

T.C. YEDITEPE UNIVERSITY
INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF PHYSIOTHERAPY AND REHABILITATION

**Cross-Cultural Adaptation, Reliability and Validity of
VISA-A Questionnaire in Standard Arabic Language**

MASTER OF SCIENCE THESIS

SUPERVISOR

Assoc. Prof. Dr. Feyza Şule HANTAL

Heba Qassim, PT

İstanbul 2022

THESIS APPROVAL FORM

Institute : Yeditepe University Institute of Health Sciences

Programme : Sport Physiotherapy Rehabilitation Master's Program

Title of the Thesis : Cross-Cultural Adaptation, reliability, and validity of VISA-A questionnaire in standard Arabic language

Owner of the Thesis : Heba Qassim

Examination Date : 25.01.2022

This study has approved as a Master/Doctorate Thesis in regard to content and quality by the Jury.

	Title, Name-Surname (Institution)
Chair of the Jury and Supervisor:	Assoc. Prof. Dr. Şule Hantal Yeditepe University
Member/Examiner:	Prof. Dr. Rasmi Muammer Yeditepe University
Member/Examiner:	Ass. Prof. Dr. Ayşe Neriman Narin Bolu Abant İzzet Baysal University

APPROVAL

This thesis has been deemed by the jury in accordance with the relevant articles of Yeditepe University Graduate Education and Examinations Regulation and has been approved by Administrative Board of Institute with decision dated and numbered

Prof. Dr. Bayram YILMAZ
Director of Institute of Health Science

DECLARATION

This thesis is my research, and it includes no material that has been accepted for the granting of any other degree, save where due acknowledgment is given in this content, to the best knowledge and belief.

25.02.2022

HEBA QASSIM



ACKNOWLEDGMENT

I'd like to thank all of my instructors and doctors for their help at Yeditepe University. I wish to say my deepest appreciation to my adviser Dr. Sule Demirbas for her great and continued support in this study, my deepest appreciation goes to Dr.Mohammad Madi, from The Hashimite University in Jordan, for his continued support and guidance which makes this project possible and successful , and Special thanks for Dr Raed Al Rantisi sport medicine physician for Saudi national football teams from the Saudi Football Federation for his support in collecting participants for this study. I would especially like to thank Prof Feryal Al Subasi for her guidance, persistence, endurance, and support throughout this study and many other endeavors.

TABLE of CONTENTS

THESIS APPROVAL FORM	Hata! Yer işareti tanımlanmamış.
DECLARATION	Hata! Yer işareti tanımlanmamış.
ACKNOWLEDGEMENTS	Hata! Yer işareti tanımlanmamış.
TABLE OF CONTENTS	Hata! Yer işareti tanımlanmamış.
LIST OF TABLES	Hata! Yer işareti tanımlanmamış.
LIST OF FIGURES	Hata! Yer işareti tanımlanmamış.
LIST OF SYMBOLS and ABBREVIATIONS	Hata! Yer işareti tanımlanmamış.
ABSTRACT	Hata! Yer işareti tanımlanmamış.
ÖZET	Hata! Yer işareti tanımlanmamış.
1. INTRODUCTION AND PURPOSE	Hata! Yer işareti tanımlanmamış.
1.1 Introduction	Hata! Yer işareti tanımlanmamış.
1.2 Importance of Research	4
1.3 Aim of The Study	Hata! Yer işareti tanımlanmamış.
1.4 Specific Objectives	Hata! Yer işareti tanımlanmamış.
1.5 Definitions	Hata! Yer işareti tanımlanmamış.
2. LITERATURE REVIEW	6
2.1 Literatur Review	Hata! Yer işareti tanımlanmamış.
2.2 Anatomy	Hata! Yer işareti tanımlanmamış.
2.2.1 Bone Anatomy	Hata! Yer işareti tanımlanmamış.
2.2.2 Ligament Anatomy	7
2.2.3 Muscular Anatomy	Hata! Yer işareti tanımlanmamış.
2.3 Anatomy of Achilles Tendon	9
2.4 The Function of Achilles Tendon	Hata! Yer işareti tanımlanmamış.
2.5 Injury Mechanism	Hata! Yer işareti tanımlanmamış.
2.6 Incidence of Achilles Tendinopathy Between Athletes Hata! Yer işareti tanımlanmamış.	
2.7 Treatment of Achilles Tendinopathy	Hata! Yer işareti tanımlanmamış.
2.8 Rehabilitation	Hata! Yer işareti tanımlanmamış.
2.9 Return to Play	Hata! Yer işareti tanımlanmamış.
2.10 Orthotic Insole	19

