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Prevalence of Achilles Tendinopathy and its Severity among Amateur Swimmers: A Cross Sectional Study

Shrutika Sharad Khairnar^{1*}, Dr. Chaitali Neve², Dr. Jayvant Nagulkar³

¹ Bachelor of physiotherapy, Dr. Ulhas Patil college of physiotherapy, Jalgaon 425001, Maharashtra University of Health Science, India

² Assistant Professor, Department of Musculoskeletal Physiotherapy, Dr. Ulhas Patil college of physiotherapy, Jalgaon 425001, Maharashtra University of Health Science, India

³ Department of Musculoskeletal Physiotherapy, Dr. Ulhas Patil college of physiotherapy, Jalgaon 425001, Maharashtra University of Health Science, India

* Corresponding Author: **Shrutika Sharad Khairnar**

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Abstract

Achilles' tendinopathy (AT) is a common overuse injury characterized by pain, stiffness, and reduced ankle function, frequently observed in sports involving repetitive plantarflexion and dorsiflexion, including swimming. Although swimming is considered a low-impact activity, the repetitive kicking motions—especially in strokes such as freestyle, breaststroke, butterfly, and backstroke—can increase the mechanical load on the Achilles tendon, predisposing swimmers to tendinopathy. Limited literature exists on the prevalence of AT among amateur swimmers. Therefore, the present cross-sectional study aimed to determine the prevalence and severity of Achilles tendinopathy among amateur swimmers using the Royal London Test and the VISA-A questionnaire. A total of 102 swimmers aged 16–50 years were recruited using simple random sampling from a sports academy. Participants meeting inclusion criteria underwent Achilles' tendon assessment with the Royal London Test; those testing positives completed the VISA-A questionnaire to determine severity. Data were analysed using Microsoft Excel. The study sample consisted of 51 males and 51 females, with a mean age of 27.63 ± 8.53 years. Most swimmers had been training for more than 5 years (40.20%). The findings highlight the distribution of AT within the sample and provide insight into symptom severity using VISA-A scores, emphasizing the importance of early screening and preventive strategies for amateur swimmers. Overall, this study underscores the need to recognize Achilles' tendinopathy as a potential problem in swimmers and encourages further research to enhance injury prevention and management.

Keywords: Achilles' tendinopathy (AT), Swimming, VISA-A questionnaire, Royal London Test, freestyle

Introduction

Achilles Tendinopathy (common overuse injury) refers to a combination of pathological changes affecting the Achilles tendon usually due to overuse and excessive chronic stress upon the tendon. It can be seen both in athletes and non-athletes. A lack of flexibility or a stiff Achilles tendon can increase the risk of injury^[1]. Pain and reduced function are the primary symptoms of Achilles tendinopathy^[2]. Insertional Achilles tendinopathy is located at the insertion of the Achilles tendon onto the calcaneus, possibly with the formation of bone spurs and calcifications in the tendon proper at the insertion site. Patients complain of pain, stiffness, and sometimes (a solid) swelling. On physical examination, the tendon insertion is painful. A swelling may be visible and a bony spur may be palpable^[3].

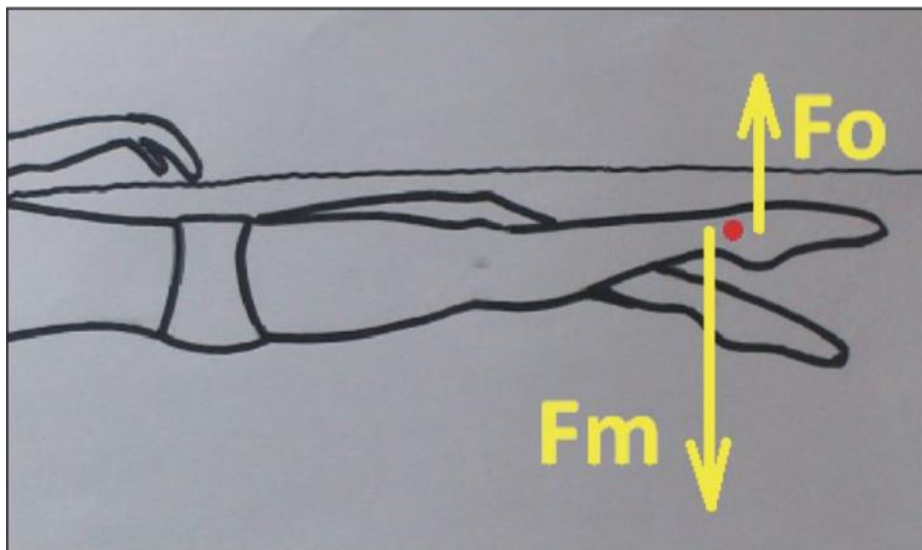
Tendons are designed to take tensile load, but excessive load can cause overuse tendinopathy. Overuse tendinopathy results in extensive changes to the cells and extracellular matrix, resulting in activated cells, increase in large proteoglycans and a breakdown of the collagen structure^[4]. An overview of its anatomy and related factors that The Achilles tendon is composed of dense connective tissue, primarily made up of collagen fibres. This structure provides strength and elasticity. The tendon originates from the gastrocnemius and soleus muscles in the calf and inserts at the posterior aspect of the calcaneus (heel bone). The tendon has limited blood supply, particularly 2-6 cm above its insertion on the heel. This area is often more susceptible to degeneration. The Achilles tendon plays a critical role in walking, running, swimming and jumping by facilitating plantar flexion (pointing the toes) and absorbing shock. Degenerative changes may occur that, Tendinopathy often involves a combination of collagen degeneration, increased ground substance, and disorganized collagen structure, leading to a weakened tendon. Repetitive stress can lead to microtears in the tendon, causing pain and stiffness, particularly during activity. While traditionally viewed as an inflammatory condition, recent understanding emphasizes a non-inflammatory degenerative process, although some inflammation may still be present^[5, 6].

