To Evaluate Upper Limb Endurance and Function in Patients with Chronic Trapezitis

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A B S T R A C T

Background: Trapezitis, an inflammation of the trapezius muscle, commonly arises from poor posture, sedentary lifestyle, and prolonged static activities, leading to muscle imbalance and reduced endurance. As the trapezius functions synergistically with the serratus anterior for scapular stability, its dysfunction can impair upper limb performance. The push-up test and Upper Extremity Functional Index (UEFI) are effective tools for assessing upper limb endurance and functional ability in individuals with trapezitis.

Materials And Methodology: Observational Cross sectional study was done on 123 subjects presented with Chronic Trapezitis who were selected using Convenient sampling. Subjects were assessed for upper limb endurance using Push-up Test and UEFI Score was evaluated for the dominant upper extremity.

Results: The results showed that 48% of participants had poor push-up performance, while only 1% achieved an excellent level. Most participants (63.4%) reported little to no difficulty with dominant upper limb functions, and 35.8% experienced mild to moderate difficulty. Only 0.8% had considerable difficulty, with none showing extreme impairment.

Conclusion: The study concludes that individuals with chronic trapezitis exhibit reduced upper limb endurance, with most participants falling under the poor category in the push-up test. However, despite decreased endurance, the functional ability of the dominant upper extremity remains largely preserved, as indicated by higher UEFI scores. This may be due to compensatory muscle activity, adequate strength, and adaptation to mild pain, allowing individuals to perform daily activities with minimal difficulty.

Keywords: Chronic Trapezitis, Endurance, Upper extremity functions, Dominance, Push-ups, UEFI scale.

INTRODUCTION:

The trapezius is a large superficial muscle of the upper back that is divided into upper, middle, and lower parts. It extends from the occipital bone to the lower thoracic vertebra and laterally to the spine of the scapula, acting as a major stabilizer of the scapula. The trapezius works synergistically with other scapular muscles, particularly the serratus anterior, to maintain posture and shoulder movement [1,4].

Inflammation of this muscle, known as trapezitis, is commonly associated with neck and shoulder pain, stiffness, and restricted arm movement. It often results from poor posture, muscle overuse, or repetitive strain.[1] As the upper trapezius functions as a postural muscle, it is especially prone to overuse, leading to fatigue and discomfort [3]. Poor posture, such as forward head and rounded shoulders, alters the normal activation of trapezius fibers and causes abnormal scapular motion, which is closely related to pain and muscle imbalance [4].

A sedentary lifestyle is another major contributing factor to trapezitis. Studies show that prolonged sitting and screen-based activities, such as computer or smartphone use, lead to continuous low-level contraction of the upper trapezius, reducing blood flow and muscle recovery time. This sustained tension results in fatigue, microtrauma, and chronic myalgia. [5,6] Lack of physical activity also decreases the endurance of postural muscles, making them more susceptible to pain and dysfunction. [7]

Jobs involving repetitive arm motions or prolonged static postures overload the trapezius and related scapular stabilizers like the serratus anterior, rhomboids, and lower trapezius, leading to weakness and imbalance [2–4].

Muscle endurance—the ability of muscles to sustain activity over time—is often compromised in individuals with trapezitis. The push-up test is considered a simple and effective method to assess upper body endurance as it engages key muscles, including the trapezius and serratus anterior, responsible for scapular stability and upper limb function [5–7]. Physiological differences between males and females influence performance in this test, with men generally demonstrating greater endurance due to hormonal and muscular factors.[8]

To assess upper limb functional ability, the Upper Extremity Functional Index (UEFI) developed by Paul Stratford et al. (2001) is widely used. It includes 20 items that evaluate daily tasks such as grooming, lifting, and driving, providing a reliable measure of upper limb function. [9,12]

MATERIALS AND METHODOLOGY:

The present study is an observational cross-sectional design to evaluate upper extremity function in individuals with chronic trapezitis. A convenient sampling method was used for the recruitment of 123 participants. The sample size was estimated using the standard formula for prevalence studies, considering a 90% confidence level (Z), an estimated prevalence of 0.13 (p), and an acceptable margin of error of 5% (E). The study was conducted in Pune over a period of six months. Ethical approval was obtained from the Institutional Ethical Committee before commencement of the study.

Participants were selected on the basis of inclusion and exclusion criteria. The inclusion criteria consisted of individuals aged 20–40 years with chronic trapezitis with pain in the dominant upper extremity persisting for more than 6 months, and with an NPRS score between 2 and 4 during activity. Both male and female participants were included. Individuals were excluded if they presented with pain arising from any other musculoskeletal dysfunctions of the neck or shoulder, any recent upper limb injury, or recent cervical spine pathology.

Participants who met the inclusion criteria were informed about the purpose and procedure of the study and informed consent was taken from all who volunteered to participate. A basic assessment was then conducted, which included demographic information such as name, age, gender, occupation, and hand dominance. Pain characteristics, including the site of pain and NPRS on activity, were documented.

