuals with tender spots in their plantar flexor muscles and suggest that application of massage-like mechanical pressure on trigger points can prevent the unnecessary firing of muscle spindles afferent discharges from the trigger point, reduce trigger point-induced muscle spasm and lead to decreased pain.Other study was suggested The physiological mechanism behind the changes in pain pressure threshold of muscle by various myofascial release therapy like massage induced decreases in pain could be due to mechanical stress or modulation of the central nervous system. Ipsilateral massage (Ipsi-R and Ipsi-M) may advocate an increased PPT via breaking up of fibrous adhesions and altering the response of free nerve endings (i.e. nociceptors) in the fascia. massage like mechanical pressure can provide analgesic effects via the ascending pain inhibitory system (gate theory of pain) .

The activation of thick myelinated ergoreceptor nerve fibers (via activation of percutaneous mechanoreceptors and proprioceptors) can alter the transmission of ascending nociceptive information via small diameter Aδ fibers and give rise to a descending inhibitory effect that allows modulation of pain perception.[39,40]

In LSF, the result of the present study In LSF, the present study shows that in experimental group,LSF score from pre-intervention to post intervention is significant better improve than in control group after 3 weeks of intervention . Our results are supported by some study done which are followed. Study done by Maryam Ziaeifar et al in 2014[35] reason for the positive change in range of motion by dry needling is mechanically disrupt the integrity of the hyper tone muscle fibers – trigger points. Inserted needle can provide a localized stretch to the muscle fibers and can induce local twitch response (LTR) which can cause muscle relaxation through reflex inhibition. Muscle relaxation can improve the ROM.[35] Some evidence suggest that after Dry needling session eliciting local twitch response, increased levels of bradykinin,Calcitonin gene related peptide (CGRP), substance P, and other chemicals at myofascial trigger point.[35] Other study done by Ga et al,2007, compared Trigger point injection with lidocaine with intramuscular stimulation using acupuncture needles .This study is consistent with current clinical practice, as dry needling currently is most commonly done with acupuncture needles. The study demonstrated the effectiveness of both in providing pain relief, better relief of depression with dry needling , and improvement in passive range of motion with both treatments.[23]

In ODI, the result of the present study shows that there is a significant reduction in oswestry disability index(ODI) score from pre intervention to post intervention testing. According to result of this study significantly reduction in oswestry disability index in both group but in experimental group significantly more reduction in oswestry disability index than in conventional group.

Our results are supported by some study done which are followed. Study done by S.Perez-palomares et al 2010, study title was percutaneous electrical nerve stimulation versus dry needling :Effectiveness in the treatment of chronic low back pain. In this study two groups were allocated first dry needling and second percutaneous electrical nerve stimulation(PENS) In this study, result indicates that quality of life measured by oswestry disability index improvement was seen as the difference between initial and final measurement of pain and result shown to improve in both groups9. Other study by by study done by Saravana kumar et al in 2013, title of study is the effectiveness of massage therapy for the treatment of non specific low back pain: a systemic review of systemic reviews,suggested that significant short-term post treatment benefits on pain and disability measures after massage when compared to placebo or no treatment.[12]

Limitation of the study

1.Real time ultrasound could havebeen used for better accuracy.

2.Limitation of this study were that only male subjects were include.

3.No follow up was done

FUTURE RESEARCH

It would be advisable to have a two week follow up once all six treatment session have been completed to determine which treatment had a more long lasting effect on the quadratus lumborum muscle trigger points and lower back pain.

Future research dealing with similar treatment regimes should use larger sample sizes.

In future studies we can conduct studies on dry needling taking other muscle in low back pain condition using real time ultrasound.

Conclusion

From the present study it can be concluded that experimental group and conventional group can be helpful in reducing pain, and improve pain pressure threshold , lumbar side flexion and quality of life in cricket fast bowlers who have non specific low back pain.

Experimental group and conventional group are both effective methods of treatment for myofascial trigger points and non specific lower back pain.

Both forms of treatment proved to be effective in deactivating active quadratus lumborum muscle trigger points (as was determined by the algometer readings). However according to the results, Experimental group was

shown to be a significantly more effective treatment of active quadratus lumborum trigger points.

Experimental group and conventional group of the active quadratus lumborum muscle trigger points lead to a marked improvement in lower back pain (Visual analogue Scale).

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