Achilles' tendinopathy occurs in both men and women at various ages. Common complaints are pain during and after physical activity, tenderness on palpation and morning stiffness. Symptoms usually subside with decreased physical activity, but tend to return as soon as physical activity is increased. With increased severity patients may also have

pain during daily functional activities. Achilles' tendinopathy causes many patients to significantly decrease their physical activity level, with a potentially negative impact on their overall health and general well-being.

Swimming becomes more effective concerning speed of movement, because the contact area of the feet is increased, allowing greater compression force and exertion on the water. However, the plantar and dorsal flexors should produce considerably greater force, to push forward the body with higher acceleration, than in normal swimming. Therefore, the load on the tendons and ligaments is increased, that may cause overuse effect^[7]. Swimming has become one of the most practised and popular sport worldwide thanx to the peculiarity of being in an aquatic environment and multitude of health benefits it offers. Likewise, swimming is available to everyone regardless of age and gender because water generates a minimal impact on the bones and joints. Nevertheless, its cyclical nature, combined with large training loads, high technical requirements and demands on strength to overcome an external load^[8].

Swimming is a discipline recognized as one of the most beneficially affecting the human body. It is particularly recommended form of recreation and rehabilitation. The benefits of this form of physical activity mainly result from the specificity of its aquatic environment. Floating in water or performing different strokes requires the involvement of many joints. The forces acting on the ankle joint during movements of the stroke. In this case, the muscle strength and water resistance contribute to enhancing plantar flexion and inversion in the joint^[9]. (fig.1)



Fo= water resistance force
Fm= muscle strength

Fig 1: Diagram showing the forces acting on the ankle joint while swimming the backstroke.

Several things can cause Ankle disability from swimming, including: Certain strokes – freestyle is generally considered the easiest stroke. However, it does require you to extend your foot and ankle for long periods of time. Breaststroke where the repetitive motion and strain placed on the Achilles tendon during the stroke. The frog kick in breaststroke requires significant dorsiflexion (bringing the toes towards the shin) and plantarflexion (pointing the toes), as well as the outward rotation of the feet. All of these movements can aggravate Achilles' tendinopathy, a condition characterized

by inflammation or degeneration of the Achilles tendon. Breaststroke's unique motion of the legs and feet puts the Achilles tendon through extreme ranges of motion. The constant alternating between dorsiflexion and plantarflexion may irritate the tendon^[10]. In butterfly stroke Swimmers need to maintain a certain degree of dorsiflexion (pointing the toes upwards) in the ankle to keep the feet streamlined and reduce drag in the water. It requires strong, repetitive kicking and rapid ankle movements, which can overload the Achilles tendon over time. Incorrect kicking form or excessive force

can put additional stress on the tendon [11].

The incidence of AT has been rising over the past three decades and the aetiology is considered to be multi-factorial [12]. Despite the high incidence [13], the aetiology of AT remains undiscovered making prevention and treatment difficult. With lack of objective measurements of AT severity, the patient-reported Victorian Institute of Sports Assessment (VISA-A) [14] is used for assessment of physical disability due to AT as an outcome measure based on symptoms [15].

The "Royal London Test" of Achilles tendinopathy refers to a specific clinical assessment used to diagnose Achilles' tendon. Purpose of this test aims to assess the integrity and function of the Achilles tendon, particularly in cases of suspected tendinopathy [16].

The Victorian Institute of Sports Assessment–Achilles' tendinopathy questionnaire (VISA-A) is the most widely used patient-reported outcome measure for studies of Achilles tendinopathy [17]. Where it can be based on the domains of pain, function in daily living, and sporting activity.

Need of Study

Achilles Tendinopathy is a condition which caused by overuse and excessive use of ankle. In swimming the various forces act on ankle, it enhances plantar flexion and eversion which can affect ankle joint function. And lot of swimmers are found with this experience. Also, there were very few studies observed on ankle instability in swimmers. So, the study needs to find out the Achilles Tendinopathy among amateur swimmers

AIM

The aim of this study is to find out the prevalence of Achilles Tendinopathy among amateur swimmers.

Objective

1. To find out the Prevalence of Achilles tendinopathy among swimmers using Royal London test.
2. To assess the severity among swimmers diagnosed with AT using Victorian Institute of Sports Assessment (VISA-A) Questionnaire.

Review of Literature

1. **Yahai Wang et al. Prevalence of Achilles tendinopathy in physical exercise: A systemic review and meta-analysis; March 2022;4,152-159(1)** The objective of this study is comprehensive systematic review and meta-analysis assessed the prevalence of Achilles tendinopathy (AT) in physical exercise (PE). Specifically, we estimate the overall risk of AT in physical exercise and compare sport-specific estimates of AT risk. PubMed, Web of Science, Cochrane Library, and SPORT Discus were searched before the 1st of October 2021. Random-effects, subgroup analysis, sensitivity analysis and meta-regressions were conducted, involving 16 publications. This meta-analysis found that the overall prevalence of AT was 0.06 (95% CI, 0.04-0.07). The prevalence of Achilles tendon rupture was 0.03 (95% CI, 0.02-0.05). Subgroup analysis showed that the prevalence of AT increased with age, the highest among the group aged over 45

(0.08; 95% CI, 0.04-0.11), and the lowest among the group under 18 years old (0.02; 95% CI, 0.01-0.03). The gymnastics and ball games had the highest prevalence of AT, at (0.17; 95% CI, 0.14-0.20) and (0.06; 95% CI, 0.02-0.11), respectively. The prevalence of AT in athletes (0.06; 95% CI, 0.04-0.08) was higher than that of amateur exercisers (0.04; 95% CI, 0.02-0.06) and there was no difference in the prevalence of AT between males and females. There are differences in the prevalence of AT in different ages, sport events and characteristics of participants. This systematic review and meta-analysis suggested that it was necessary to pay more attention to AT in people who were older or engaged in gymnastics.

