

# Prevalence of Myofascial Trigger Points in Shoulder Girdle Muscles in Patients with Adhesive Capsulitis

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**Abstract:** ***Introduction:** Adhesive capsulitis is a common musculoskeletal condition. Because of altered postural mechanisms and the use of accessory muscles during shoulder movements in these patients, trigger points often develop in the muscles around the shoulder joint. Which may further contribute for functional impairments. **Aim:** To determine the prevalence of the number of myofascial trigger points and its presence in shoulder girdle muscles in patients with adhesive capsulitis. **Methods:** 50 patients having adhesive capsulitis were included in the study and upper trapezius, pectoralis major, pectoralis minor, supraspinatus, infraspinatus, anterior, middle and posterior deltoid muscle were assessed for presence of active and latent MTrPs using palpation method by therapist having clinical experience in identifying MTrPs. **Results:** Data was collected and Mean, median, standard deviation, and frequency distribution were calculated for descriptive purposes. Results of this study revealed that the myofascial trigger points were most prevalent in upper trapezius (88%), middle deltoid (82%), supraspinatus (76%) which was followed by anterior deltoid (64%), infraspinatus (52%) and pectoralis major muscle (50%) among patients with adhesive capsulitis. And there were maximum of 2 MTrPs in each muscle in most of the patients. **Conclusion:** MTrPs are very prevalent in shoulder muscles of patients with adhesive capsulitis with upper trapezius, middle deltoid, supraspinatus, anterior deltoid, infraspinatus, pectoralis major muscles being most affected.*

**Keywords:** Prevalence, Adhesive capsulitis, Myofascial trigger points

## 1. Introduction

Adhesive capsulitis is a common musculoskeletal condition and affects around 2% to 4% of the general population [1]. It contributes to around 43.1% of the shoulder cases reported in India [2]. Patients with adhesive capsulitis complain of pain and disability due to affected shoulder and is characterized by insidious shoulder pain and stiffness that aggravates at night, and there is loss of passive and active external rotation of the shoulder [3]. Among the dysfunctions, the mobility deficits affects the quality of life of the patients the most. Mobility deficits affects not only the glenohumeral movement but also the scapulothoracic articulation hence the patients face difficulty primarily in overhead activities [4], [5], [6].

The pathogenesis of adhesive capsulitis is not known. However, previous literature suggest that the restriction in shoulder movement in adhesive capsulitis is due to the involvement of non-contractile structures around shoulder causing shoulder capsule adhesion due to fibro vascular inflammation and thickening of joint capsules, and coracohumeral ligament thickening etc. [7]. In the surface EMG study carried by Wani et al., the authors reported the reduction in shoulder muscle activation during MVIC in patients with shoulder dysfunction with type II diabetes. Therefore, we speculate the alterations in contractile tissues around shoulder may be one of cause for the development of adhesive capsulitis [8]. In addition, found abnormality in the contractile tissue such as myofascial tightness and muscular adhesions may cause shoulder mobility deficits and functional limitations in patients with adhesive capsulitis [9], [10], [11].

Additionally, patients with adhesive capsulitis may have rounded shoulders and stooped posture and the scapula of the

involved shoulder is elevated, laterally rotated, and abducted as a compensatory excessive scapular motion required to complete the range due to presence of pain and stiffness. Because of these altered postural mechanisms and the use of accessory muscles during shoulder movements, trigger points often develop in the muscles around the shoulder joint [12].

Myofascial trigger points (MTrPs) are tender points in the taut bands of the muscles, that are highly sensitive to pressure, and produces characteristic referred sensations, including pain, muscle dysfunction [13], and sympathetic hyperactivity [14] on application of pressure. MTrPs are classified into types: active and latent myofascial trigger points [13]. Although the exact pathophysiology of MTrPs is not fully known, both active and latent MTrPs are said to be associated with abnormal electrical activity called endplate noise, and several pro-inflammatory and pain-inducing substances have been found at active MTrP [15], [16]. It has also been shown that patients with active trigger points have high disability<sup>11</sup> and could affect the muscle activation pattern (MAP) [17], and hence may affect the muscle performance.

Management of AS should be focused by treating causative factors to get maximal benefit. Many physical therapy interventions focused on treating pain, capsular tightness and chronic inflammation, muscle strength imbalance etc. Previous literature demonstrated effectiveness of various physiotherapy interventions focusing on above causative factors. But as discussed previously, due to chronicity of disease, patients may develop myofascial trigger points in the shoulder muscles may further contribute for functional impairments which need to be addressed during treatment of adhesive capsulitis.

Hence, there is a need to prove the presence of trigger points in shoulder muscles having adhesive capsulitis and there are very few research studies on prevalence of trigger point in

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shoulder pain and particularly in adhesive capsulitis [18], [19], but based on clinical experience, MTrPs seem to be associated with shoulder pain, disability, and dysfunction which are characteristic features of adhesive capsulitis. Therefore, this study was conducted with an aim to determine the prevalence of the number of myofascial trigger points and its presence in shoulder girdle muscles in patients with adhesive capsulitis.

