



Prevalence and risk factors of myofascial trigger points in quadratus lumborum in subjects with mechanical low back pain

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Abstract

Objective: The purpose of this investigation was to find out the prevalence of myofascial trigger points (MTrPs) in the quadratus lumborum (QL) muscle in patients with mechanical low back ache (LBA) and to determine the risk factors associated with the formation of MTrPs. **Participants:** Patients referred to the physiotherapy OPD with a complaint of LBA and a VAS score above 5 out of 10 were screened for inclusion and exclusion criteria. Subjects with signs of malaise, fever, fractures or any infectious disease of the spine, malignancy or post-operative lower back conditions were excluded from the study. 50 active individuals between 20-50 years of age with mechanical LBA were screened for the presence of MTrPs in the QL muscle. **Method:** In this cross-sectional study the qualifying subjects were patients with pure mechanical symptoms. They were further assessed for MTrPs in QL using overlying hand palpation. A hypersensitive spot in a palpable taut band of muscle fibers within the anatomical margins of QL, associated with a jump sign were considered positive findings. Subjects who were tested positive were presented with a pre-validated questionnaire to determine the risk factors associated with developing MTrPs in the QL. **Results:** Prevalence of MTrPs in QL in patients with mechanical LBA was 72% with 95% C.I of 0.58-0.82. Data was analysed with a 95% CI 0.58-0.82. It was found more to be more common in the acute cases of LBA with majority patients (47.22%) in the younger age group of 20-30 years. Repetitive and strenuous activities like bending and lifting heavy objects, as well as long hours of sitting without back support, lack of exercise and sedentary lifestyle were found to be major risk factors for developing MTrPs in QL. **Conclusion:** The prevalence of MTrPs in the QL is high in patients with mechanical LBA and that, stratification of these risk factors will further enable us to give sound ergonomic advices to patients. Trigger point induced non-specific mechanical low back pains can be kept in check to a great extent.

Keywords– Mechanical low back pain, Quadratus Lumborum, Trigger points.

Introduction

Low back pain is the most common pain dysfunction of day to day life. Life time prevalence of low back pain is reported to be around 80%.^[1] It is usually a self-limiting condition. Efforts are made at excluding systemic diseases, neurologic conditions or psychological distress but a specific cause



is not easily identified.^[2] Despite number of treatment modalities reported in the literature there is no single definitive treatment that has been proven to be effective for LBA. ^[1] The key to understanding low back pain is understanding the source of pain. A vast majority 80-90% are classified as non-specific low back pain. The term non-specific or idiopathic LBA represents lack of medical knowledge about this diversified group of patients. It is assumed that many of the non-specific low back pain cases are related to musculoskeletal and postural dysfunctions. Musculoskeletal pain problems involve fibromyalgia and myofascial pain syndrome.^[2] The myofascial pain syndrome is a common non-articular local musculoskeletal pain syndrome caused by myofascial trigger points located at muscle, fascia or tendinous insertions.^[3]

A trigger point is defined as a hyperirritable spot located in a palpable, taut band of muscle fibres. Trigger points form from an excessive release of acetylcholine which produces sustained sarcomere contracture. Decreased levels of adenosine triphosphate caused by reduced blood flow renders the muscle fibres with insufficient energy to return calcium to the sarcoplasmic reticulum thus leading to energy crisis. This leads to increasing metabolic demands resulting in local temporary hypoxia and release of noxious histochemicals which may account for MTrP pain.^[3-6] Trigger points can either be active, which are tender and spontaneously painful, or latent, which are tender but not spontaneously painful.^[3]

There are many factors that have been proposed to result in development and persistence of MTrP pain. These factors include anatomic abnormalities, various postural habits, vocational activities causing excessive strain on a particular muscle, tendon or ligament, metabolic and endocrine dysfunctions, enzyme dysfunctions, psychological stress, chronic infection and infestation, sleep disorders, lack of exercise etc.^[7-9]