2. **Manar Mohamed Selmy, Naveen Abd El Latif Abd El Raouf, Magda Ramdan Zahran. Prevalence of Posterior Ankle Impingement syndrome in Egyptian Swimmers; April 2022;6(S1);8092-8100(8)** The Objective of this study is to determine the prevalence of posterior ankle impingement syndrome is a common cause of posterior ankle pain that is known to be associated with sports which require the athletes to repetitively plantar flex the ankle such as ballet dancers, gymnasts, football, football, swimming, cycling. PAIS can limit the athlete's ability to perform at the optimal level. Three hundred and fifty male and female athletes; their age ranging from 8 to 18 years old practicing swimming for at least one year. Diagnosis of PAIS was made based on history taking and assessment using hyper plantar flexion ankle special test.
3. **Jessica Kuhn and Kirsten Legerlotz, Ankle joint flexibility affects undulatory underwater swimming speed; Front sports act living, August 2022; 4: 948034^[18].** The aim of this study is to investigate the impact of ankle joint flexibility on swimming velocity and kick efficiency during UUS by comparing kinematics of swimming trials with reduced, normal, and enhanced maximum angles of plantar flexion. Ten well trained swimmers, performed multiple trials of UUS with normal, restricted and increased ankle joint flexibility on two separate days in randomized order. Kick frequency was controlled by a metronome. Plantar flexion was restricted by tape application on both feet and increased by passive dynamic stretching. All trials were filmed. Kinematics were obtained with two-dimensional motion analysis. Tape application restricted maximum plantar flexion by 10.42% while stretching increased PF by 6.87% compared to normal PF. Swimming velocity and kick efficiency significantly decreased during swimming with restricted PF ($1.13 \pm 0.13 \text{ m} \cdot \text{s}^{-1}$; $0.69 \pm 0.09 \text{ m}$) compared to normal ($1.20 \pm 0.14 \text{ m} \cdot \text{s}^{-1}$; $0.72 \pm 0.10 \text{ m}$) and increased ($1.22 \pm 0.15 \text{ m} \cdot \text{s}^{-1}$; $0.73 \pm 0.10 \text{ m}$) PF. Swimming velocity and kick efficiency did not differ between normal and increased PF. Body height normalized swimming velocity correlated significantly with PF angle ($r = 0.538$). The results suggest that UUS velocity is affected by impaired PF. Particularly swimmers with low or average maximum PF angles may benefit from a long-term ankle joint flexibility program to improve their UUS performance.

4. **Patrick Vallance, Fatmah Hasani. Self-reported pain with single leg heel raise or single leg hop offer distinct information as measures of severity in men with midportion and insertional Achilles' tendinopathy: An observational cross-sectional study. January 2021, 47; Pages 23-31**^[19] To investigate if self-reported pain with single leg heel raise (SLHR) or single leg hop (SLH) are concurrently valid to assess midportion (MPAT) or insertional Achilles' tendinopathy (IAT) symptom severity, compared to the VISA-A. Additionally, if SLHR or SLH pain accounts for VISA-A variability, and if they are associated with psychological factors. Relationships were negligible between load tests and VISA-A activity in both conditions, and VISA-A pain in MPAT. In IAT, there was fair-positive relationship between pain catastrophising and load tests. Remaining psychological outcome relationships were negligible. Best model accounting for VISA-A included SLH in MPAT, and SLHR in IAT.
5. **Kevin Lieberthal, Kade L. Paterson. Prevalence and factors associated with asymptomatic Achilles' tendon pathology in male distance runners; September 2019; 39:64-68**^[20]. The objective of this study investigated the prevalence of tendon pathology and associated factors in experienced, high mileage male endurance runners with no history of Achilles tendon pain. Asymptomatic male distance runners had a high incidence of tendon pathology. Increased running years was associated with pathology in the Achilles tendon.
6. **P. Vallance, L. Crowley. Maximal isometric force is more strongly associated with Achilles' tendinopathy severity than rate of force development and muscle force steadiness. October 2019; 22:83**^[21]. The aim of this study is to investigate the relationship between motor output measures including MVIC, RDF and muscle force steadiness, and their relationship with AT severity (self-reported pain and function) as indicated by Victorian institute of sport assessment-Achilles VISA-A.
7. **Imre Juhasz et al. Creatine Supplementation Supports the Rehabilitation of Adolescent Fin Swimmers in Tendon Overuse Injury Cases. J Sports Sci Med. 2018**^[22]. The purpose of this study is to investigate the effect of creatine supplementation on regeneration periods in tendon overuse injury rehabilitation of adolescent fin swimmers. The participants of this study were injured adolescent competitive fin swimmers. The result of this study indicate that Cr supplementation combined with therapeutic strategy effectively supports the rehabilitation of tendon overuse injury of adolescent fin swimmers.
8. **Richard W. Willy, Pt, PhD, OCS; Lisa Halsey, DPT. Patellofemoral joint and Achilles Tendon Loads during overground and Treadmill running. July 2016; 46: 664-672**^[23]. The objective of this study is to compare measures of loading of the patellofemoral joint and Achilles' tendon across treadmill and overground running in healthy, uninjured runners. Little is known regarding how the potential differences between treadmill and overground running may affect patellofemoral joint.
9. **Natalia Radlinska, Arkadiusz Berwecki. The assessment of range of motion in selected joints in competitive swimmers. Journal of kinesiology and exercise sciences 2015; 70: 25**^[24]. The objective of this study to assess the difference in mobility of the joints: upper limb girdle, knee joint and ankle joint between groups of competitive swimmers and people who have never trained swimming and any other discipline and, also, to determine whether there any differences in range of motion in these joints between groups of swimmers specialising in various strokes.
10. **S de Jonge, C van den Berg. Incidence of midportion Achilles' tendinopathy in the general population. 2011; 45: 13**^[25]. Achilles' tendon disorders, like Achilles' tendinopathy, are very common among athletes. In general population, however, knowledge about the incidence of Achilles tendinopathy is lacking. Subsequently, the authors assessed associations of these rates with demographic characteristics
11. **Erkan demirkan, Sema Can; does ankle plantar and dorsiflexion affect fifty meter swimming time in swimmers; 2021; 23; 353-358**^[26]. The purpose of this study was to determine the relationships between ankle plantar and dorsiflexion and the four swimming styles in girl and boy swimmers. The study consisted of 20 girls (Mage= 16.50 ± 0.51 years) and 20 boys (Mage= 16.50±0.51 years), for a total of 40 swimmers volunteer individuals. Anthropometric and body composition measures were obtained including body height, body mass, fat %, fat free mass (FFM). Besides, ankle flexibility was assessed by measuring ankle plantar flexion and ankle dorsiflexion and four style swimming performance was obtained in official competition.
12. **Joshua Pinter and Kaitlyn R Schlueter; Clinical evaluation techniques for injury risk assessment in elite swimmers: A systemic review; 2021 Jan-Feb; 13(1): 57-64** To evaluate the quality of current literature regarding clinical assessment techniques used to evaluate the presence and/or development of pain/injury in elite swimmers and to categorize objective clinical assessment tools into relevant predictors (constructs) that should consistently be evaluated in injury risk screens of elite swimmers.
13. **Tin m Williams, Justein A M Cornelis; The effect of ankle muscle strength and flexibility on dolphin kick performance in competitive swimmers. 2014 Aug; 36: 167-76**^[27]. The velocity of a swimmer is determined by biomechanical and bioenergetics factors. However, little is known about the effect of ankle flexibility on dolphin kick performance. Next to this, scientific evidence is lacking concerning the influence of ankle muscle strength. Therefore, the aim of this study was to investigate the effect of ankle flexibility and muscle strength on dolphin kick performance in competitive swimmers. Ankle range of motion (ROM) and ankle muscle strength were measured in 26 healthy