2.11 Assessment Methods for Foot and Ankle	Hata! Yer işareti tanımlanmamış.
2.12 The Victorian Institute of Sport Assessment – Achilles Tendon	Hata! Yer işareti tanımlanmamış.
3. MATERIALS AND METHODS	Hata! Yer işareti tanımlanmamış.
3.1 Type of Research.....	Hata! Yer işareti tanımlanmamış.
3.2 Place and Time of Research	Hata! Yer işareti tanımlanmamış.
3.3 The Subjects and Sample of the Research.....	23
3.3.1 Inclusion criteria in the study	23
3.3.2 Exclusion criteria from the study	24
3.4 Socio-Demographic Survey	Hata! Yer işareti tanımlanmamış.
3.5 Data Collection Tools.....	24
3.6 The Process of Adaptation	26
3.7 Analysis Data.....	Hata! Yer işareti tanımlanmamış.
4. RESULTS	32
5. CONCLUSIONS, DISCUSSION, AND SUGGESTIONS	Hata! Yer işareti tanımlanmamış.
5.1 Results of Internal Consistency	37
5.2 Results of Test-Retest Reliability.....	37
5.3 Results of Spermen Correlation	38
5.4 Limitations of The Study.....	39
5.5 Conclusion	40
6. REFERENCES.....	41
7. APPENDICES.....	54
7.1 Ethical Approval.....	56

LIST OF TABLES

Table 1: Comparison between the Current Study and other Validation Studies...	29
Table 2: Patient Demographics and Distribution Across Several Factors(N=49) ..	32
Table 3: Items Internal Consistence as well as the Intraclass Correlation Coefficient	34
Table 4: Correlation between VISA-A and LEF Questionnaire	35



LIST OF FIGURES

Fig. 1: Foot Anatomy	7
Fig 2: Ligaments Anatomy, lateral view	8
Fig 3: Ligaments Anatomy, medial view	8
Fig 4: Muscular Anatomy	9
Fig 5: Achilles Tendon Anatomy	10
Fig 6: Eccentric Exercises	17
Fig 7: Lower Extremity Functional Scale Questionnaire	22
Table 8: The Victorian Institute of Sport Assessment-Achilles Tendon	24
Fig 9: Inclusion Flow Chart	Hata! Yer işareti tanımlanmamış.
Fig 10: Flow-Chart of the steps for translation of the VISA-A (English to Arabic)	Hata! Yer işareti tanımlanmamış.

LIST OF SYMBOLS AND ABBREVIATIONS

AT	Achilles Tendon
ATP	Achilles Tendinopathies
ATT	Achilles Tendinitis
ATR	Achilles Tendon Rupture
PROMs	Patient Report Outcome Measures
VISA-A	Victorian Institute of Sport Assessment – Achilles tendinopathy
VISA-A-AR	Victorian Institute of Sport Assessment – Achilles tendinopathy Arabic version
LEFS	Lower Extremity Functional Scale
RTP	Return to Play
NFL	National Football League
NA	Not Applicable
PTs	Physiotherapists
P&O	Prosthesis and Orthosis
ICC	Intraclass Correlation Coefficient

ABSTRACT

Qassim H. (2022). Cross-Cultural Adaptation, Reliability and Validity of VISA-A Questionnaire in Standard Arabic Language. Yeditepe University, Institute of Health Science, Department of Physiotherapy and Rehabilitation MSc thesis, İstanbul.

This study aims to perform a Cross-Cultural Adaptation of the VISA-A questionnaire in standard Arabic language and to calculate the reliability and validity of this new version. Cross-cultural adaptation was carried out in accordance with established procedures. 75 Arabic patients with Achilles Tendinopathy agreed to take part in the study and completed the questionnaire. Internal consistency was measured using Cronbach's alpha. After two weeks the Test-retest reliability was calculated using the Intraclass correlation coefficient. Spearman correlation coefficient was used to calculate construct validity with Lower Extremity Functional Scale (LEFS) was calculated. To assess measurements errors (SEM) and (MDC) were calculated. The internal consistency of the Arabic Victorian Institute of Sport Assessment-Achilles Tendon was excellent, with a Cronbach's alpha of .87. The test-retest reliability was outstanding (Intraclass Correlation Coefficient was .91). Correlation with Lower Extremity Functional Scale was high which reflects excellent construct validity (.83). Standard Error Measurement (SEM) was 2.37 and at the individual level, Minimal Detectable Change MDC was 6.57 and 1.3 at the group level. Arabic Victorian Institute of Sport Assessment-Achilles Tendon was created. Internal consistency, test-retest reliability, and construct validity were all excellent in this tool. In the Middle-East and Africa region, the questionnaire is appropriate for Achilles Tendinopathy patients.

Keywords: VISA-A questionnaire, standard Arabic language, cross-cultural adaptation, Validity, Reliability, VISA-A questionnaire translation.

