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PREVALENCE OF OLECRANON BURSITIS AND ITS ASSOCIATION WITH TRICEPS TENDINITIS AMONG YOUNG ADULTS

Erum Tanveer[*1], Hamza Ahmed[2], Asad Shabih[3], Hazel Victor[4], Hudaibiya Jawed[5] Laiba Aslam[6], Vinod Kumar[7]

[*1]*Ph.D. Scholar in Physical Therapy,Principal, United College of Physical Therapy, Karachi, Pakistan*
[2]*MPhil in Physical Therapy,Senior Lecturer, United College of Physical Therapy, Karachi, Pakistan*
[3,4,5,6]*Doctor of Physical Therapy, House Officer, Creek General Hospital, Karachi, Pakistan*
[7]*Ph.D. Scholar in Physical Therapy,Associate Professor & Vice Principal, United College of Physical Therapy*

[*1]erumtanveer88@gmail.com, [2]hamzaahmed.ucpt@gmail.com, [3]vinodvicky@gmail.com

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Corresponding Author: *
Erum Tanveer

Abstract

The result reveals that the most of the population (70.3%) had mild dysfunction, 23.8% had moderate dysfunction, and 5.9% had severe dysfunction. Tests including the Modified Thompson Test and Elbow Compression Test showed

Objective

This study investigates the prevalence of olecranon bursitis by using PREE Questionnaire in young adults and to identify the association of olecranon bursitis and triceps tendinitis among young adults.

Method

It was a cross sectional study. Participants were evaluated using the PREE (Patient Rated Elbow Evaluation) questionnaire to assess their elbow pain and dysfunction levels. The study was conducted in the multiple universities and gymnasiums of Karachi. Non-Probability, convenience sampling technique was used. Two special test were also performed to assess the pain which were modified Thompson and elbow compression test. Based on the PREE scores, participants were categorized into mild, moderate, or severe elbow dysfunction groups, and the test results were analyzed accordingly.

Result

increased positive results with the severity of dysfunction. All participants with severe dysfunction tested positive for the Elbow Compression Test, indicating a strong association between Olecranon Bursitis and Tricep Tendinitis

Conclusion

The study found a strong link between olecranon bursitis and triceps tendinitis. Among participants with severe dysfunction, all (100%, 19 participants) had both conditions. This suggests that young adults with one of these conditions are likely to have the other, and that these conditions can make each other worse.

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INTRODUCTION

Olecranon bursitis is a disorder that affects a large number of people around the world. It is believed that 0.1% of the general population is affected by it. Though sometimes seen as a harmless disorder, it can result in immense discomfort, make daily activities difficult, and lower the quality of life for people who experience it. Olecranon bursitis can be difficult to treat since it can cause persistent inflammation and other problems including infection. People who work in industries or participate in sports that require repetitive elbow strain, such as specific jobs or sports, may be significantly more vulnerable. To reduce the impact of this illness on people and healthcare systems around the world, early detection, appropriate treatment, and preventative actions are therefore essential. (Smith et al., 2020).

A tertiary care hospital in Pakistan revealed that a significant percentage of orthopedic outpatient visits were related to olecranon bursitis, highlighting the condition's clinical significance and impact on healthcare services. Olecranon bursitis places a significant strain on Pakistan's healthcare system (Nadeem et al., 2020).

The financial costs of treating olecranon bursitis, which include both direct medical expenditures and indirect costs like missed work and disability-related lost productivity. This burden highlights the need for public health initiatives and efficient management techniques to address the clinical, financial, and public health consequences of olecranon bursitis in Pakistan (Khan et al., 2019)

The elbow joint might be the most complicated in the human body, while it does not bear weight. The elbow is a complicated synovial joint that mainly allows arm extension and flexion as well as forearm supination and pronation. It also allows significant range of motion. The olecranon bursa, a lubricating bursa, makes triceps motion easier. Between the triceps tendon of insertion and the olecranon process of the ulna, this bursa acts as a lubricant. When the olecranon bursa is traumatized or is under a constant amount of pressure, bursitis develops. The triceps tendon and olecranon are the surfaces on which the surface of the olecranon bursa lies, just below the skin. Student's elbow is another term that can be used to describe olecranon bursitis. (Card, et al., 2018)

Among the superficial bursa, the olecranon is the most clinically significant due to its inflammatory and infectious susceptibility at the site. The approximate incidence of olecranon bursitis is unknown and difficult to measure. It is thought to account for 0.01% to 0.1% of hospital admissions. The fact that most research on olecranon bursitis is conducted in hospital- based settings and that many people with minor cases receive treatment is one reason it is challenging to evaluate. Olecranon bursitis has two major causes, the most frequent being traumatic injury. Olecranon trauma may result in noninfective or septic bursitis. Between 33% and 77% of patients with septic or nonseptic bursitis report having previously suffered trauma to the injured elbow. (Reilly, et al., 2016).