competitive swimmers. The effect of both was assessed on the swimmer's velocity and lower extremity joint angles during three maximal dolphin kick trials.

14. Nicola Maffulli, Francesco oliva; The Royal London test for diagnosing Patellar Tendinopathy. 2017 Apr-Jun; 7(2): 315–322^[16]. Fifteen consecutive athletes with patellar tendinopathy were prospectively enrolled and compared with a control group of 15 non-consecutive athletes with Achilles' tendinopathy. Two testers examined separately each patient, using manual palpation and the Royal London Hospital test for diagnosis of patellar tendinopathy. High-resolution real-time ultrasonography was used as standard for diagnosis of tendinopathy and assessment of tendon thickness.

15. M Smith *et al.* J Athl Train. Osteochondritis dissecans of the talar dome in a colligative swimmer: a case report. 1998; 365:71^[28]. The objective of this case to present the case of an intercollegiate swimmer with a stage IV lateral talar dome injury and associated bony fragments. Lack of distinct diagnostic symptoms, low index of clinical suspicion, and the difficulty of visualizing the early stages of this injury on standard x-rays cause frequent misdiagnosis of talar dome lesions. Ganglion cyst, with inflammatory synovitis secondary to rupture of cyst; loose bodies from previous occult fracture; osteochondral fracture. Patient presented to the team physician for care of acute left medial ankle pain after the athletic trainer had attempted to rupture a ganglion cyst on the anterolateral aspect of the patient's ankle.

Methodology

Materials and methods

Study Design: A Cross sectional study

Sampling method: simple random sampling

Sample Size: 102 (G power software version 3 and calculation were done on data on similar study)

Study Duration: 6 months

Study Settings: Sports academy Jalgaon

Study Population: amateur swimmers

Materials

1. Measuring tape
2. Consent form
3. Case record form
4. VISA-A Questionnaire
5. Plinth
6. Pen

Inclusion Criteria

- Both male and female subjects
- Age group-16 to 50 years^[32]
- Amateur swimmers
- Duration more than 6 months

Exclusion Criteria

- Previous fracture or trauma
- Neurological and cardiovascular disorder
- Pulmonary disorder
- Any recent surgery
- Any other musculoskeletal injury

- Other ankle injuries – ankle sprain, ankle instability

Outcome Measures

London Royal Test

Procedure:

The patient lies prone with their ankle relaxed and foot hanging freely. The tenderest area of the mid-portion of the Achilles tendon is located using a pinch test. The patient moves their ankle into maximum dorsiflexion. The tendon is palpated again at the tender spot. The patient moves their foot into maximum plantar flexion. The tender spot is palpated again. The test is considered positive if the pain on the tender spot is absent or reduced when the ankle is in dorsiflexion. (Specificity-98% sensitivity-88%) (16).



Fig 2:

The Victorian institute of sports assessment - Achilles' questionnaire (visa-a)

In VISA A score, eight questions that measured the domains of pain, function in daily living, and sporting activity. Where Pain: Evaluates the intensity of pain during activity, Function: Assesses how the condition affects daily activities and sports performance. The VISA-A questionnaire consists of 8 items. The first 3 items rate pain or stiffness level on a numeric pain-rating questionnaire (0 to 10); the following 3 items are about pain during daily life activities (items 4 and 5) and the capacity to perform single-leg hops (item 6). The final 2 questions are about the impact of Achilles tendinopathy on sports participation (with categorical response options). The maximum possible score is 100 points, where higher scores are associated with lesser symptoms (29). Results range from 0 to 100, where 100 represents the perfect score (14). VISA-A scores in AT patients and healthy individuals, ranged from 24 to 100. This means that patients did not report VISA-A scores under 24 in any study, indicating that scores below a 24 on the VISA-A scale are not normally reported by subjects with AT. An explanation of this phenomenon could be that AT patients usually are able to transport themselves to the clinic, all having some mobility, and this would probably also be the case for the participants in the included studies (15).