ÖZET

Qassım H. (2022). VISA-A Anketinin Standart Arapça Dilinde Kùltürler Arası Uyarlaması, Güvenilirliđi ve Geçerliliđi. Yeditepe Üniversitesi Sađlık Bilimleri Enstitüsü,Fizyoterapi ve Rehabilitasyon ABD. Yüksek Lisans Tezi. İstanbul

Gereç ve yöntemler: Kùltürler arası adaptasyon kılavuzlara göre yapıldı. 75 Aşıl Tendinopatili Arap hasta çalışmaya katılmayı kabul etti ve anketi doldurdu. İç tutarlılıđı deđerlendirmek için Cronbach alfası hesaplandı. Test-tekrar test güvenilirliđi, sınıf içi korelasyon katsayısı hesaplanarak 2 hafta sonra deđerlendirildi. Yapı geçerliliđini deđerlendirmek için Alt Ekstremitte Fonksiyonel Ölçeđi (LEFS) ile Spearman korelasyon katsayısı hesaplandı. Ölçüm hatasını deđerlendirmek için Standart Ölçüm Hatası (SEM) ve Minimum Saptanabilir Deđişiklik (MDC) hesaplandı.Sonuç: Arap Victorian Spor Deđerlendirme Enstitüsü-Aşıl Tendonu mükemmel bir iç tutarlılıđa sahiptir, Cronbach alfası .87 idi. Test-tekrar test güvenilirliđi mükemmeldi (Sınıf İçi Korelasyon Katsayısı .91 idi). Alt Ekstremitte Fonksiyonel Ölçeđi ile korelasyon yüksekti ve bu da mükemmel yapı geçerliliđini yansıtıyordu (.83). Standart Hata Ölçümü (SEM) 2.37 ve Minimal Saptanabilir Deđişiklik MDC'si bireysel düzeyde 6.57 ve grup düzeyinde 1.3 idi.Sonuçlar: Arapça Victorian Spor Deđerlendirme Enstitüsü-Aşıl Tendonu üretildi. Araç, mükemmel bir iç tutarlılık, test-tekrar test güvenilirliđi ve yapı geçerliliđi gösterdi. Anket, Orta Dođu ve Kuzey Afrika bölgesindeki Aşıl Tendinopatili hastalarda kullanıma uygundur.

Anahtar Sözcükler: VISA-A anketi, standart Arap dili, kùltürler arası uyarlama, Geçerlilik, Güvenilirlik, VISA-A anket çevirisi.



1. INTRODUCTION AND PURPOSE

1.1 Introduction

The Achilles tendon (AT) is the human body's strongest and thickest tendon, connecting the foot (the calcaneus bone) with the leg (Tibia and Fibula) [1]. AT pathologies can either be due to acute injury or due to chronic background called Achilles tendinopathies (ATP) one of its inflammation of the tendon is called Achilles tendinitis (ATT) [22].

ATP is a disease that affects both athletes and non-athletes. Achilles tendinopathy records 6-17% of all running injuries, and 7% of military trainees suffer from tendinopathy [20], It is an overload injury and can influence the distal insertion or the mid-portion of the tendon [3], According to observational data, competitive athletes have a lifetime incidence of Achilles tendinopathy of 24%, with 18% of those under 45 years old suffering from it [2].

According to studies, the force exerted on the Achilles tendon when running is 6–8 times that of the bodyweight [4]. Predisposing factors are grouped into 2 groups: intrinsic and extrinsic factors, Intrinsic Risk Factors (sex, age, weight, and height) [6], one study showed that, in their young group, there was no notable change in blood flow between different genders, while male patients in the elderly population had a lower rise in AT blood flow than female patients. [23]. And one study showed that the male gender was a significant risk factor for non-operative re-rupture [24].

Therapeutic medicines (corticosteroids, antibiotics), ambient variables, and physical activity-related elements, such as training pattern, technique, and equipment, are examples of extrinsic factors. [6].

The medical history and physical examination of the patient are used to diagnose ATT. Pain is a symptom that appears later in the disease process. Stiffness in the morning or stiffness after a period of inactivity is a typical symptom. Pain is most common in athletes at the start and finish of a training session.

In severe cases, pain takes place at rest [20], ATR is a disruption in the conjoined tendon of the gastrocnemius and soleus muscles, usually around 2-6 cm proximal to the tendon insertion into the calcaneus [5], The best diagnostic tool is a clinical examination [20].

According to one meta-analysis study, operation treatment resulted in a considerable reduction in re-rupture (2.3 percent) when compared to non-operative treatment (3.9 percent). The final decision on the treatment of acute ATR should be based on shared decision-making [8].

The average time to RTP with surgical treatment is 6 to 9 months, and 6 to 8 months with non-surgical treatment. Sports that require a lot of acceleration and jumping can take a long time (up to 12-months) [21].

96 percent of professional male football players who had surgery to repair an ATR returned to the same level of competition within 7-9 months, however, 18 percent did not return to the same level of competition within the first two sessions after their return, with those who had a re-rupture being at a higher risk. [39].