Following the initial assessment, each participant performed the Push-Up Test to assess upper extremity endurance. Standardized test procedures were followed for both genders. Male participants performed the conventional push-up position, beginning in the “down” posture with hands placed shoulder-width apart, aligned under the shoulders, body kept straight, head up, and toes serving as the pivot point. Female participants performed the modified “knee push-up” position, maintaining a straight trunk with knees acting as the pivot, legs together, lower legs in contact with the mat, hands shoulder-width apart, and head kept in neutral alignment. The total number of correct repetitions was recorded for analysis.

After which the participants completed the Upper Extremity Functional Index (UEFI), a validated self-administered questionnaire used to assess functional status of the dominant upper extremity. All collected data were systematically compiled and subjected to appropriate statistical analysis to determine the endurance and functional performance of the upper limb in chronic trapezitis.

RESULTS:

A total of 123 subjects diagnosed with chronic trapezitis were included in the study. The age distribution revealed that the majority of participants (61.8%) belonged to the 20–25 years age group, indicating that trapezitis is more prevalent among younger adults. The gender distribution showed a nearly balanced representation with 53.7% males and 46.3% females.

TABLE 1: DISTRIBUTION OF AGE

Age (in years)	Count	Percent (%)
20-25	76	61.80%
26-30	27	22%
31-35	13	10.60%
36 – 40	7	5.70%
Total	123	100%

Interpretation*:* Major sample population was from the age group of 20 to 25 years.

TABLE 2: DISTRIBUTION OF GENDER

Gender	Frequency	Percent (%)
Female	57	46.2%
Male	66	53.7 %
Total	123	100 %

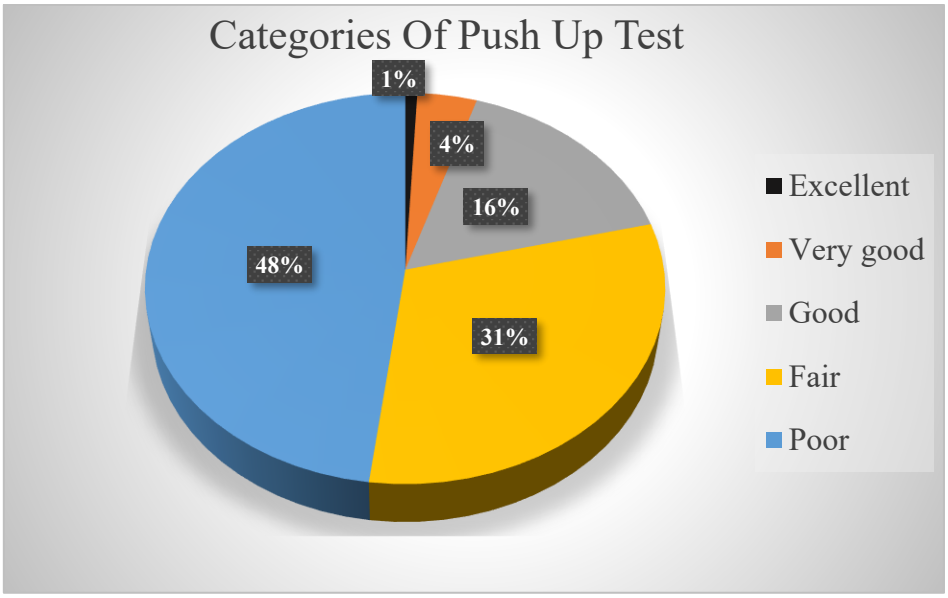
Interpretation: The gender distribution reveals a slightly higher proportion of male respondents (53.7%) compared to female respondents (46.3%).