Trigger points in the quadratus lumborum, gluteus medius, gluteus minimus, gluteus maximus, piriformis and iliopsoas are mainly implicated in low back pain.^[10] Simons and Travell suggest that trigger points in quadratus lumborum and gluteus medius are frequently found in low back pain. Trigger points show a definitive referral pattern. The QL muscle group can consist up to four trigger points that refer pain to low back, groin, hip and gluteal regions. QL being a hip and spine stabilizer, Active QL trigger points can cause severe pain while in an upright posture.^[11]

There are four potential trigger points in the QL muscle including, Upper - found just lateral to where the lumbar paraspinal muscles and the 12th rib meet; Lower - lies deep where paraspinal muscles meet the hip crest; Middle or deep - lies closer to the spine next to the 3rd and 4th lumbar vertebrae.^[12]

The QL muscle plays a prominent role in normal body mechanics. This muscle group is composed of several small muscles located deep within the lower back. QL helps to extend the lumbar spine, cause lateral flexion and is also an important stabilizer of lumbar spine.^[13-16] A sustained contraction of the QL is required during sitting, walking, lying and other functional activities in order to stabilize the trunk and maintain body mechanics. Poor posture and body positioning alters the body mechanics which results in development of MTrPs in this muscle.^[17]



The QL trigger points can be activated by poor posture, altered body mechanics, seated postural stress (sitting without back support or without contacting the backrest, no lumbar support, no scapular contact), overloading the muscle, bending and reaching movements lifting heavy weights, major body trauma as in RTA, having a genetically short leg or small hemipelvis that causes a lateral tilt in pelvis, walking or running on a canted surface, sleeping on a soft bed, triggered by various bacterial or viral infections or a combination of above mentioned factors. [11,12,18]

The identification of a trigger point is however a subjective clinical judgement. For evaluative and diagnostic purposes localized tenderness, a taut palpable band in muscle concerned, presence of hypersensitive tender spot in the taut band, typical referred pain pattern of trigger points in response to compression, limited stretch range for the muscle concerned and a local twitch response elicited by snapping palpation of taut band are criterion to establish the presence of an active trigger point. [11,12,18]

Thus, the focus of the study is emphasized on presence of myofascial trigger points in quadratus lumborum and to determine the possible risk factors responsible for the development of MTrPs in cases of mechanical low back pain. The findings of this study may lead to increased emphasis on assessment and treatment of myofascial trigger points (MTrPs) in cases of mechanical LBP and the same may help to further prevent the development of MTrPs by avoiding the potential risk factors.

Materials and methods

This Cross-Sectional study was conducted after approval from the institutional Sub-Ethics committee. Eligible participants signed a written informed consent prior to enrolment in this study.

Participants

Fifty subjects of either gender who were referred to the Physiotherapy OPD of Dr. D.Y. Patil college of Physiotherapy, Pune, with a complaint of LBA were assessed for the presence of pure muscular symptoms excluding subjects with signs of malaise or fever, fractures or any infectious disease of the spine, malignancy or post-operative lower back conditions. The remaining subjects became sample for the study.

Procedure

Demographic data was collected from all participants and then they were assessed for severity of pain on VAS (visual analogue scale) and checked for the presence of MTrPs in the QL. Palpation was done bilaterally in the QL muscle checking for jump sign, for which the patients were positioned in side lying with the side to be assessed facing up and upper hip and knee flexed to allow the quadratus lumborum to relax (Fig.1). An alternative position is in prone lying (Fig.2).



Fig.1



Fig.2

Musculofascial palpation comprises of two objectives: 1. To locate the affected musculofascial region. 2. To assess the health of the affected musculofascial region.