**2. Materials and Methods**

The commencement of the observational study was done after obtaining approval by the Institutional Ethics Committee. 50 patients with adhesive capsulitis attending outpatient department of physiotherapy in Dr. Vithalrao Vikhe Patil Memorial Hospital, Ahmednagar were recruited using purposive sampling method.

Patients of both genders with age between 40 -65 years, who were medically diagnosed patients of unilateral adhesive capsulitis with and without diabetes mellitus and reporting pain ranging in between 3 – 8 on NPRS and stiffness of shoulder at least from 3 month duration were included in the study. Patients reporting past history of surgery, trauma or fracture of affected shoulder. Instability or dislocation of the affected shoulder, degenerative pathology, shoulder pain of cervical origin, neurovascular injuries or patients who have taken muscle relaxants or analgesics taken 72 hours before examination were excluded from the study. Prior to examination written informed consent was taken from the patients who were willing to participate and their demographic data including name, age, gender, occupation, any history of systemic diseases, medications were recorded.

**2.1 Method myofascial trigger points assessment**

The active and latent MTrPs were found in upper trapezius, pectoralis major, pectoralis minor, supraspinatus, infraspinatus, anterior, middle and posterior deltoid using palpation method by therapist having clinical experience in identifying MTrPs. For palpation of the trigger points, the patient was positioned in such a way that the muscle which is to be examined is in lengthened position. Cross-fiber palpation was used to identify any taut bands. Flat palpation method was used for identifying myofascial trigger points in pectoralis major, pectoralis minor, supraspinatus, infraspinatus anterior, middle and posterior deltoid muscles and pincer palpation method was used for upper trapezius muscle.

The criterion for myofascial trigger point diagnosis was as following: firstly, presence of palpatory taut band in skeletal muscle around the shoulder is identified then presence of hyperirritable tender spot within the taut band is identified by the therapist. When this tender point has been identified, the point is marked on the skin and the patient is asked if the point was tender when compressed and whether the pain is referring elsewhere Snapping palpation of the taut band should elicit local twitch response [13].

Figures 1 to 10 showing trigger point location and its referred pain in the respective muscles.

**3. Result**

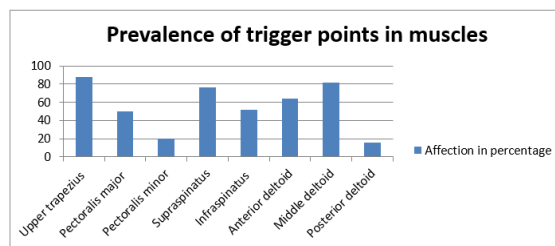
**Table 1:** Characteristics of the patients (n=50)

<b>Age (Year)</b>	Mean ± SD	48.16 ± 5.02
<b>Gender</b>	Male / Female	26 / 24
<b>Affected side</b>	Right / Left	27 / 23
<b>Duration of symptoms</b>	3- 5 months	31(62%)
	6- 8 months	16 (32%)
	9-12 months	3(6%)

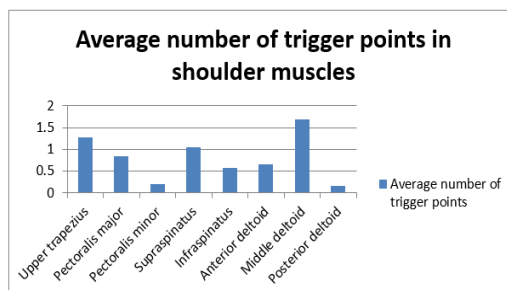
As shown in the graph no. 1, the upper trapezius muscle is affected maximally with 44 (88%) patients of adhesive capsulitis having myofascial trigger points in shoulder muscles. Secondly, middle deltoid muscle is affected with 41 (82%) patients having trigger points followed by supraspinatus muscle in 38 (76%) patients, anterior deltoid muscle in 32 (64%) patients, infraspinatus muscle in 26 (52%) patients, and pectoralis major muscle in 25 (50%) patients. The least common shoulder muscles that have myofascial trigger points in adhesive capsulitis are pectoralis minor muscle i.e in 10 (20%) patients and posterior deltoid muscle in 8 (16%) patients.