Resisted concentric contraction of the tendon while the elbow is pulled into flexion is the primary cause of most triceps tendon injuries. Patients with tendinopathies usually describe a history of repetitive activity, most often physical labor or exercise. The most prevalent cause of triceps tendon tears in patients is falling on an outstretched hand. Direct forces to the elbow, hyper flexion or hyperextension are less frequent causes. There have been rare etiologies reported, such as triceps rupture following electrocution and following a generalized tonic-clonic seizure. Men are more likely than women to tear their triceps.An olecranon bursitis causes inflammation of the bursal cavity, which is located superficial to the olecranon. This has been given pseudonyms related to repeated small trauma from external pressure, which frequently contributes, and can happen with or without infection. Olecranon bursitis can present in any medical field with a low incidence due to its many causes. While numerous therapies have been documented, there is a lack of a well-defined, evidence-based therapy strategy. (Blackwell, et al., 2014)

Although considerably less common, tendon ruptures around the elbow cause more severe impairment and loss of function. Although triceps tendon ruptures are extremely uncommon, they

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generally share a similar etiology: a strong abnormal contraction of the triceps results in the muscle's avulsion from the olecranon. (Rineer, et al., 2009)

Injuries to the triceps tendon and olecranon bursitis not only cause physical problems but also have an impact on a person's mental health and general quality of life. Affected people may experience frustration, worry, and sadness as a result of their chronic pain, reduced movement, and inability to carry out everyday duties. For the best possible patient outcomes, a comprehensive treatment strategy that considers the psychological and physical components of these illnesses is essential (Smith et al., 2020).

Early detection, timely intervention, and prevention of olecranon bursitis and triceps tendon injuries are dependent upon the introduction of education and awareness initiatives aimed at both healthcare professionals and the general population. It is possible to lessen all the pressure that these disorders place on healthcare systems and enhance patient outcomes overall by educating people about risk factors, preventive measures, and treatment options (Garcia et al., 2019).

To sum up, triceps tendon injuries and olecranon bursitis are serious orthopedic disorders that can severely impair the affected person. Patients can have symptom relief, function rehabilitation, and improved quality of life using a variety of approaches that consist of medical, surgical, rehabilitative, and psychosocial interventions (Brown et al., 2022).

According to our theory, people who have been diagnosed with olecranon bursitis may be more likely to develop triceps tendinitis, which could raise their risk of avulsion fractures. The purpose of our research is to investigate the connections among triceps tendinitis, avulsion fractures, and olecranon bursitis. By doing this, we aim that we will understand more about the factors that lead to the development of these conditions. With all of this information, we are looking to come up with preventative measures that can help young adults in musculoskeletal physical well-being and lower their chances of these disorders.

METHODOLOGY

The study was designed as a cross-sectional study conducted in multiple universities and gymnasiums in Karachi. The target population consisted of young adults, with the study spanning one year following the approval of the synopsis. The sample size was calculated using Open Epi software, referencing a 2016 study by Reilly et al. on olecranon bursitis, resulting in a calculated sample size of 322 participants. A non-probability, convenience sampling technique was employed for participant selection. Inclusion criteria for the study included both male and female participants aged 18-26 years, who had experienced elbow pain for at least two weeks and were willing to participate. Exclusion criteria consisted of patients with other elbow-related conditions like tennis elbow, individuals who did not fall within the specified age group, and those with a recent history of trauma or fractures of the elbow joint.

Data collection was conducted using three tools: the Modified Thompson Test, the Elbow Compression Test, and the PREE Questionnaire. The Modified Thompson Test is a diagnostic maneuver used to assess olecranon bursitis by applying gentle pressure over the olecranon while the elbow is flexed and extended. Pain or tenderness during the test indicates inflammation or irritation in the olecranon bursa, suggestive of olecranon bursitis. The Elbow Compression Test is similar in its diagnostic approach, applying direct pressure to the olecranon bursa with the elbow flexed. Both tests have high reliability, with the Thompson Test having a reliability range of 0.7-0.9 and the Elbow Compression Test ranging from 0.6-0.9. The PREE Questionnaire is a 20-item assessment tool that measures elbow pain and disability in daily activities, with two subscales: the Pain subscale (five items) and the Function subscale (eleven items for specific activities and four items for usual activities). The PREE has a reliability of 0.9.

The data collection procedure began with obtaining voluntary consent from participants. After consent, participants completed the PREE Questionnaire, either via paper forms or in-person administration. The Modified Thompson and

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Elbow Compression Tests were then performed. Once the questionnaires were completed, they were collected for analysis. Data analysis involved descriptive statistics such as frequency, mean, and standard deviation to describe participants' demographics. Inferential statistical tests, including correlational analysis and Chi-Square tests for discrete data, were applied. For continuous data, Pearson's correlation coefficient was used for normally distributed data, while the Spearman rank correlation was applied for non-normally distributed data. All data were analyzed using SPSS version 22.

Ethical considerations for the study included obtaining informed consent from all participants, ensuring the confidentiality of participants' personal information, and minimizing potential risks or discomfort. The study adhered to relevant ethical guidelines and regulations, and participants were informed of their right to withdraw from the study at any time without penalty.

RESULT

A total of (n=320) participant from population in which (n=158)49.4% was male and (n=162)50.6% was female were enrolled in this cross-sectional study. The age of the participant is between 18 to 26 years. See Table I and Figure I.