Methods of palpation included:

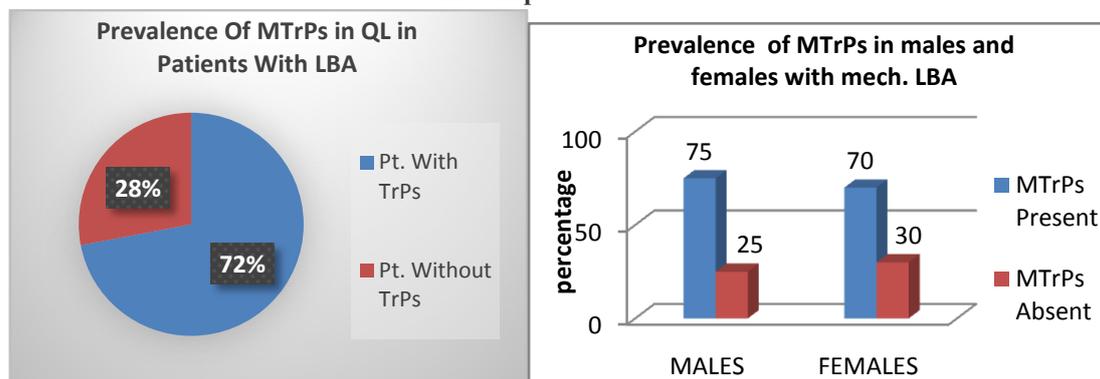
1. Flat palpation- with finger bellies for an initial survey of the muscle tone for any spasm or superficial tenderness.
2. Fingertip palpation- across the muscle fibres to locate the taut bands and trigger points.
3. Pincer palpation- between the thumb and fingers for accessible muscles.
4. Overlying hand palpation- one hand applies pressure while the other hand palpates for deep muscles.

QL trigger points are located on the lateral aspect of transverse process from L1-L5. Pressure is supposed to be applied anteriorly then medially. After assessing the subjects for trigger points in the quadratus lumborum, those with positive results were presented with a pre-validated questionnaire based on the risk factors associated with the development of myofascial trigger points in quadratus lumborum. It included 15 questions based on the lifestyle, day to day activities undertaken and psychological and pathological conditions, that might have put the muscle under stress and lead to development of trigger points.

Results

Mechanical low back pain was seen more prevalent in case of women i.e. 60% as compared to men i.e.40% and is more common with patients in the younger age group as compared to the older age categories.

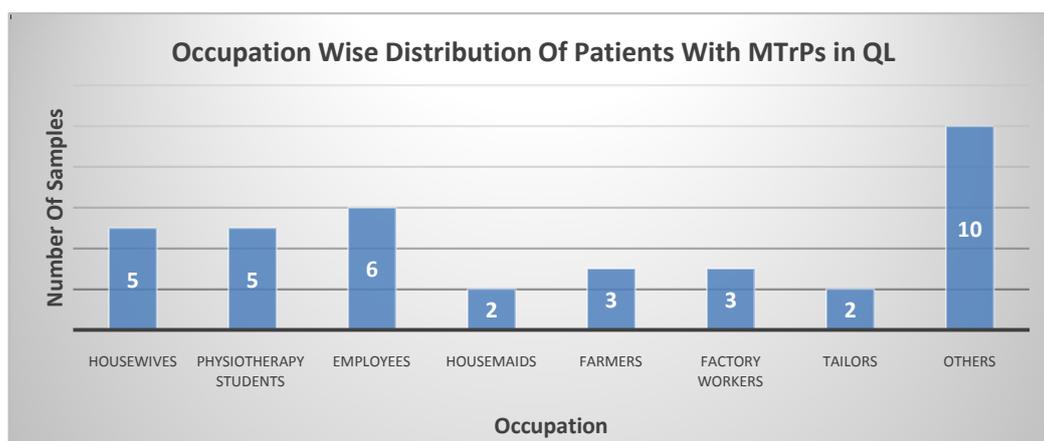
Amongst these subjects with mechanical LBA, Prevalence of myofascial trigger points in Quadratus Lumborum was found to be 72%, with a C.I OF 95% (0.58-0.82) (Graph no. 1). The trigger points in QL were seen to be slightly more common in males i.e. 75% as compared to females i.e. 70% (Graph no. 2).