Key feature for VISA-A score is Higher scores reflect less pain and fewer limitations, while lower scores indicate more severe symptoms

Single Leg Heel Raise Test

Procedure:

Ask the patient to stand on one leg near a wall. Ask him to use fingertip against the wall for support at shoulder level. Tell him to keep your knee and body straight and Lift heel as high as possible. Make sure to load across entire forefoot and

avoid rolling onto the outside of your foot. Aim for a solid tempo of one heel raise per second. Observe patient should able to perform 25 to 30 repetitions on each leg as an indicator of good calf muscle strength and endurance and

ankle stability. Continue until you can't complete any more with good form. Test both legs - were they the same? (30) (Specificity= 0.71- 0.98) (13)



Fig 3:

Single hop heel raise test

In this test, the aim is to jump as far as possible on a single leg, without losing balance and landing firmly. The distance is measured from the start line to the heel of the landing leg. The goal is to have a less than 10% difference in hop distance

between the injured limb and uninjured limb. Observe patient should able to perform 25 to 30 repetitions on each leg as an indicator of muscle strength and the ability to tolerate loads related to ankle specific activities (31). (specificity= 0.91)

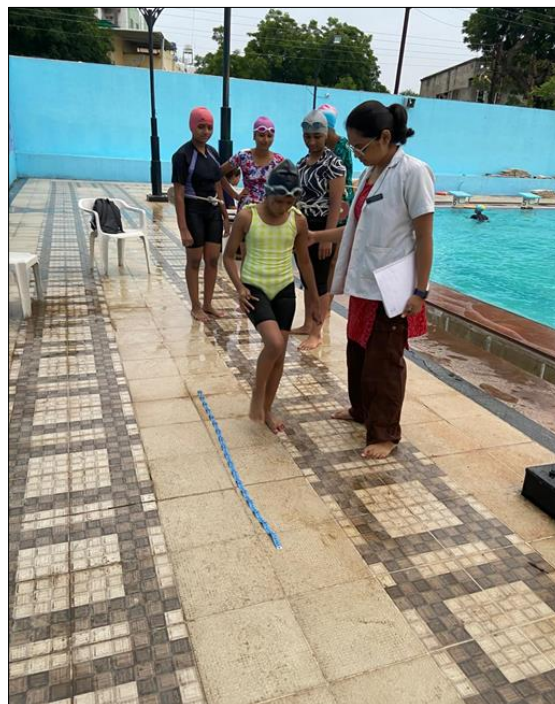


Fig: 4

Procedure

To conduct the following study, approval was taken from institutional ethical committee of college.



Subjects was taken according to inclusion and exclusion criteria



Prior to starting the study, the procedure must be explained and a written consent form was taken from the subjects.



Royal London test was performed to diagnosed the AT



Victorian Institute of Sports Assessment (VISA-A) Questionnaire was taken to assess physical activity among swimmers diagnosed with AT



Data was collected, analysed and result was obtained

Statistical Analysis

- The data and tests result of subjects was entered in MS Excel sheet before it was statistically analyzed.
- The statistical analysis was done for a special test and VISA A questionnaire
- All the results are shown in tabular as well as graphical format to visualize the statistically difference more clearly.
- Quantitative analysis was done by using MS excel.

Results

Table 1: Age wise distribution

Sr. No.	Variable	Groups	Frequency	Percentage
1	Age (in years)	below 20	20	19.61
		21-30	45	44.12
		31-40	26	25.49
		41-50	11	10.78

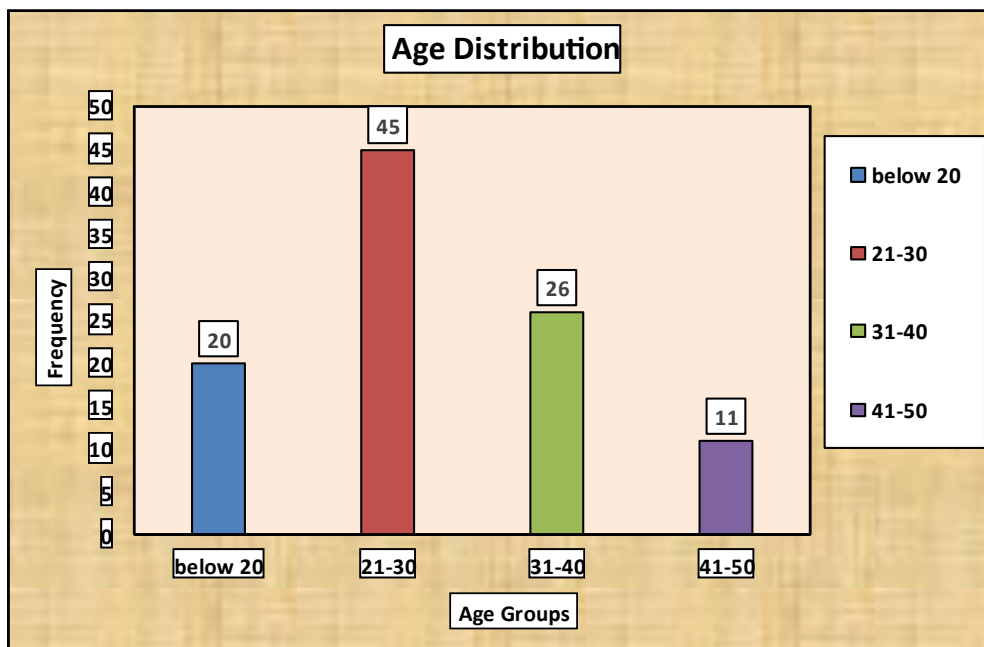


Fig 5: Age wise distribution

Table 2:

Age	Mean	SD	Min	Max
	27.63	8.53	16	48

Interpretation- Above table represents the result of age group between <20 there are 20 subjects [19.61%], age 21-30 there are 45 subjects [44.12%], age 31-40 there are 26

subjects [25.49%], age 41-50 there are 11 subjects [10.78%]. Mean age is 27.63 years in this project

Table 3: Gender wise distribution:

Sr. No.	Variable	Groups	Frequency	Percentage
2	Gender	Male	51	50.00
		Female	51	50.00