One study showed that the players who RTP after ATR, the performance affected only in the season immediately following the injury, and players able to return to pre-injury levels if allowed to play more than 1 season after the injury [40].

The proper way to prevent sports injuries is to improve the agility of a football player when designing training, the use of weight training combined with strength and endurance, container training, a ball game in converted spaces, sprints with changing the direction. Using training methods of speed, agility, and speed, neuromuscular training program, or muscular program, all of them have proven to be effective [41].

In 2007, assessment tools have become a vital part of assessing therapy success [9]. Like, Lower Extremity Functional Scale (LEFS), Foot and Ankle Disability Index (FADI), Foot and Ankle Outcome Score (FAOS), American Orthopedic Foot and Ankle Score (AOFAS), and the Victorian Institute of Sport Assessment-Achilles (VISA-A) questionnaire are some of the tools used to assess the condition's impairment and functional limitations.

LEFS is a functional status scale for people with musculoskeletal lower extremity problems. FADI and FAOS are both area-specific outcome measures that evaluate the ankle and foot region. FADI focuses on the functional evaluation, whereas FAOS, a modification of the Knee Injury Osteoarthritis Outcome Score, evaluates a variety of

ankle and foot symptoms and restrictions. VISA-A, on the other hand, is the only disease-specific, valid, and accurate health outcome indicator for Achilles Tendinopathy. [29], and it is one of the most widely used these days [10].

In 2001, The VISA-A was designed to evaluate ATP symptoms and their impact on physical activity [12].

The Victorian Institute of Sport Assessment-Achilles questionnaire (VISA-A) was created by Robinson as a self-administered questionnaire to examine results.

It is thought to be the most specific functional questionnaire for determining the location and degree of ATP.

It can be self-administered and is easily understood by patients. It also aids the clinician in evaluating the symptoms and effects of physical exercise, comparing and determining clinical indicators, and monitoring therapy effectiveness. [13].

For systematic usage, the VISA-A, like any other self-administered questionnaire, must meet reliability criteria. These reliability criteria consist of having good internal consistency (Cronbach's alpha) which is .9, test-retest reliability (intraclass correlation coefficient [ICC] which is .93), and parallel forms reliability (correlation coefficients of the questionnaire score compared with other similar scales).

Reliability, on the other hand, is a feature that is dependent on the specific set of subjects on whom it is performed. As a result, Internal consistency, test-retest reliability, and parallel-forms reliability are all variables that can change, depending on the questionnaire's application. [12].

The VISA-approved application is in its final form. The eight questions on the questionnaire included the three domains of pain (questions 1-3), function (questions 4-6), and activity (questions 7-8). Questions one through seven are graded on a scale of one to ten, with question eight carrying a maximum score of thirty. The questionnaire assigns a score between 0 and 100, with 0 indicating the maximum possible severity and 100 indicating an asymptomatic patient.

Participants must only respond to part A, B, or C to question 8. If a player is in pain while participating in sports, he or she will lose at least 10 and maybe 20 points [15].

1.2 Importance of Research

In 2001, the Origin version was created for the English-speaking community. Cross-cultural adaptation is necessary and required since the source language and culture in which the original questionnaire was prepared differs significantly from those in the Middle East and North Africa, where it will be used.

Respondents are expected to understand the translated questionnaire's ideas and concepts in the same way that they did the original form. Respondents across cultures would have the same perspective, content, and idea about the study if questionnaires were cross-culturally adapted. Cross-cultural adaptation is also necessary to ensure that the original version's notions have a similar or equivalent meaning in the target community [13].

1.3 Aim of The Study

VISA-A has been translated and approved in a number of languages, but there is no Arabic version of this instrument. The goal of this research is to create an Arabic version of the VISA-A and to evaluate its reliability and construct validity.

Because there is currently no Arabic version of the VISA-A Questionnaire, the goal of this study was to translate, culturally adapt, and validate it for the Arabic-speaking population.

This study hypothesizes that the VISA-A Arabic version has high validity and reliability score.

1.4 Specific Objective

- Age, Gender, Height, Weight, Educational Level, Duration of symptoms, fitness level, Health status.
- To determine the relation between VISA-A score and NSAID.
- To determine the incidence of ATP between males and females.
- To determine the relation between VISA-A score and LEFS.
- To determine the relation between VISA-A score and Operative status.

1.5 Defenitions

- BMI (Body Mass Index); Body Mass Index (BMI) is a person's weight in kilograms divided by the square of height in meters.
- Incidence; It refers to the number of individuals who develop a specific disease or experience a specific health-related event during a particular time period.