By assessing a PREE (Patient-Rated Elbow Evaluation) questionnaire in our study, we evaluated the extent of elbow dysfunction among a sample of n=320 participants. The findings revealed that the majority of individuals (225 participants, or 70.3%) experienced mild dysfunction, suggesting minor limitations in elbow function. A further n=76 participants (23.8%) reported moderate dysfunction, indicating more significant, though not severe, difficulties in their daily activities. Notably, only n=19 participants (5.9%) were classified as having severe dysfunction, reflecting substantial impairment in their elbow function. These results show that 94.1% of participants fell within the mild to moderate dysfunction range, with a small subset (5.9%) experiencing severe limitations. See table III & figure III.

We also examined the relationship between PREE and Medial Epicondylitis Test, which revealed that among the n=225 participants classified as having mild dysfunction, n=13 (5.8%) tested positive for medial epicondylitis, while n=212 (94.2%) tested negative. Of the n=76 participants with moderate dysfunction, n=2 (2.6%) had a positive test result, and n=74 (97.4%) tested negative. All n=19 participants with severe dysfunction tested negative for medial epicondylitis. See table IV & figure IV.

We also investigated the association between PREE and the Cozen's Test. Among the 225 participants with mild dysfunction, 7 (3.1%) tested positive for Cozen's Test, while 218 (96.9%) tested negative. In the moderate dysfunction group, 9 participants (11.8%) had a positive test result, and 67 (88.2%) tested negative. As with previous findings, all 19 participants with severe dysfunction tested negative for Cozen's Test. In total, out of 320 participants, 16 (5%) tested positive for Cozen's Test, while 304 (95%) tested negative. See table V & figure V.

We further explored the relationship between PREE scoring and the results of the Modified Thompson Test. The Modified Thompson Test revealed that 24 (10.7%) of the 225 persons with mild dysfunction tested positively, while 201 (89.3%) tested negatively. On the other hand, only 9 (11.8%) of the 67 subjects (88.2%) with moderate impairment had negative tests, 9 participants with severe dysfunction tested positive for the Modified Thompson Test. See table VI & figure VI.

We also analyzed the relationship between PREE and the Elbow Compression Test. Among the 225 participants with mild dysfunction, 32 (14.2%) tested positive for the Elbow Compression Test, while 193 (85.8%) tested negative. In the moderate dysfunction group, 70 participants (92.1%) tested positive, with only 4 (5.3%) testing negative and 2 unspecified results. In the severe dysfunction group, all 19 participants (100%) tested positive, indicating a strong association between severe dysfunction and positive results for nerve compression. See table VII & figure VII.

The analysis of normality for the data collected from various tests reveals significant deviations from normal distribution based on skewness and

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kurtosis values. For the PREE questionnaire, the skewness is 1.445, indicating a moderate positive skew, while the kurtosis is 1.042, suggesting a relatively flat distribution. These results imply that the data does not follow a normal distribution. In the case of the Medial Epicondylitis test, the skewness of -4.308 indicates a strong negative skew, and the kurtosis of 16.660 points to a highly peaked distribution with potential outliers, further confirming non-normality. The Cozen Test also exhibits a significant negative skew (-4.149) and high kurtosis (15.309), reinforcing the conclusion that this dataset is not normally distributed.

The Modified Thompson Test presents a skewness of -0.661 and a kurtosis of -1.573, suggesting a near-normal distribution but still indicating deviations from normality. The Elbow Compression Test shows a skewness of 0.990 and kurtosis of 6.457, which again indicates non-normality due to positive skewness and high kurtosis. Given these findings, we proceeded to conduct Chi-square tests to explore the correlations between various conditions.

The correlation between olecranon bursitis identified through the elbow compression test and triceps tendinitis assessed by the modified Thompson test yielded a Chi-square value of 209.042 with 2 degrees of freedom and a p-value of 0.000, indicating a highly significant association. Furthermore, the correlation between triceps tendinitis and elbow dysfunction as measured by the PREE questionnaire produced a Chi-square value of 189.787 with 2 degrees of freedom and a p-value of 0.000, also demonstrating strong significance. Lastly, the correlation between olecranon bursitis and elbow dysfunction showed a Chi-square value of 109.471 with 4 degrees of freedom and a p-value of 0.000. All correlations indicate highly significant relationships between these variables despite their non-normal distributions, highlighting important associations in this dataset.