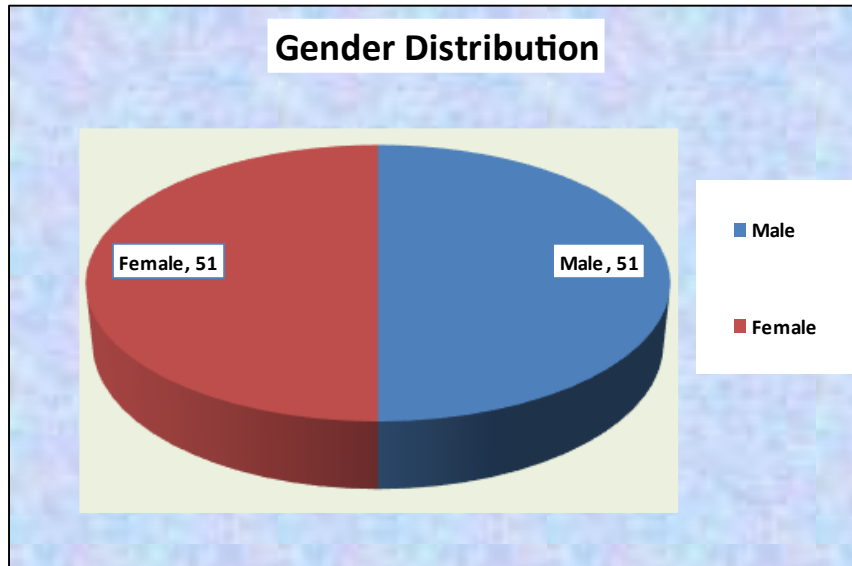


Fig 6: Gender wise distribution:

Interpretation – Above table represents the result of gender where 51 male [50%] and 51 females [50%]

Table 4: Duration wise distribution:

Sr. No.	Variable	Groups	Frequency	Percentage
3	Duration	6 months - 2 years	33	32.35
		2 - 5 years	28	27.45
		> 5 years	41	40.20

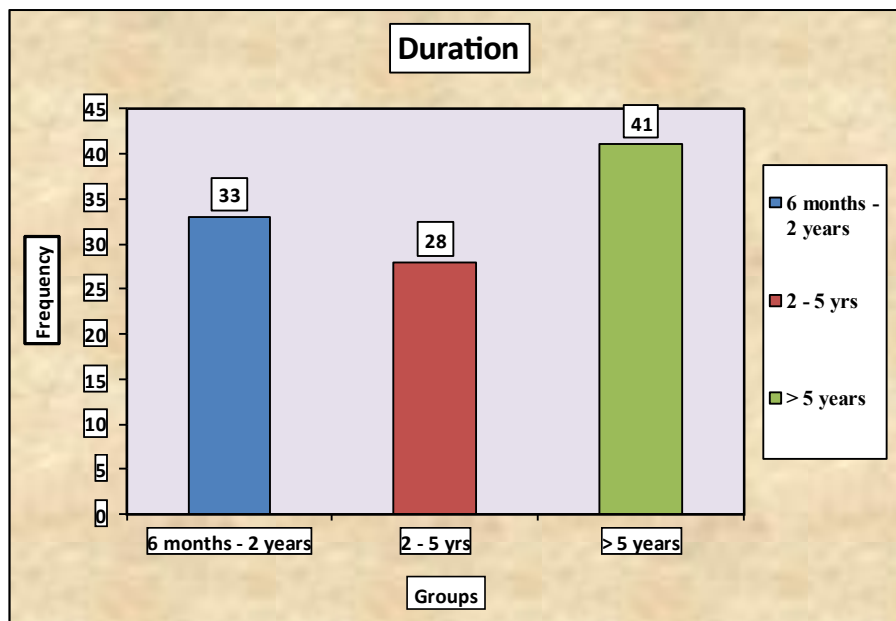


Fig 7: Duration wise distribution:

Table 5:

Duration (in months)	Mean	SD	Min	Max
	67.16	60.45	6	252

Interpretation -Above table represents the result of duration [27.45%] and more than 5 years [40.20%]. Mean duration between 6 months – 2 years [32.35%], 2 years-5 years 67.16 months in this project.

Table 6: Royal London test:

Sr. No.	Variable	Groups	Frequency	Percentage
4	Royal London Test	Positive	29	28.43
		Negative	73	71.57

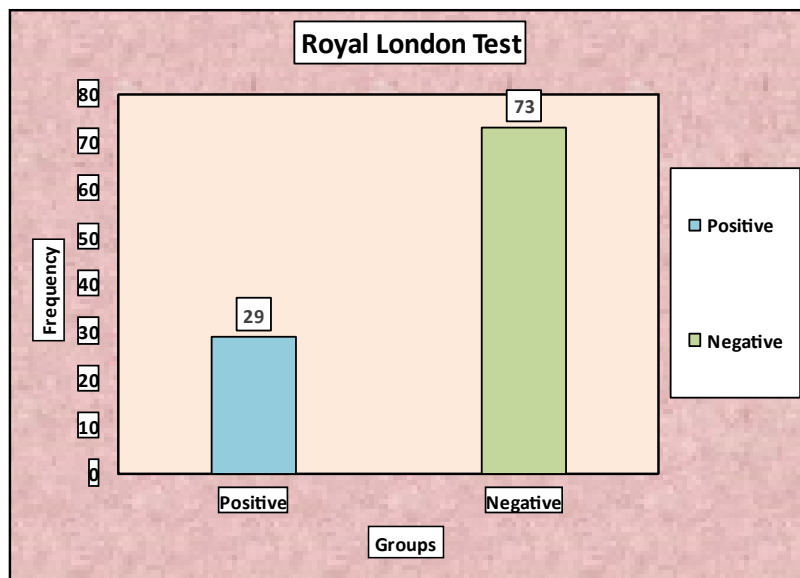


Fig 8: Royal London test:

Interpretation -Above table represents positive and negative subjects 29 [28.43%] shows positive and 73 [71.57%] tests results of Royal London test out of 102 shows negative result.