2. LITERATURE REVIEW

2.1 Literature Review

ATP is a disease that affects both athletes and non-athletes. Achilles tendinopathy records 6-17% of all running injuries, and 7% of military trainees suffer from tendinopathy [20], It is an overload injury and can influence the distal insertion or the mid-portion of the tendon [3], According to observational data, competitive athletes have a lifetime incidence of Achilles tendinopathy of 24%, with 18% of those under 45 years old suffering from it [2].

According to studies, the force exerted on the Achilles tendon when running is 6–8 times that of the bodyweight [4]. Predisposing factors are grouped into 2 groups: intrinsic and extrinsic factors, Intrinsic Risk Factors (sex, age, weight, and height) [6], one study showed that, in their young group, there was no notable change in blood flow between different genders, while male patients in the elderly population had a lower rise in AT blood flow than female patients. [23]. And one study showed that the male gender was a significant risk factor for non-operative re-rupture [24].

Therapeutic medicines (corticosteroids, antibiotics), ambient variables, and physical activity-related elements, such as training pattern, technique, and equipment, are examples of extrinsic factors. [6].

The VISA-A questionnaire was developed for English –speaking populations and has already been translated for the Italian, Turkish, French, Persian, Portuguese, Chinese, Filipino, German, Swedish, Chilean, Danish, and Spanish. It is for this reason that it is required to translate it into Arabic, culturally adapt, and validate it [15,16,18,19,26,27,28,29,30,31,33,34,35,121].

2.2 Anatomy

The talus inserts into the mortise produced by the tibial plateau, as well as the tibia and fibular malleoli, in the ankle, which is a synovial, hinge type joint. This anatomical conformation allows movement along just one axis, the sagittal axis, which produces the Dorsiflexion and Plantarflexion movements [42]. The usual range of motion for DF is 10-20 degrees [44,45,46], and for PF is 23-56 degrees [43,45,46].

2.2.1 Bone Anatomy

The distal tibia and fibula, seven tarsals, five metatarsals, and 14 phalanges make up the bones of the ankle and foot. [47].

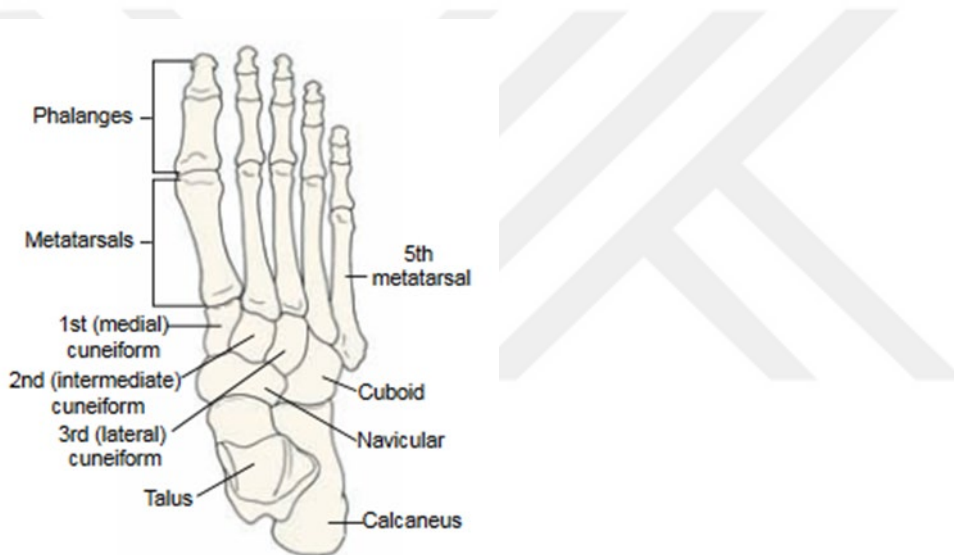


Figure 1: Foot Anatomy, Gulick, D. (2018). Ortho notes [121]

2.2.2 Ligaments Anatomy:

3 ligaments provide lateral support to the ankle joint,

The talofibular ligament joins to the talus distally and proximally on the anterolateral surface of the lateral malleolus.

The calcaneofibular ligament joins to the calcaneus distally and proximally on the outside section of the lateral malleolus.

The posterior talofibular ligament joins to the talus and calcaneus proximally and distally on the distal lateral section of the lateral malleolus [51].

