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Prevalence of Myofascial Trigger Points in Brachioradialis, Biceps Brachii, Triceps Brachii, Supinator and Extensor Carpi Radialis Brevis in Lateral Epicondylitis

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Abstract

Introduction– Myofascial pain syndrome (MPS) is a myalgic condition in which muscle and musculotendinous pain are the primary symptoms. Some muscles are likely to develop Myofascial trigger points in cases of lateral epicondylitis and become possible cause of mainstay of symptoms. Hence the study was undertaken to find the prevalence of myofascial trigger points in such muscles.

Methodology & Results – 40 individuals aged between 20-50 years fulfilling the inclusion criteria were selected for the study with acute and chronic lateral epicondylitis. Brachioradialis, Biceps Brachii, Triceps Brachii, Supinator and Extensor carpi radialis brevis were checked for the presence of trigger point by palpation. Pressure algometer was used to check the pain threshold of each point. When the subject reports feeling pain the action of pressure is stopped and reading is recorded.

Results showed a higher prevalence in females than males. The most prevalent area for trigger point was the brachioradialis followed by biceps brachii, extensor carpi radialis, triceps brachii and the least prevalent was the supinator.

Conclusion - This study provides that the relation between myofascial trigger points in lateral epicondylitis is relatively high especially in Brachioradialis, It also shows that latent trigger points don't lead to severe functional disability.

Key words – *Tennis Elbow; taut band; patient related tennis elbow evaluation; myalgia*

Introduction

Myofascial pain is characterized by hyper irritant points called trigger points. They are caused by muscle injury due to repeated movements or pure posture. In case of lateral epicondylitis these trigger points are caused by repeated injury over the lateral epicondyle in the forearm. [1]

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To understand the physiology of trigger points we must know that, Muscles are composed of fibers and for any movement to occur they contract and relax in response a stimuli from higher centers. When these fibers become over stimulated they cannot contract and relax and form contraction knots. A trigger point consists of contraction knots and the muscles become shortened. The persistent contraction of these muscles leads to decreased blood supply and irritation of nerves causing pain.

The trigger point is a small, painful, locus of abnormal muscle which is the source of the muscular dysfunction. Myofascial pain syndrome (MPS) is a form of myalgia that is characterized by local regions of muscle hardness that are tender and that cause pain to be felt at a distance, i.e., referred pain. Clinical diagnosis

of a MPS is made by history and by palpation of muscle to identify the taut band. Myofascial trigger points (MFTrP's) are considered active if the palpation evokes same pain as before, and if it is a latent MTrP it does not evoke the usual pain.

Criteria for diagnosis MFTrP are palpable taut band, patient pain recognition, exquisite spot tenderness and painful range of motion at the end of range.[2]Once all these criteria's are fulfilled a region on the muscle can be confirmed as a trigger point.

Muscle pain is a common problem that is underappreciated and often undertreated. Myofascial pain syndrome (MPS) is a myalgic condition in which muscle and musculotendinous pain are the primary symptoms. The following muscles are likely to develop MFTrP's in cases of lateral epicondylitis.[1]

- **Brachioradialis:**There is pain at the muscle bulk on the lateral side of the elbow which is palpated my thumping palpation. There are active Trigger points(TP's) felt at the muscle bulk as a part of lateral epicondylitis.[1]

- **Biceps Brachii:**The biceps referred pain pattern covers the anterior shoulder and sometimes extends to the elbow. The long head of this muscle crosses two joints and requires both elbow extension and horizontal extension of the arm at the shoulder for full stretch.[1] As the muscle is closely related to the elbow joint, development of TP's can might occur in case of lateral epicondylitis due to compensation and increased work load.[1]

- **Supinator**. This muscle refers pain to the dorsal web space of the thumb and to the region of the lateral epicondyle , which becomes tender to finger taps. The finger and wrist extensors, which form the extensor muscle mass attached to the lateral epicondyle, frequently also develop TP's as part of the "tennis elbow" syndrome. These TP's are readily located by palpation of the extensor muscles for taut bands and local twitch responses.[1]