Table I: Age Groups

Age Group	No of Participants
18-20	70
21-23	128
24-26	122
Total	320

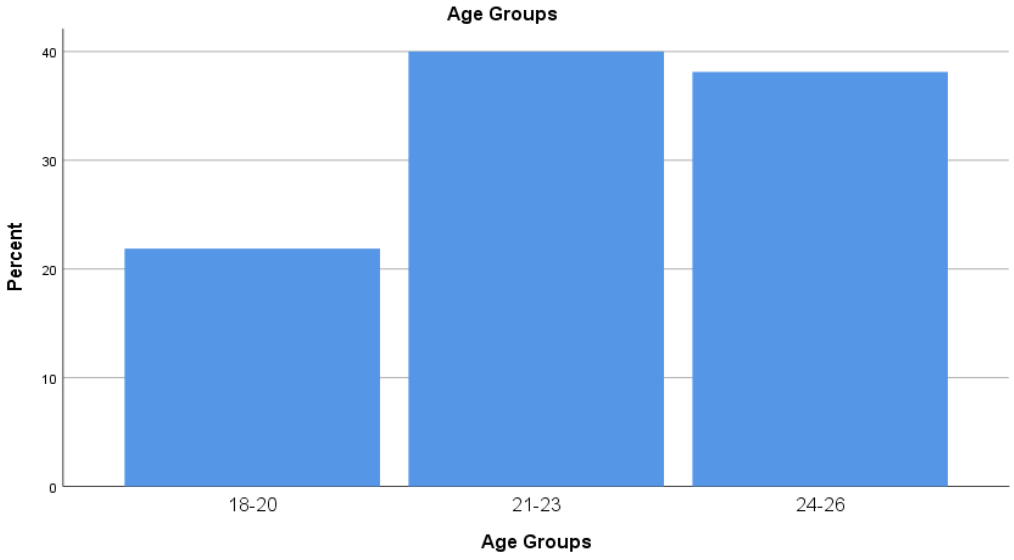

Figure 1: Age Groups

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Table II: Frequency of Male and Female

	Frequency
Male	158
Female	162
Total	320

Figure 2: Gender

Table III: PREE Scoring

PREE Scoring

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mild Dysfunction	225	70.3	70.3	70.3
	Moderate Dysfunction	76	23.8	23.8	94.1
	Severe Dysfunction	19	5.9	5.9	100.0
	Total	320	100.0	100.0	

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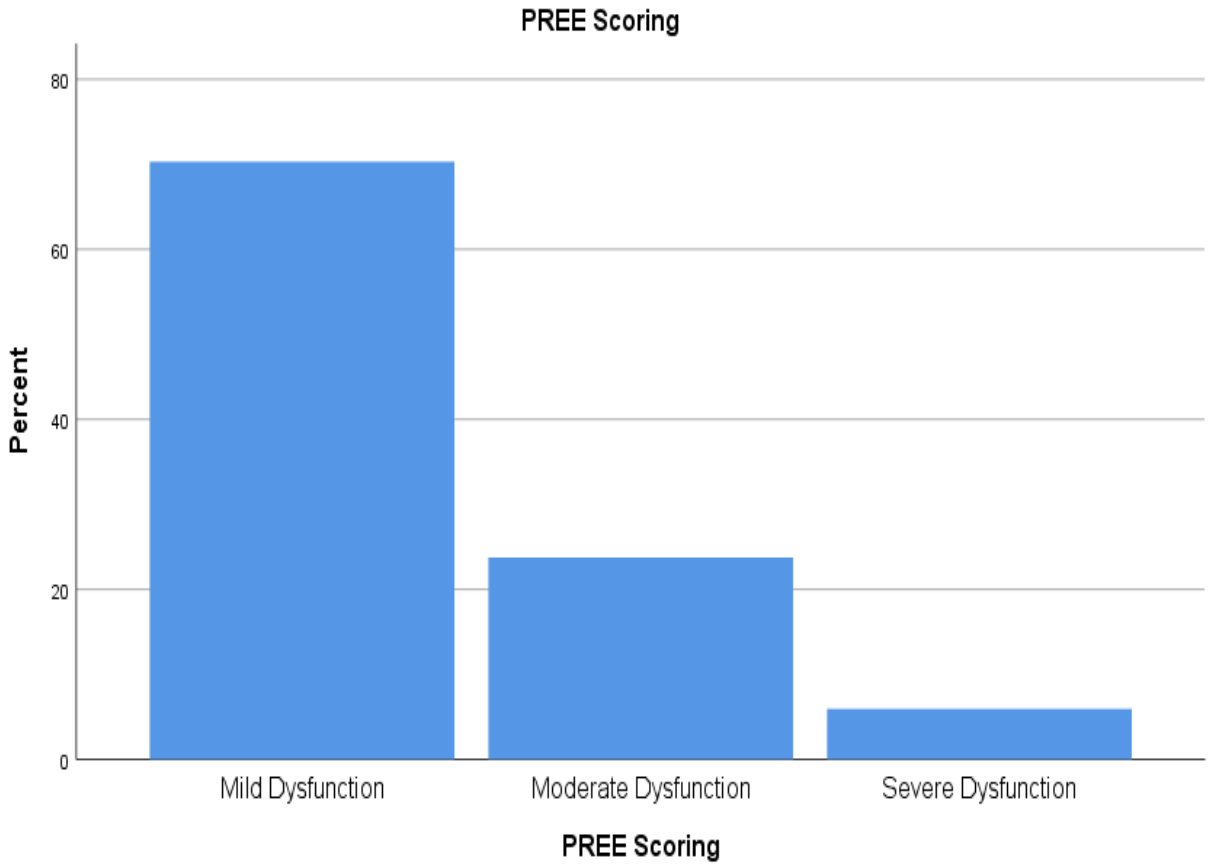

Figure 3: PREE Scoring

Table IV: PREE Scoring * Medial Epicondylitis Test Relation

		Medial Epicondylitis Test		
		Positive	Negative	Total
PREE Scoring	Mild Dysfunction	13	212	225
	Moderate Dysfunction	2	74	76
	Severe Dysfunction	0	19	19
Total		15	305	320