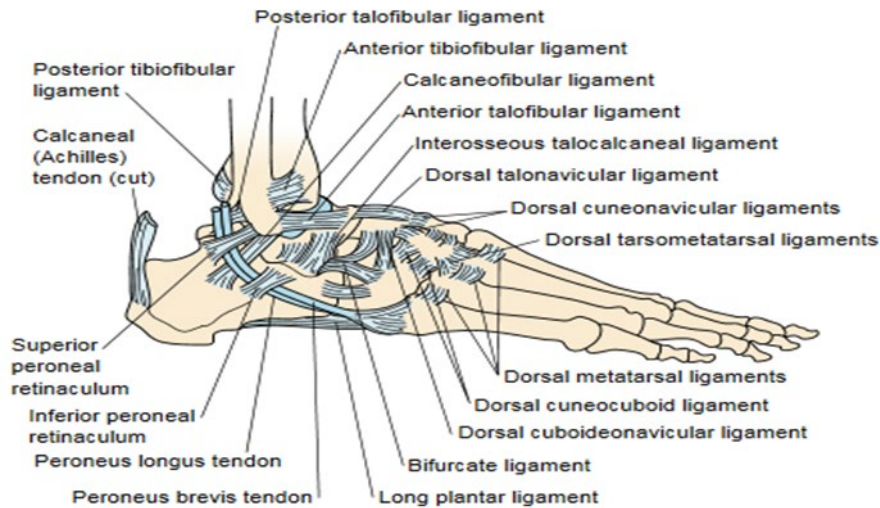


Figure 2: Ligament Anatomy, laterak view, Gulick, D. (2018). Ortho notes [121]

The Deltoid Ligament is made up of four ligaments that offer medial support.

The anterior tibiotalar ligament connects the anteromedial section of the malleolus to the superior portion of the medial talus proximally and distally.

The posterior tibiotalar ligament connects the medial malleolus to the talus and links distally to the medial malleolus.

The tibionavicular ligament attaches to the medial surface of the navicular from the posterior to the anterior tibiotalar ligament.

The tibiocalcaneal ligament joins to the calcaneus just below the apex of the medial malleolus proximally and distally [45].

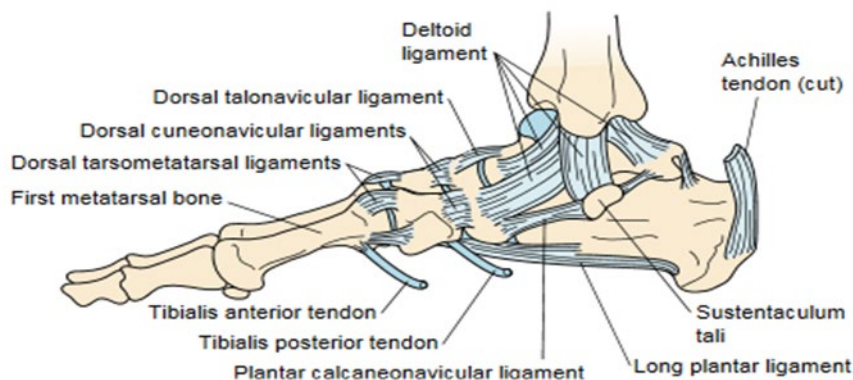


Figure 3: Ligament Anatomy, medial view, Gulick, D. (2018). Ortho notes [121]

2.2.3 Muscular Anatomy

The anterior compartment of the leg, which includes the anterior tibialis (main dorsiflexor), extensor hallucis longus, peroneus, and extensor digitorum longus, is the ankle's dynamic stabilizer.

Plantarflexor Muscles: The gastrocnemius, posterior tibialis, soleus, and plantaris are the muscles that make up the posterior compartment of the leg. The gastrocnemius and soleus (primary plantar flexor) provide dynamic ankle stability [48,49,50].

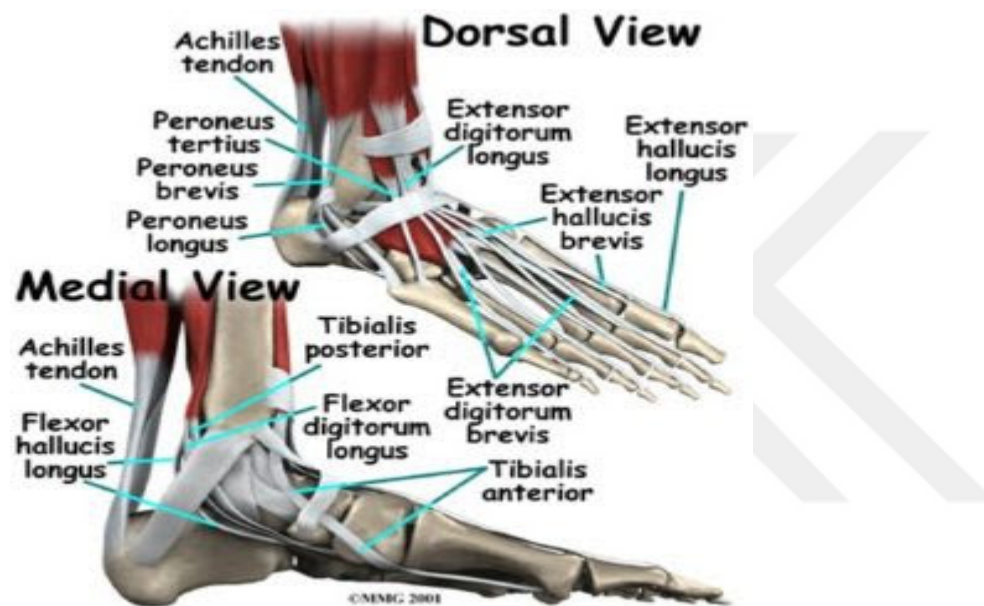


Figure 4: Muscular Anatomy <http://podiatryhq.com.au/foot-muscle-strengthening/>[128]

These calf muscles (Gastrocnemius and soleus) connect the calcaneus bone through the strongest and thickest tendon in the whole human body which is Achilles Tendon [52].