- **Extensor carpi radialis brevis** : The hand and finger extensor group of muscles is essential for strong grip. Patients with TPs in these muscles frequently develop a painful hand grip and an impaired sense of grip strength; a cup or a glass unexpectedly drops from their grasp. Active TPs in the extensor carpi radialis refer pain to the lateral epicondyle and dorsum of the hand.[1]

- **Triceps brachii**: The three heads of the triceps muscle have five TP's locations that refer separate pain patterns. The long head is a two joint muscle; TP's in it restrict flexion both at the elbow and at the shoulder. The long head of the triceps is commonly involved with other shoulder-girdle muscles and is a frequently overlooked cause of shoulder dysfunction. The taut bands of the long head TP's are readily felt by pincer palpation of the belly of the long head just above mid-arm adjacent to the humerus. The muscle is examined for taut bands as the muscle fibers slip between the finger tips that start palpating outward from the groove between the muscle and the humerus.[1]

Pain complaints were found in 32% of a university primary care general internal medicine practice series of 172 patients of which 30% were found to have myofascial pain (9% of the total number of patients) (Skootsky et al. 1989). In a pain treatment referral program known for its interest in myofascial pain, within a larger neurological practice, 93% of persons with musculoskeletal pain had MTrPs (Gerwin 1995).[1]

Myofascial trigger points are overlooked in cases of tennis elbow because it clinically presents itself as radiating pain due to lateral epicondylitis. The myofascial pain usually goes unrecognized at trigger points. Hence, there is a need to determine the prevalence of myofascial trigger points in the following muscles for better management and prognosis.

Methodology

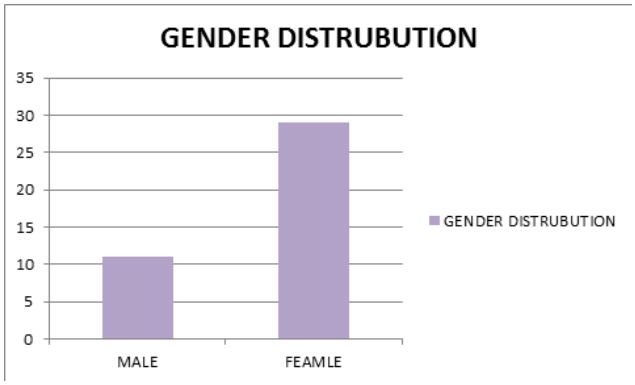
After the institutional ethical committee approval, 40 individuals diagnosed with acute or chronic lateral epicondylitis and positive for trigger points in Brachioradialis, Biceps Brachii, Triceps Brachii, Supinator and Extensor carpi radialis brevis participated in this observational study. They were 20-50 years of age who visited outpatient department of Dr. D.Y. Patil College of Physiotherapy,Pimpri. Patients who had any previous fracture and fall, any recent surgery In the upper extremity or bilateral lateral epicondylitis were excluded.All the participants were informed about the content and purpose of the study and written informed consent was taken from the participants in the study.

The principal investigator (trained physiotherapist) undertook a standardized history and physical examination of patients. Demographic data like age,

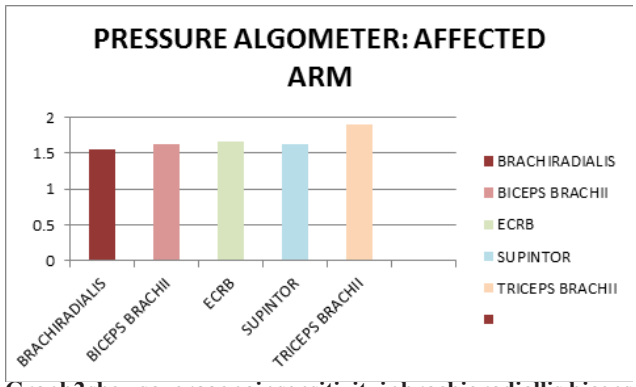
gender, location and nature of patient's symptoms were noted. Cozen's mill's and Maudley test was used to test the subjects clinically. During the test, standardized verbal instructions were given by the examiner to explain the test to each subject. Each subject was asked to lie on plinth in supine position. The patient is asked extend the wrist and the therapist puts enough pressure to resist this motion. Pain elicited at the lateral epicondyle shows a positive for cozen test. Patient Is then asked to extend the middle finger and resistance is applied against the same. Pain at the lateral epicondyle confirms the diagnosis. Mills test is performed by flexing the wrist passively with the elbow completely extended. Pain at the lateral epicondyle is positive foe lateral epicondyle.