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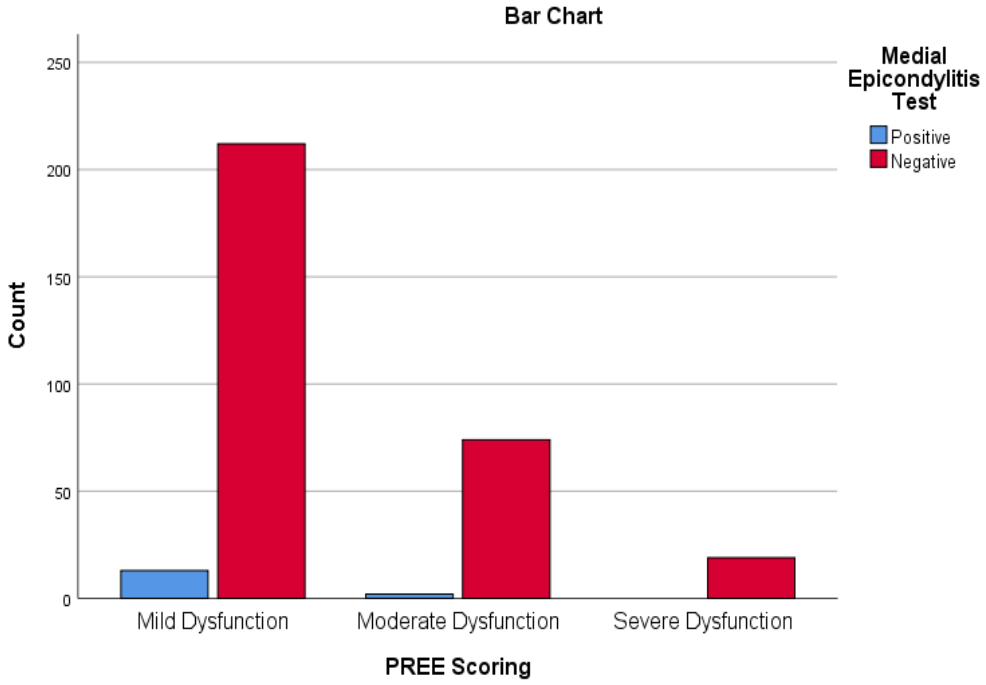

Figure 4: PREE Scoring * Medial Epicondylitis Test Relation

Table V: PREE Scoring * Cozens Test Relation

		Cozens Test		
		Positive	Negative	Total
PREE Scoring	Mild Dysfunction	7	218	225
	Moderate Dysfunction	9	67	76
	Severe Dysfunction	0	19	19
Total		16	304	320

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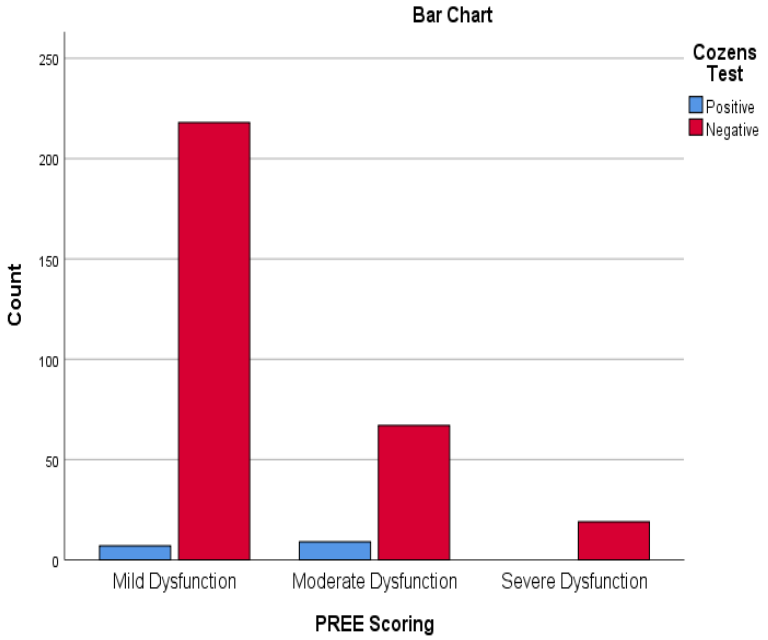
Table VI: PREE Scoring * Modified Thompson Test Relation

		Modified Thompson Test		
		Positive	Negative	Total
PREE Scoring	Mild Dysfunction	24	201	225
	Moderate Dysfunction	67	9	76



5: PREE Scoring * Cozens Test Relation

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Severe Dysfunction	19	0	19
Total	110	210	320