2.3 Anatomy of the Achilles Tendon:

The Achilles tendon connects the superficial posterior compartment of the leg to the calcaneus bone and is 12-15 cm long.

The calf muscles have separate proximal origins; however, they share a united distal part known as the AT. The third posterior compartment muscle, the plantaris, has a weak tendon.

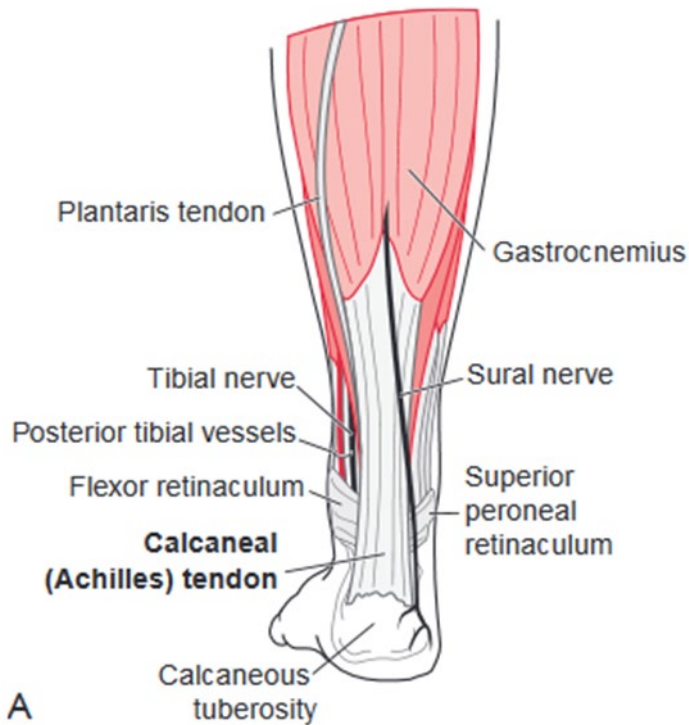


Figure 5: Achilles Tendon Anatomy, Brotzman, S. B., & Manske, R. C. (2011) [11].

The proximal tendomuscular junction of the AT is flat and broad, while the tendon's middle half is spherical. The tendon insertion in the posterior edge of the calcaneal bone is moon-shaped, with substantial medial and lateral projections [53].

The AT is wrapped by a peritenon, a thin connective tissue sheath that provides a gliding surface for the tendon and transmits blood flow. The peroneal artery supplies the circulatory supply for the middle section, whereas the posterior tibial artery supplies both the proximal and distal sections. In the intermediate location, 2-6cm from the calcaneal insertion site, the vascular supply to the AT is poor [54].

The AT's local blood supply varies according to age. The sural nerve and a minor supply from the tibial nerve provide innervation to the AT [53].

2.4 The Function of AT:

The primary PF of the ankle is the AT. Humans can jump and run more efficiently because the tendon has adapted to an upright position. In addition, it serves as a spring and shock absorber during gait [55].

2.4.1 Achilles Tendinopathies (ATP)

ATP is a degenerative disorder that causes localized pain, edema, and decreased performance [56]. The majority of the time, a patient's history and clinical examination are used to make a diagnosis. Tendinitis, acute inflammation of the AT, should be distinguished from chronic tendinopathy. The cause of ATP remains uncertain [57].

ATP has split into two categories anatomically: insertional and non-insertional. Insertional ATP, which is more prevalent, has been linked to old age, obesity, diabetes, and inflammatory arthropathies [127].

The calcaneal insertion point is where degenerative changes in insertional tendinopathy occur, and the most common symptom is morning pain. Haglund's deformity [58] is caused by the insertion location of the AT being categorized and the calcaneal tuberosity being conspicuous.

In non-insertional ATP, however, the lesion develops between 2 and 6 cm from the distal insertion point [59]. This is an area with a poor vascular supply and a common site for ATR [54]. Non-insertional tendinopathies have been linked to both partial and complete ATR. In 23 percent of tendons operated on for non-insertional tendinopathy, a partial rupture was discovered. In 23 percent of tendons operated on for non-insertional tendinopathy, a partial rupture was discovered [60]

2.5 Injury Mechanism

ATT is frequently characterized by slow onset over a period of time. Initially, the patient may dismiss the symptoms, which may appear at the start of an activity and then go away as the activity develops. After a period of prolonged sitting, symptoms may escalate to morning stiffness and discomfort when walking [122].