This was followed by checking Brachioradialis, Biceps Brachii, Triceps Brachii, Supinator and Extensor carpi radialis brevis for the presence of trigger point by palpation. After which, in case the trigger points were felt in any of the following muscles pressure algometer was used to check the pain threshold of each point. The Pressure algometer is placed perpendicular to the tissue surface and pressure applied steadily at a constant rate. When the subject reports feeling pain the action of pressure is stopped and reading is recorded. Subjects were then asked a series of question from the patient rated tennis elbow evaluation and given the total score. The total score will determine the degree of pain and difficulty in doing daily activities.

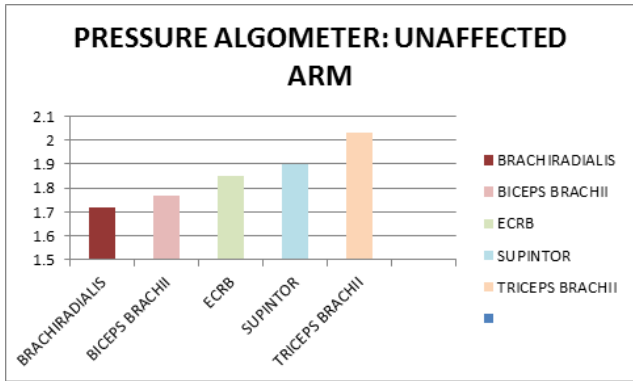
Data Analysis



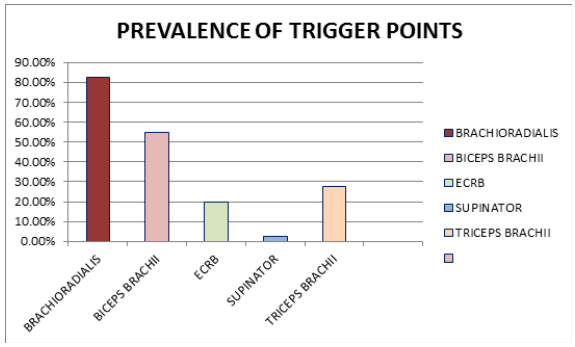
Graph 1 shows sample distribution of male and female population for sample size n=40



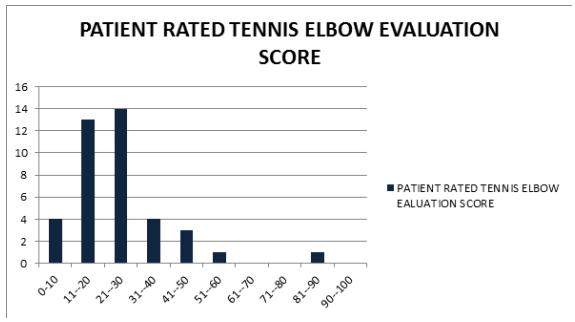
Graph 2 shows average pain sensitivity in brachioradiallis, biceps brachii, Extensor carpi radialis brevis, Supinator and triceps brachii in affected arm.



Graph 3 shows average pain sensitivity in brachioradiallis, biceps brachii, Extensor carpi radialis brevis, Supinator and triceps brachii in unaffected arm.



Graph 4 shows Prevalence of trigger points in brachioradiallis, biceps brachii, Extensor carpi radialis brevis, Supinator and triceps brachii



Graph 5 shows subjects categorized according to the score in evaluation

(0: bestscore 100: worst score)

Results

• Out of 40 patients 11 were males and 29 were females indicating that there is a high prevalence of lateral epicondylitis in females due to repeated activities especially household chores.