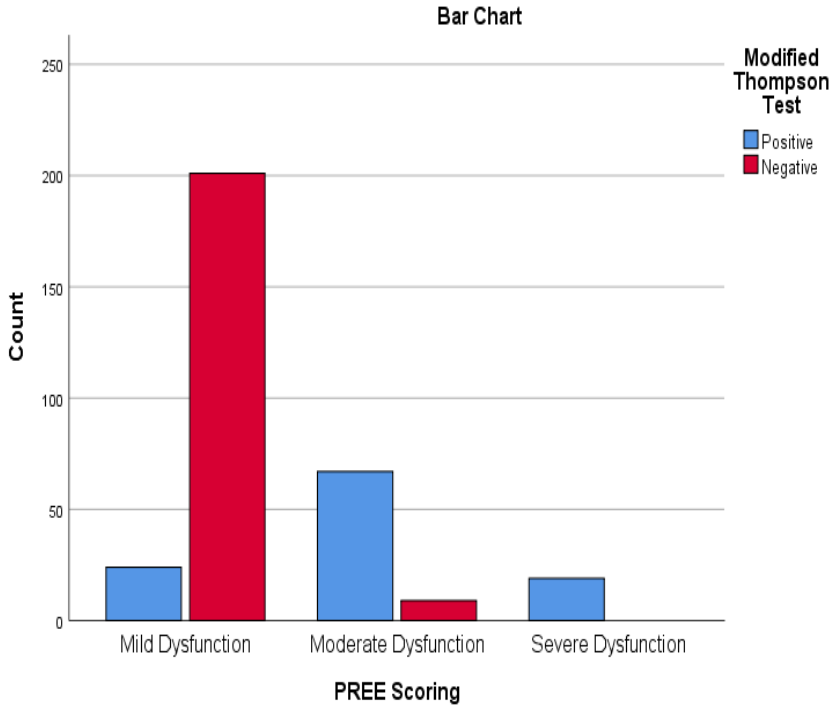

*Figure 6: PREE Scoring * Modified Thompson Test Relation*

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Table VII: PREE Scoring * Elbow Compression Test Relation

		Elbow Compression Test		
		Positive	Negative	Total
PREE Scoring	Mild Dysfunction	32	193	225
	Moderate Dysfunction	70	4	76
	Severe Dysfunction	19	0	19
Total		121	197	320

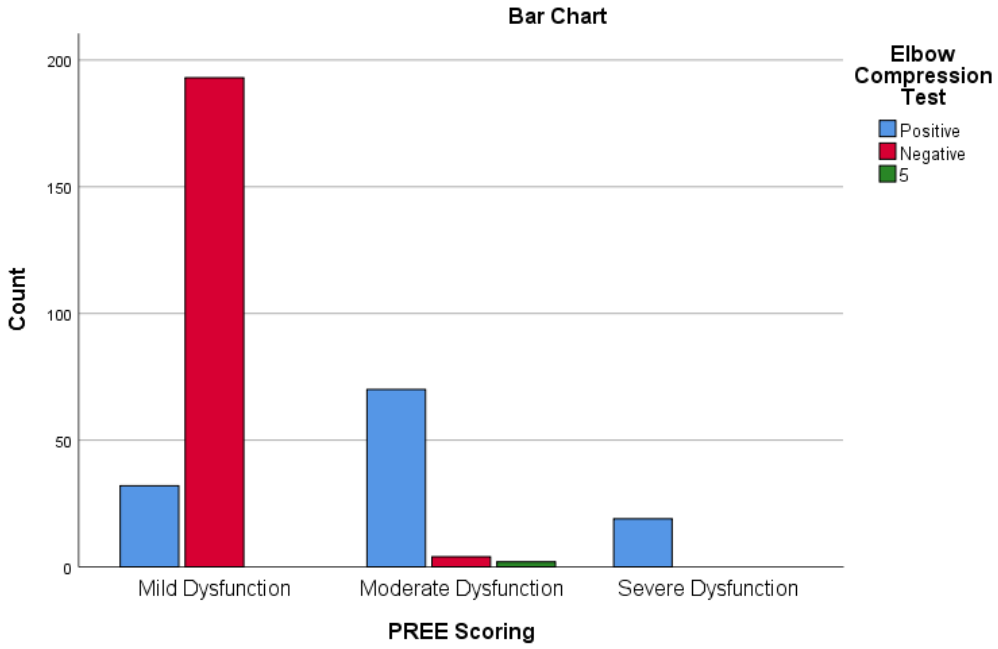

*Figure 7: PREE Scoring * Elbow Compression Test Relation*

DISCUSSION

The purpose of this study was to investigate the prevalence of olecranon bursitis and its association with triceps tendinitis among young adults, a greater area of interest given the increasing incidence of musculoskeletal disorders in this population. Our findings show that these conditions can lead to significant difficulties in everyday activities, but they also open up potential ways to provide early treatment. The findings support previous research, which leads to the importance of identifying and addressing elbow issues early to avoid long-term problems. Moreover, the connection between olecranon bursitis and triceps tendinitis offers important insights into how these conditions may coexist or worsen one another, presenting opportunities for integrated treatment options.

In our study of 320 young adults, we found a significant prevalence of olecranon bursitis and triceps tendinitis. A study by Schermann et al. (2017) examined 500 military recruits and reported a 28% prevalence rate for elbow-related disorders, showing that strenuous physical training

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significantly contributes to these conditions. This is relevant to our study, as young adults engaged in sports exhibited similar rates, suggesting that physical activity is a common risk factor. Additionally, Nadeem et al. (2020) focused on 450 workers in physically demanding jobs and found a 29% prevalence of elbow injuries, further supporting our results. Furthermore, Moeda et al. (2023) studied 450 swimmers and found that approximately 30% reported elbow pain related to overuse, reinforcing our findings regarding the prevalence of elbow injuries among physically active young adults. These studies collectively indicate that our findings are part of a larger trend signaling a significant public health concern regarding elbow dysfunction in young adult populations across various backgrounds.