TABLE 3: DISTRIBUTION OF DOMINANT SIDE WITH PAIN

Dominance	Right	Left	Total
Count	114	9	123
Percentage	92.60%	7.30%	100%

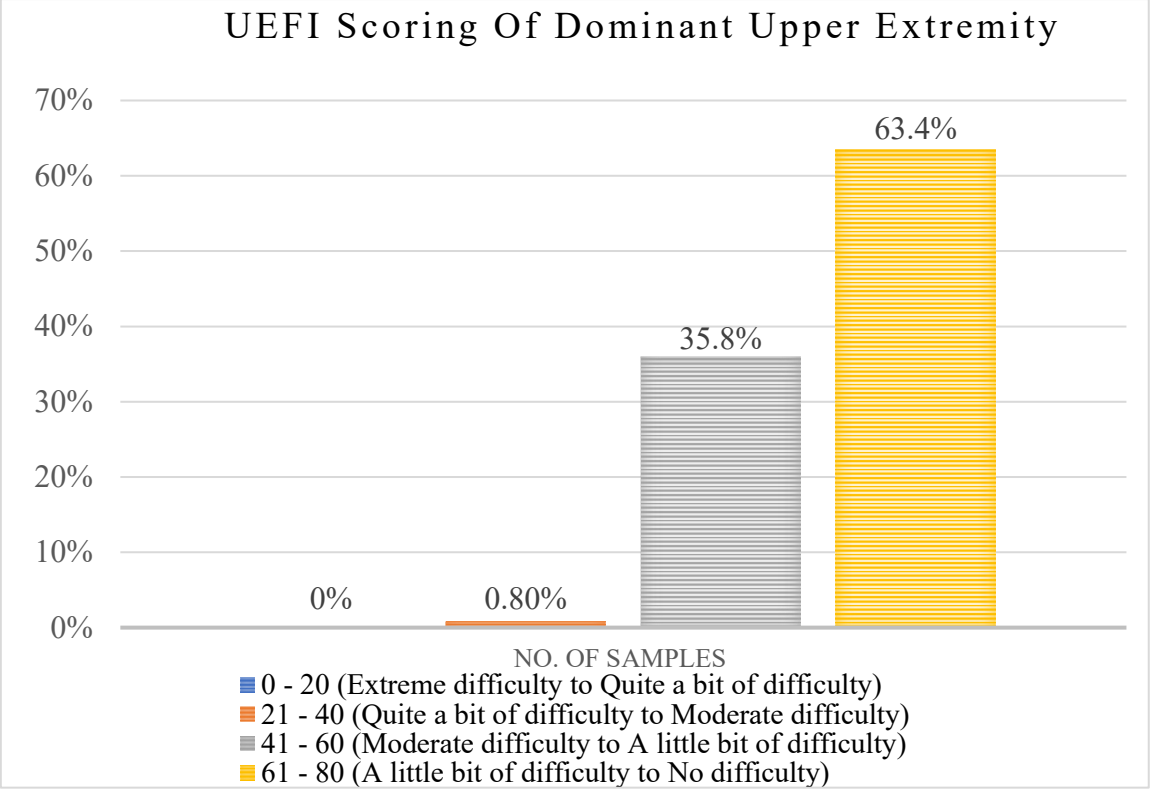
Interpretation: Majority of the samples have right side dominance.

GRAPH 1: CATEGORIES OF PUSH UP TEST FOR TOTAL SAMPLES.



Interpretation: Out of the total respondents 48% fall under the poor category, 31% of them fall under the fair category, 16% fall under the good category and 4% fall under very good category. Only 1% fall under the excellent category for push-ups.

GRAPH 2: UEFI SCORES OF DOMINANT UPPER EXTREMITY



Interpretation: The graph shows that the category with the most samples is 61 – 80, representing the majority of the population (over 63.4%) with "A little bit of difficulty to No difficulty" with their dominant upper limb functions. 35.8% of the population have moderate to a little bit of difficulty. Only 0.8% of the population have quite a bit of difficulty and none of them show extreme difficulty while performing functions with their dominant hand.

DISCUSSION:

The present study evaluated upper limb endurance and functional ability in individuals with chronic trapezitis. The results showed that most participants had reduced endurance, as nearly half of the sample fell into the poor category on the push-up test. In a prior study by Tanjung Subrata et al similar findings emerged reveling that 62% of participants exhibited diminished capacities during pushup test, indicating reduced endurance in upper body muscles.[10] Females demonstrated lower endurance than males, which may be due to natural differences in muscle mass and strength. In a study by Sofia Ryman Augustsson et al shows that males completed twice as many push-ups as women suggesting males have more upper body endurance that women which aligns with the results of the current study.[3]

Overall endurance was reduced in both genders, likely due to altered muscle activation in chronic trapezitis. Continuous tightness of the upper trapezius leads to weakness of supporting muscles like the serratus anterior and lower trapezius, causing poor scapular mechanics and difficulty performing repetitive upper limb tasks. Despite low endurance, most participants reported little to no difficulty performing daily activities with their dominant hand. This may be because everyday tasks require strength and coordination than endurance. Mild pain levels also allow individuals to adapt their movements.

Shoulder strength holds significant importance in providing strength for upper extremity functions. Co-ordination of movement of the upper extremities, hand flexibility, muscle strength, and sensitivity are important prerequisites to fully perform physical tasks of the upper extremity also as the pain was mild the individuals cope up with the pain and adapt themselves to perform day to day activities. In a study by Amina Rasool et al shows that the upper extremity functional score decreases with increasing age which aligns with the results of our study which shows that younger age group have better functioning of the upper extremity.[11] Furthermore, other shoulder muscles often compensate for the dysfunction of trapezius, helping maintain arm function.

Additionally, the majority of the study population belonged to a younger age group, which may have contributed to better functional scores despite reduced endurance. Younger individuals typically have faster muscle recovery, better neuromuscular control, and greater adaptability, which may enable them to maintain daily activities with minimal difficulty even in the presence of chronic trapezitis.

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