(Graph 1)

• The average pressure pain sensitivity in the affected arm in the following muscles are as follows **(Graph 2)**

1. Brachiradialis:1.55
2. Biceps Brachii: 1.63
3. Extensor carpi radialis brevis: 1.66
4. Supinator:1.63
5. Triceps brachii:1.85

• The average pressure pain sensitivity in the unaffected arm in the following muscles are as follows **(Graph 3)**

1. Brachiradialis:1.72
2. Biceps Brachii: 1.77
3. Extensor carpi radialis brevis: 1.85
4. Supinator:1.90
5. Triceps brachii:2.03

• Out of the 40 patient's prevalence of trigger points was seen most in brachioradialis followed by biceps brachii then extensor carpi radialis brevis the triceps and least in supinator.

(Graph 4)

• According to the patients related tennis elbow evaluation most of the patients had a score below 50/100 showing low levels of pain and disability in functional activities.**(Graph 5)**

Discussion

In this study we found that in subjects who have lateral epicondylilitis the presence of trigger points is maximum in brachioradialis (82.5 %) followed by biceps brachii (55%) extensor carpi radialis (20%) triceps brachii (27.5%) and supinator (2.5%). Out of which, some spots are more irritable than others; this was tested with pressure algometer. There were varying readings of pain elicited on these MFTrP's on applying the pressure algometer. The brachioradialis was the most pain sensitive (1.72 kg) while the triceps brachii was the least sensitive (2.03 kg). Most of the patients complained of pain at the elbow while doing household chores, carrying heavy bags, riding a bike or recreational activities like playing badminton, cricket etc. The pain sensitivity in males is much lower than females. Pain sensitivity is also more in the affected arm as compared to the unaffected arm.

Kao et al found that every subject has a hyper irritant spot in the brachioradialis muscle with is latent in nature. This can be caused by any minor injury which was ignored leading to subsequent chronic inflammation.

The findings suggested that MFTrP's are most prevalent in brachioradialis followed by biceps brachi, extensor carpi radialis, triceps brachii and the least in supinator. This can be explained as they are closely related to the elbow joint and most of the functional activities are done with the flexion and extension of the elbow joint which can be caused by any micro injury.[9]

Simons et al[1] proposed that excessive acetylcholine secretion may induce electrotonic potentials (endplate noise observed in the MTP region) and cause focal contraction of sarcomeres (contraction knot1) near the endplate zone, and these may subsequently develop an energy crisis (excessive energy consumption due to persistent muscle contraction). The sensitizing substances released during an energy crisis may cause peripheral sensitization of the nociceptors near the endplate. An MTP may be formed in this way.

In a subject with lateral epicondylitis the myofascial pain usually goes unrecognized or misdiagnosed. Once these trigger points are palpated and confirmed it can be treated with MFR and ultrasound, thus reducing the pain and help in clinical practice. The limitation for this study is the proper palpation technique and experience which varies between examiners. Findings suggested an acceptable agreement on MTrPs classification in both ECRB and EDC muscles between the expert examiners. Nevertheless, when comparing expert and non-expert evaluators, the agreement level decreased dramatically [2] , when comparing MTrPs location between expert evaluators and the inexpert examiner, a strong decrease

in the percentage of agreement was found, suggesting that an evaluator's manual skills may play a key role in diagnostic accuracy.[2]

Results of patient rated tennis elbow evaluation questionnaire where the patient was asked a series of question from their personal activity to functional where pain was subjectively noted on those specific activities. Most patients reported mild to moderate pain which can be explained as the trigger points present were mostly latent and not active. Thus, indicating that latent trigger points do not cause severe functional impairments but elicit pain only on repeated activity due to over use and strain on the particular muscle.

This study can be future continued by finding the better line of treatment for these trigger points with physiotherapy interventions and suggesting ergonomics by which trigger points will not reoccur.

Thus, from this study we can say that evaluation of lateral epicondylitis must include the palpation of trigger points and appropriate treatment must be given to reduce myofascial pain.

Conflict of Interest – None

Source of Funding- Self

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