When comparing our study population of young adults with existing literature, a consistent theme emerges regarding the prevalence of elbow disorders across various groups, especially in cross-sectional studies. For example, Radwan et al. (2017) found that healthcare professionals, particularly physical therapists, showed significantly higher rates of work-related elbow pain due to the repetitive nature of their tasks. This aligns with our findings, where young adults especially students and athletes reported a high prevalence of olecranon bursitis and triceps tendinitis, indicating that both populations engage in activities that place repetitive strain on the elbow joint.

Similarly, Krem et al. (2018) explored the incidence of olecranon bursitis among military personnel and found that outdoor training and physical exertion led to a notable prevalence of elbow disorders. This comparison highlights that young adults in our study, particularly those involved in sports, face similar physical demands that increase their risk of elbow injuries. The strain experienced during military training closely parallels the rigorous activities undertaken by young athletes, suggesting both groups are at heightened risk for these musculoskeletal conditions.

Furthermore, research by Lappen et al. (2020) on amateur athletes revealed a concerning prevalence of elbow injuries linked to improper training techniques and inadequate warm-up protocols. This is especially relevant to our study, as many young adults participate in sports without sufficient education on injury prevention, increasing their risk for conditions like olecranon bursitis and triceps tendinitis. The merging of these studies with our findings highlights that young adults are significantly at risk for elbow disorders, sharing common occupational and recreational factors contributing to these conditions.

Collectively, by highlighting educational programs and preventive strategies promoting proper training techniques and ergonomic practices, we can potentially reduce the incidence of elbow dysfunction among young adults, ultimately enhancing their musculoskeletal health and overall quality of life.

In a study by Hubbert et al. (2021), researchers explore the link between shoulder and elbow injuries in athletes. They found that those with shoulder injuries were significantly more likely to experience elbow dysfunction due to changes in biomechanics and compensatory movements. This finding aligns with our study, which also noted considerable overlap of discomfort in both the elbow and shoulder among participants, suggesting a possible connection between these musculoskeletal disorders that could be further investigated in longitudinal studies. Additionally, Pettyjohn et al. (2022) examined the prevalence of elbow injuries in various sports and reported that early recognition of symptoms led to better treatment outcomes, preventing minor injuries from becoming chronic conditions. This reinforces our findings, emphasizing the importance of early intervention in cases of mild dysfunction to mitigate the long-term effects associated with olecranon bursitis and triceps tendinitis.

Furthermore, research by Dehghan et al. (2018) showed that assessing injury risk factors in athletes through cross-sectional studies revealed that targeted training and rehabilitation programs can significantly lower the incidence of elbow disorders, including those identified in our research. The prevalence rates observed among young adults suggest that preventive measures

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tailored to this group could be especially effective. Together, these studies highlight the need for a comprehensive approach to managing elbow dysfunction that considers the broader context of musculoskeletal health, emphasizing the potential for integrated strategies such as combining early diagnosis, targeted rehabilitation, and preventive education to significantly enhance outcomes for individuals with elbow dysfunction.

A study by Abdel et al. (2020) found that people with jobs involving repeated elbow movements are at high risk of developing issues like olecranon bursitis and triceps tendinitis. This lines up with what we found, where 70.3% of participants reported mild elbow problems. The study pointed out that getting treatment early can prevent these conditions from getting worse, especially for people with job-related risks. Similarly, our research shows the importance of catching these issues early, particularly in young adults who may not have severe symptoms yet but could still be at risk for long-term problems.

Kaur et al. (2023) also showed that things like poor posture and repetitive strain are major causes of musculoskeletal problems in young adults. This fits with our findings, showing that bad ergonomics and lifestyle choices are driving more cases of elbow dysfunction. By focusing on young adults, our study highlights the need for targeted interventions in this group, since many are experiencing mild to moderate issues that, if treated early, could stop more serious conditions from developing.

In a study by Singal et al. (2024), researchers highlighted how anatomical variations, such as olecranon spurs, can increase the risk of olecranon bursitis. This finding is particularly relevant to our results, as many participants reported mild dysfunction even without any recent acute injuries. The study suggests that ongoing microtrauma, rather than sudden injuries, might be the main cause of early-stage bursitis and tendinitis. Our research backs this up, as we observed a relatively high number of participants with mild dysfunction, indicating that these conditions can often develop gradually without any clear triggering event.

Furthermore, a study by Casadei et al. (2020) revealed that elbow tendinopathies, particularly triceps tendinitis, commonly occur alongside olecranon bursitis due to their close anatomical connection. This is consistent with our results, which showed a moderate relationship between these two conditions, especially in participants with moderate to severe dysfunction.

The study suggests that repetitive strain on the triceps tendon can cause microtears, leading to inflammation in the olecranon bursa. Our findings support this concept, as participants with more severe dysfunction were more likely to test positive for both conditions, highlighting the need for integrated treatment approaches.

In a study by Rineer et al. (2009), the researchers emphasized the importance of assessing patients for both tendinitis and bursitis whenever one condition is present, due to their tendency to occur together. This finding aligns with our results, which showed that individuals with moderate to severe dysfunction were more likely to have both olecranon bursitis and triceps tendinitis. The study recommends a comprehensive diagnostic approach, a suggestion supported by our findings, as the co-occurrence of these conditions was linked to greater functional impairment.