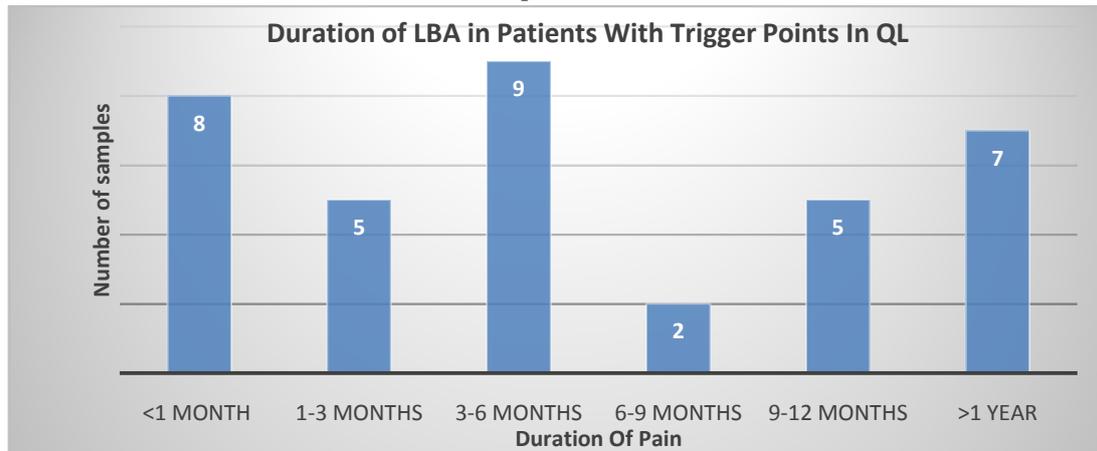
Graph no.1

Graph no.2

QL MTrPs were seen more commonly in the younger age group, with the highest prevalence i.e. 48% found to be in patients 20-30 years of age. Occupation wise distribution showed dominance of QL MTrPs in office workers with a 9 to 5 desk job, followed by housewives and students (Graph no. 3). Also, the phenomenon was more common in patients suffering from low back pain of acute duration (0-6 months), rather than in long standing cases of low back pain. Majority of positive findings were seen in patients with LBA persisting from 3-6 months (Graph no.4).



Graph no.3



Graph no.4

Based on evaluation of the subjective feedback questionnaire, out of the risk factors enlisted for developing trigger points in the QL (Table 1), the following proved to be more prevalent- occupation involving repetitive and strenuous activities like bending and lifting, occupation involving long hours of sitting without back support, lifting heavy weights at gym or other recreational activities, walking or running on an inclined surface, sleeping on a very soft bed, lack of exercise and sedentary lifestyle.

Risk Factors	Percentage of pts. with MTrPs in QL
occupation involving long hours of sitting without back support	55.6%
occupation involving any repetitive or strenuous activity like bending and lifting activities	63.9%
lifting heavy weights at the gym or during other recreational activities	52.8%
performing excessive or vigorous exercise without proper guidance	27.8%
walking or running on an inclined surface	47.2%
personal or work-related stress	41.7%
suffering from any endocrine or metabolic disorder	25%
recent bacterial or viral infection	21%
sleep disturbances	31.7%



sleeping on a very soft bed	47.2%
lack of exercise	50%
sedentary lifestyle	44.4%
prolonged bed rest in recent years	11.1%

Table no. 1

Discussion

The study conducted shows the high prevalence of myofascial trigger points in Quadratus Lumborum in patients suffering from mechanical low back pain. It also gives us a review of the Risk Factors associated with the development of Trigger Points in Quadratus Lumborum.

A total of 50 patients were included in the study. From this study we found the Prevalence of development of myofascial trigger points in Quadratus Lumborum in patients with mechanical LBA is 72%.