Table 7: VISA-A Questionnaire:

Sr. No.	Variable	Groups	Score	Frequency
5	Visa A	Rupture	0-24	0
		Pain	24-96	29
		No Pain	96-100	0

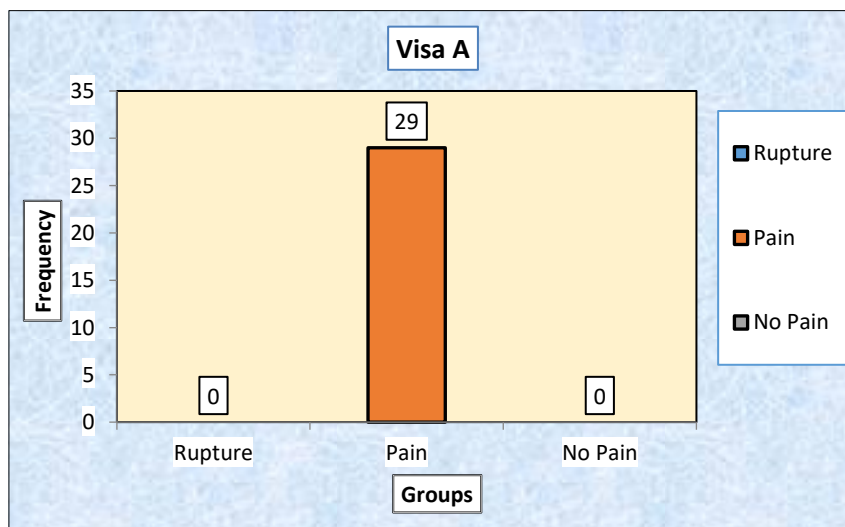


Fig 9: VISA-A Questionnaire:

Table 8:

Visa A	N	Mean	SD	Min	Max
	29	50.48	10.86	30	68

Interpretation- In VISA-A Questionnaire there is no score between 0 to 24[0%] no tendon rupture, score 24 to 96 there are 29 subjects having pain [28.43%] and score 96 to 100 there are 73 subjects having no pain [71.57%]. Mean of VISA-A score is 50.48 in this project

Discussion

The present study aims to assess the prevalence of Achilles tendinopathy and its effect on physical activity among amateur swimmers and to find out the Prevalence of Achilles tendinopathy among swimmers using Royal London test and to assess physical activity among swimmers diagnosed with AT using Victorian Institute of Sports Assessment (VISA-A) Questionnaire.

The present research was conducted on 102 male and female amateur swimmers. In this study 28% of swimmers are positive with royal London test that they are diagnosed with Achilles' tendinopathy where D J Magee concluded in his book that because of the high training volumes or intensity, can lead to overuse injuries, including Achilles' tendinopathy. And poor biomechanics, such as improper kicking techniques or foot posture, may be at increased risk. And 72% of swimmers are negative with same test that they don't have any type of pain that Joshua Pinter and Kaitlyn R Schlueter mentioned in their study that, Achilles' tendinopathy is less common among swimmers compared to athletes in high-impact sports, primarily because swimming is a low-impact activity that does not place significant stress on the Achilles tendon.

According to visa a questionnaire i.e., 29 subjects having pain because several things can cause physical disability while Pushing of the wall-at the time of swimming laps, you will need to push off the wall between each lap. The hard tile on the side of the pool is not very forgiving, and pushing off repeatedly can cause AT. Foot position while kicking – if you do not always use proper swimming form, which is easy to do as you get tired, your feet and ankles might become weak. Ankles that are not strong as they contact the water can be inflamed (31).

Michael J. B. R. and J. B. M. concluded that Degenerative changes may occur that, Tendinopathy often involves a combination of collagen degeneration, increased ground substance, and disorganized collagen structure, leading to a weakened tendon (29).

The current study disagreed with Richardson *et al.* who stated that swimming is a low prevalence sport but the major finding of the current study was the high prevalence of Achilles tendinopathy of the studies sample was 28%.

Mookerjee *et al.* (32) found that there was no significant relationship between ankle plantar and dorsiflexion and swimming performance. The present study says that, the plantar and dorsal flexors should produce considerably greater force, to push forward the body with higher acceleration, than in normal swimming. Therefore, the load on the tendons and ligaments is increased, that may cause overuse effect.

(Langley *et al.*, 1974). Found that The FHL muscle is the strongest muscle among the deep digital flexor muscles, is involved in plantar flexion, supination and approximation of

the foot. The FHL muscle is part of the propulsion power transmission during fin swimming. If the tendon is damaged, the person usually feels pain in the whole ankle. This area is swollen, warm and painful to touch. In mild cases, pain may occur during rest after a strenuous activity.

The current study's significant interpretation derived from statistical analysis and careful consideration of the available literature, suggest that the moderate degree of pain during activities such as stiffness, pain on stretch, pain on walk, pain on stairs, single heel raise, single hop raise, physical activity, and time engaged in sports is a common sign of Achilles tendinopathy.

Conclusion

A moderate degree of pain during activities such as stiffness, pain on stretch, pain on walk, pain on downstairs, single heel raises, single hop raises, physical activity and time spent was found to be a common symptom of Achilles tendinopathy in this study.

Future Scope

- Study can be done in Athletes and underwater swimmers
- Intervention and treatment can be done for Achilles' tendinopathy

Limitation

- The data was collected from small population of swimmers from particular region in the Jalgaon and hence, the extensive application of the results to a wider population needs to be interpreted.
- The study cannot include specific swimming styles, and as such, results will reflect general swimming activity without differentiation by stroke type.