**Table 2:** Prevalence of myofascial trigger points in shoulder muscles of patients with adhesive capsulitis

Muscles	Average number of trigger points	Number of patients in which trigger points were observed	Percentage of patients in which trigger points were observed
Upper trapezius	1.28	44	88
Pectoralis major	0.84	25	50
Pectoralis minor	0.2	10	20
Supraspinatus	1.04	38	76
Infraspinatus	0.58	26	52
Anterior deltoid	0.66	32	64
Middle deltoid	1.68	41	82
Posterior deltoid	0.16	8	16

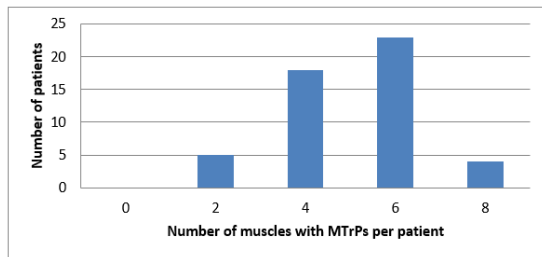


**Graph no. 1:** Prevalence of myofascial trigger points in shoulder muscles of patients with adhesive capsulitis



**Graph no. 2:** Average number of trigger points in a particular shoulder muscle of patients with adhesive capsulitis

All 50 patients with adhesive capsulitis had MTrPs in shoulder muscles. The median number of muscles with MTrPs per subject was 5 (range 2 to 8) as shown in the graph no. 2 of frequency distribution.



**Graph no. 3:** The frequency distribution of the number of muscles with MTrPs per patient

The X-axis shows the number of muscles with MTrPs per patient, and the Y-axis shows the number of patients (n = 50).

#### 4. Discussion

As per our knowledge, there are very few studies found in the literature which report prevalence of the myofascial trigger points in shoulder muscles of patients with chronic shoulder pathologies. The present study aimed at finding the prevalence of MTrPs in shoulder muscles in patients with unilateral adhesive capsulitis. We observed a great variation in the number of shoulder muscles affected with myofascial trigger points and its number in patients with adhesive capsulitis.

Out of 50 patients, 27 of them had right sided adhesive capsulitis and remaining 23 had left side involved, Maximum of the patients (62%) had symptoms from 3-5 months of duration, 32% of patients complained of symptoms since 6-8 months and rest 6% of patients had symptoms from 6-8 months.

After assessment of MTrP using standardized procedure and its analysis, results of this study revealed that the myofascial trigger points were most prevalent in upper trapezius (88%), middle deltoid (82%), supraspinatus (76%) which was followed by anterior deltoid (64%), infraspinatus (52%) and pectoralis major muscle (50%) among patients with adhesive capsulitis. And there were maximum of 2 MTrPs in each muscle in most of the patients.

These results are supported by a study conducted by CarelBron et al. that concluded infraspinatus and upper trapezius muscles were the most affected shoulder muscles in subjects with unilateral, chronic, non-traumatic shoulder pain [20]. Another study also suggested that the prevalence of MTrPs is highest in upper trapezius muscles in patients affected with adhesive capsulitis [21]. These were in accordance with the results of this study.

One of the mechanism for development of myofascial trigger points in upper trapezius, supraspinatus, pectoralis major muscles would be that the patients of adhesive capsulitis adapts an protective posture with rounded shoulders and keeps the affected shoulder elevated [22]. In order to overcome this altered posture and impaired glenohumeral

motion, the patient uses the accessory musculature including upper trapezius, supraspinatus and anterior fibers of deltoid muscle which may lead to development of pain and trigger points around the shoulder joint in this muscles[22], [23].

Another mechanism says that trigger points develop as a result of overuse. Overuse of the upper trapezius, middle deltoid, supraspinatus and pectoralis major muscles due to the altered posture causes lowering of pH and increase in inflammatory mediators in this muscles. As a result of this MTrPs are formed in these muscles by persistent nociceptive input by the central sensitization of the C fiber nociceptive withdrawal reflex and plateau depolarization of withdrawal agonist alpha motor neurons and reticulospinal motor facilitation of antigravity muscles and plateau depolarization of withdrawal antagonist alpha motor neurons for compensation [24]. Hence, high prevalence of trigger points is present in Upper trapezius, middle deltoid, supraspinatus, anterior deltoid, infraspinatus, pectoralis major muscles which resulted in altered biomechanics of the shoulder joint.

#### 5. Limitations

The main limitation of our study is that the sample size was small. Other limitation was that MTrPs are thought to be present in both acute and chronic shoulder conditions but we considered patients with only chronic adhesive capsulitis as it is considered symptoms for longer duration play an important role in development of MTrPs.

#### 6. Conclusion

This study shows that MTrPs are very prevalent in shoulder muscles of patients with adhesive capsulitis with upper trapezius, middle deltoid, supraspinatus, anterior deltoid, infraspinatus, pectoralis major muscles being most affected. Most of the patients had maximum of 2 MTrPs in each muscle.

#### 7. Clinical implication

As per the results of this study, we suggest that an alternative approach may be used in the assessment and management of patients with adhesive capsulitis. Along with the non-contractile structures, the contractile tissues i.e. the muscles should also be considered while assessing adhesive capsulitis patients. Therefore, diagnosis and treatment of myofascial trigger points in patients with adhesive capsulitis as early as possible along with the conservative physiotherapy protocol may lead to a better recovery in patients.

**Conflict of interest:** None.

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