A study done by Coelho DM, Barbosa RI, Pavan AM, Oliveira AS, Debora B, Defino HLA on Prevalence of myofascial dysfunction in patients with low back pain shows that out of 70 individuals participating in the study, 56 (76%) presented trigger points in quadratus lumborum.⁴ The result of this study was similar and supporting to the result of our study.

We also found the phenomenon was slightly more common in males i.e. 75% as compared to females i.e. 70% amongst subjects with MTrPs in QL (Graph no.2), possibly owing to the more vigorous manual hardships undertaken by men as compared to women.

Age wise distribution of patients with trigger points in QL reveals that it is more common with patients in the younger age group of 20-30 years as compared to the older age categories. The young generation is enthusiastic and undertake variety of strenuous activities like lifting heavy weights during gym and other recreational activities which could be a possible reason. It is also seen in the study that trigger points are more common in patients suffering from shorter duration of low back pain rather than in long standing cases of low back pain of duration greater than one year. Majority of positive finding were seen in patients with LBA persisting for 6 months or less.

The results show that occupation has a major role in development of trigger points in Quadratus Lumborum and were mainly seen in housewives, students and office workers who have 9-5 desk jobs (Graph no.3).

A study done by Chee Kean Chen, Abd Jalil Nizar, On Myofascial pain syndrome in chronic back ache patients, Korean journal of pain, 2011 June, shows the demographic characteristics of patients with myofascial pain syndrome, in which Housewives, Office workers and Businessmen predominate whereas students were not included in the study.⁸ Our study showed similar results, data interpreted showed QL MTrPs to predominate in Indian housewives as their daily



chores involve a lot of repetitive bending work as well as lifting weights during household work which may contribute to formation of trigger points in quadratus lumborum muscle fibers whose major function is lateral flexion and extension of the lumbar spine and stabilizing the pelvis during the same. Similarly, it was seen to be prevalent in physiotherapy students with acute mechanical LBA owing to their long hours of dealing with patients in Neuro and Pediatric OPD's which is associated with lifting hefty patients and children putting undue load on the lower back. On the other hand, it was seen in employees with 9-5 desk jobs involving prolonged hours of sitting in the same position with poor ergonomic settings.

The main risk factors associated with formation of triggers in QL were evaluated via a subjective questionnaire given to patients with trigger points present in QL. The risk factors which proved to be more prevalent for developing trigger points included occupation involving repetitive and strenuous activities like bending and lifting, occupation involving long hours of sitting without back support, lifting heavy weights at gym or other recreational activities, walking or running on an inclined surface, sleeping on a very soft bed, lack of exercise and sedentary lifestyle.

Some supporting studies indicate that acute trauma or repetitive microtrauma can predispose the development of trigger points.⁴ QL trigger points can be activated by overload of the muscle, bending and reaching movements.⁹ A study done by Gerard A. Malanga, Eduardo J. Cruz, on Myofascial low back pain indicates that factors that

predispose to development and persistence of MTrP pain include vocational activities causing excessive strain on a particular muscle, postural habits, psychological stressors and lack of exercise.³

Stratification of these risk factors will further enable us to give sound ergonomic advices to patients. Trigger point induced non-specific mechanical low back pains can be kept in check to a great extent.

Conclusion

From this study we conclude that the prevalence of MTrPs in the QL is high in patients with mechanical LBA and that, repetitive and strenuous activities like bending and lifting heavy objects, as well as long hours of sitting without back support, lack of exercise and sedentary lifestyle are major risk factors for developing MTrPs in QL.

Limitations

A larger sample population could be taken into consideration since the prevalence of mechanical LBA is high amongst general population.

Future scope

Further studies can be done to see if patients with mechanical low back pain benefit from treating the myofascial trigger points in the lower back since the prevalence of patients with TPs in Mechanical LBA is high.



Future studies can also be done to find the prevalence of trigger points in SI joint pain and dysfunction.

Conflict of interest: None.

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