References

1. Wang Y, Zhou H, Nie Z, Cui S. Prevalence of Achilles tendinopathy in physical exercise: A systematic review and meta-analysis. *Sports Med Health Sci.* 2022 Sep;4(3):152–9.
2. Silbernagel KG, Hanlon S, Sprague A. Current Clinical Concepts: Conservative Management of Achilles Tendinopathy. *J Athl Train.* 2020 May;55(5):438–47.
3. Zhi X, Liu X, Han J, Xiang Y, Wu H, Wei S, *et al.* Nonoperative treatment of insertional Achilles tendinopathy: a systematic review. *J Orthop Surg.* 2021 Mar 30;16(1):233.
4. Cook JL, Purdam C. Is compressive load a factor in the development of tendinopathy? *Br J Sports Med.* 2012 Mar;46(3):163–8.
5. Khan KM, Maffulli N. Tendinopathy: an Achilles' heel for athletes and clinicians. *Clin J Sport Med.* 1998 Jul;8(3):151–4.
6. Loiacono C, Palermi S, Massa B, Belviso I, Romano V, Di Gregorio A, *et al.* Tendinopathy: Pathophysiology, Therapeutic Options, and Role of Nutraceuticals. A Narrative Literature Review. *Medicina (Mex).* 2019 Aug 7;55(8):447.
7. Selmy MM, El Raouf NAELA, Zahran MR. Prevalence of posterior ankle impingement syndrome in Egyptian

- swimmers. *Int J Health Sci.* 2022;6(S1):8092–100.
8. Juhasz I, Kopkane JP, Hajdu P, Szalay G, Kopper B, Tihanyi J. Creatine Supplementation Supports the Rehabilitation of Adolescent Fin Swimmers in Tendon Overuse Injury Cases. *J Sports Sci Med.* 2018 Jun;17(2):279–88.
 9. Zwierzchowska A, Gawel E, Karpinski J, Maszczyk A, Zebrowska A. The effect of swimming on the body posture, range of motion and musculoskeletal pain in elite para and able-bodied swimmers. *BMC Sports Sci Med Rehabil.* 2023 Sep 25;15(1):122.
 10. Demirkan E, Özkadı T, Can S, Alagöz İ. Does ankle plantar and dorsiflexion affect fifty-meter swimming time in swimmers? *Turk J Sport Exerc.* 2021 Dec 30;23(3):353–8.
 11. Sorosky B, Press J, Plataras C, Rittenberg J. The practical management of Achilles tendinopathy. *Clin J Sport Med.* 2004 Jan;14(1):40–4.
 12. Kvist M. Achilles tendon injuries in athletes. *Sports Med.* 1994 Sep;18(3):173–201.
 13. Robinson JM, Cook JL, Purdam C, Visentini PJ, Ross J, Maffulli N, *et al.* The VISA-A questionnaire: a valid and reliable index of the clinical severity of Achilles tendinopathy. *Br J Sports Med.* 2001 Oct;35(5):335–41.
 14. Iversen JV, Bartels EM, Langberg H. The victorian institute of sports assessment - achilles questionnaire (visa-a) - a reliable tool for measuring achilles tendinopathy. *Int J Sports Phys Ther.* 2012 Feb;7(1):76–84.
 15. Maffulli N, Oliva F, Loppini M, Aicale R, Spiezia F, King JB. The Royal London Hospital Test for the clinical diagnosis of patellar tendinopathy. *Muscles Ligaments Tendons J.* 2017;7(2):315–22.
 16. Comins J, Siersma V, Coupe C, Svensson RB, Johansen F, Malmgaard-Clausen NM, *et al.* Assessment of content validity and psychometric properties of VISA-A for Achilles tendinopathy. *PLoS One.* 2021;16(3):e0247152.
 17. Kuhn J, Legerlotz K. Ankle joint flexibility affects undulatory underwater swimming speed. *Front Sports Act Living.* 2022;4:948034.
 18. Vallance P, Hasani F, Crowley L, Malliaras P. Self-reported pain with single leg heel raise or single leg hop offer distinct information as measures of severity in men with midportion and insertional Achilles tendinopathy: An observational cross-sectional study. *Phys Ther Sport.* 2021 Jan;47:23–31.
 19. Lieberthal K, Paterson KL, Cook J, Kiss Z, Girdwood M, Bradshaw EJ. Prevalence and factors associated with asymptomatic Achilles tendon pathology in male distance runners. *Phys Ther Sport.* 2019 Sep;39:64–8.
 20. Vallance P, Crowley L, Hasani F, Malliaras P. Maximal isometric force is more strongly associated with Achilles tendinopathy severity than rate of force development and muscle force steadiness. *J Sci Med Sport.* 2019 Oct;22(Suppl 2):S111–2.
 21. Willy RW, Halsey L, Hayek A, Johnson H, Willson JD. Patellofemoral Joint and Achilles Tendon Loads During Overground and Treadmill Running. *J Orthop Sports Phys Ther.* 2016 Aug;46(8):664–72.
 22. Radlińska N, Berwecki A. The assessment of range of motion in selected joints in competitive swimmers. *J Kinesiol Exerc Sci.* 2015;70.
 23. Willems TM, Cornelis JAM, De Deurwaerder LEP, Roelandt F, De Mits S. The effect of ankle muscle strength and flexibility on dolphin kick performance in competitive swimmers. *Hum Mov Sci.* 2014 Aug;36:167–76.
 24. Smith M, Chang CJ. Osteochondritis dissecans of the talar dome in a collegiate swimmer: a case report. *J Athl Train.* 1998 Oct;33(4):365–71.
 25. Mookerjee S, Bibi K, Kenney G, Cohen L. Relationship Between Isokinetic Strength, Flexibility, and Flutter Kicking Speed in Female Collegiate Swimmers. *J Strength Cond Res.* 1995;9(2):115. (Note: page range incomplete in source)
 26. Lee JH, Jung HW, Jung TS, Jang WY. Reliability and usefulness of the single leg heel raise balance test in patients with chronic ankle instability. *Sci Rep.* 2021 Oct 13;11(1):20369.
 27. de Jonge S, van den Berg C, de Vos RJ, van der Heide HJL, Weir A, Verhaar JAN, *et al.* Incidence of midportion Achilles tendinopathy in the general population. *Br J Sports Med.* 2011 Oct;45(13):1026–8.
 28. Elsevier. Orthopedic Physical Assessment. 7th ed. [Internet]. Available from: <https://www.asia.elsevierhealth.com/orthopedic-physical-assessment-9780323749510.html>

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