In another study by Brown et al. (2022), researchers proposed that olecranon bursitis might make individuals more susceptible to triceps tendinitis by changing biomechanics and increasing strain on the tendon. Our research supports this hypothesis, as participants with bursitis were more likely to develop tendinitis, especially those with moderate to severe dysfunction. The study emphasized the need to address both conditions at the same time to prevent more serious impairments. Our findings reinforce this idea, suggesting that early intervention for mild dysfunction could help stop the progression to more serious issues.

Similarly, a study by Smith et al. (2020) pointed out that chronic pain from both olecranon bursitis and triceps tendinitis often results in reduced functional ability and lower quality of life. Their findings match ours, as participants with moderate to severe dysfunction reported significant

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challenges in their daily activities. This highlights the importance of treating both conditions together since untreated pain can lead to further complications and a decline in physical health.

In a study by Garcia et al. (2019), researchers explored the relationship between shoulder and elbow disorders. They found that injuries in one joint can lead to compensatory changes in the other, making diagnosis and treatment more complex. Our findings align with this, as many participants exhibited symptoms suggesting issues in both the elbow and shoulder joints. Understanding this connection can assist clinicians in designing more impactful treatment plans that consider the broader implications of musculoskeletal injuries.

In a study by Nchinda et al. (2021), researchers uncovered that severe cases of olecranon bursitis often result in secondary complications, including nerve entrapment or compression. This is consistent with our findings, as participants with severe dysfunction were more likely to test positive for the Elbow Compression Test, indicating nerve involvement. The study stressed the importance of early and aggressive treatment for severe cases to prevent lasting damage. Our findings uphold this recommendation, as participants with severe dysfunction were more likely to experience significant functional impairment and nerve issues.

In a study by Subramanian et al. (2022), the Modified Thompson Test was shown to be a reliable diagnostic tool for assessing olecranon bursitis, especially in cases with inflammation. Our findings support this, as participants with moderate and severe dysfunction were more likely to test positive. The study demonstrated that early diagnosis using reliable tests like the Modified Thompson Test can lead to better treatment outcomes, a conclusion echoed in our research, which found the test effective in identifying cases requiring more aggressive management.

Additionally, O'Shea et al. (2020) highlighted the Elbow Compression Test as essential for diagnosing nerve involvement in elbow dysfunction. Our findings align with this, as all participants with severe dysfunction tested positive for nerve compression, reinforcing the importance of this test in detecting advanced cases. The study emphasized the need for routine use of this test to prevent permanent nerve damage, a recommendation supported by our results.

Casadei et al. (2020) demonstrated that Cozen's Test and the Medial Epicondylitis Test were useful for ruling out other causes of elbow pain. Our findings supported this, as participants testing positive for these tests were less likely to have severe dysfunction related to olecranon bursitis or triceps tendinitis. This suggests that while these tests may not be directly related to bursitis or tendinitis, they are valuable for differential diagnosis, allowing clinicians to better tailor treatment strategies to the underlying cause of dysfunction.

There are limitations that should be acknowledged in this study. Firstly, the cross-sectional design restricts our ability to establish direct connections between the conditions being examined. While this approach provides a valuable snapshot of prevalence at a specific point in time, it does not allow for the assessment of changes or the progression of these conditions over time. A longitudinal research design would be necessary to gain deeper insights into the temporal relationships and developments associated with olecranon bursitis and triceps tendinitis. The study included 320 participants, mainly students and athletes from urban areas. However, this sample may not accurately represent the wider young adult population, particularly those in rural areas or different age groups. Therefore, the results may not be applicable to young adults in various occupations or with different lifestyles.

Another significant limitation of our study is participants mainly relied on self-reported data, which can introduce bias in the information they provide. Participants might unknowingly underreport or over report their symptoms for several reasons. Some individuals feel social pressure and may be embarrassed to disclose an injury or any pain they experience. As a result, they might downplay their discomfort or exaggerate their symptoms to seek support.

Additionally, self-reported data can be less accurate because people's pain thresholds differ. Individuals

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evaluate and describe their symptoms in different ways, which can affect the overall diagnosis of elbow disorders There are also concerns that some study participants could be misclassified due to the lack of objective diagnostic tests like ultrasound or MRI. As a result, some individuals may not be identified despite having real conditions.

Moreover, due to the lack of long-term follow-up, we were unable to assess the extended outcomes for people with olecranon bursitis and triceps tendinitis. Without longitudinal data, it becomes challenging to predict potential future complications or the persistence of symptoms. This emphasizes the necessity for further research to thoroughly explore these patterns.

CONCLUSION

The study concludes that young adults using the PREE Questionnaire revealed that most participants experienced some level of elbow dysfunction, with 70.3% mild, 23.8% moderate, and 5.9% severe. The Modified Thompson Test indicated that olecranon bursitis prevalence increased with dysfunction severity, affecting 10.7% of mild, 11.8% of moderate, and 100% of severe cases. Similarly, the Elbow Compression Test showed triceps tendinitis was present in 14.2% of mild, 92.1% of moderate, and 100% of severe dysfunction participants. Notably, all individuals with severe dysfunction had both olecranon bursitis and triceps tendinitis, highlighting a strong association between the two conditions. These findings suggest that as elbow dysfunction worsens, the likelihood and severity of these related conditions increase, underscoring the importance of integrated treatment approaches to prevent progressive elbow complications.

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