Repetitive weight-bearing sports, such as running or early-season conditioning, will aggravate the problem by increasing the duration and intensity too soon with insufficient

recovery time. The tensile strain around the medial aspect of the AT will be increased by strong compensatory pronation of the subtalar joint with simultaneous internal rotation of the lower leg due to a forefoot varus, tibial varum, or femoral anteversion [123].

Reduced gastrocnemius and soleus complex flexibility can lead to increased pronation of the subtalar joint as a result of the reduced closed-kinetic chain. The tendon will get more inflamed if the patient continues to train, and the gastrocnemius-soleus musculature will become less efficient due to pain inhibition. The tendon may be heated and unpleasant to touch, as well as thickened, indicating that the problem is persistent [124].

A sudden forceful PF of the ankle is frequently the cause of ATR. Theoretically, the ruptured area has undergone degenerative changes and is more prone to rupture when subjected to increased tensile loading. Repetitive compensatory pronation at the subtalar joint to address structural aberrations of the forefoot and lower leg while walking and running may be the cause of the degenerative alterations. The medial portion of the AT may be subjected to greater tensile stress as a result of this pronation [61].

2.6 Incidence of ATP between athletes

Acute AT rupture is one of the most common tendon injuries in adults, with rates ranging between 7 and 40 per 100,000 person-years [62,63,64].

Over the last decade, the number of AT ruptures has grown. This rising incidence is thought to be attributed to older individuals' increased participation in physical exercise [64,65,66]. According to studies, the majority of AT ruptures occur during sports involvement and particularly in middle-aged males, implying that male leisure sportsmen are the most vulnerable to these injuries [64,66,67,68].

Female athletes in the Women's National Basketball Association have 60 percent more injuries than male athletes in the National Basketball Association, with lower extremity injuries, according to a retrospective comparison of AT injuries between male and female professional players. Despite the fact that lateral ankle sprains account for the bulk of ankle injuries in the WNBA, ATR poses a career-threatening difficulty for professional athletes [69,70].

According to one study, there was no significant variation in blood flow between male and female participants in their young population, but male patients in the elderly

population had a lower rise in AT blood flow than female patients [23]. Another study found that both male and female runners had equal declines in AT cross-sectional area while running [71].

When compared to people without the disease or medication, patients with diabetes, hypertension, rheumatoid arthritis, and patients receiving orally administered corticosteroids had a lower ATR score at baseline (before rupture). Diabetes and oral corticosteroid medication had a negative impact on ATR score at follow-up, but none of the other comorbidities or oral corticosteroid treatment had a negative impact on ATR score change from baseline to follow-up [72].

During a half marathon race, 74.9 percent of professional runners used floor touch first with the heel, followed by 23.7 percent with the middle foot, and 1.4 percent with the front [73].

When compared to footwear runners, Almonroeder et al. found that barefoot runners employ the midfoot and forefoot, generating higher trust. Rearfoot runners, on the other hand, require greater cushioning in the rearfoot since they initially contact the ground with their heel. This running style is not only comfortable for the athlete, but it is also important for long distances in order to improve the racing economy [74].

2.7 Treatment of ATP

All kinds of ATP require non-operative treatment to ease pain, adjust limb alignment using orthotics, improve flexibility, and rectify training errors. In general, non-operative treatment comprises physical therapy that includes stretching and strengthening exercises, rest, and cryotherapy. Because ATP affects two different patient groups, treatment for younger athletes and older leisure athletes or non-athletes must be tailored to each individual [75]. Conservative treatment for active, athletic people with paratenonitis often includes modifying training programs (staged cross-training), NSAIDs, ice, massage, and rest [125]. Immobilization with a nonarticular solid molded ankle-foot orthosis, NSAIDs, and a brief course of physical therapy are used to treat paratenonitis in less active, elderly patients (uncommon) [126]. Because of the risks, corticosteroid injections are not suggested in any group. On tendon mechanical characteristics and the increased risk of tendon rupture [75].

Electrocoagulation, topical glyceryl trinitrate (GNT), sclerosing therapy, platelet-rich plasma injection, aprotinin injections, botulinum toxin injection, and bone morphogenic protein therapy are some of the other treatment options for ATP [75]. In one study, the effects of Autologous-condition-serum-injections (i.e. Ortokine) and eccentric training were compared, and both of them improved MRI data, including tendon thickness and quality reduction. When compared to eccentric exercise, autologous-condition-serum-injection provides a better long-term effect, and hence is a good alternative to eccentric training [87].

In terms of sclerotherapy and prolotherapy, a meta-analysis evaluating the efficacy of sclerosing agents on VAS in ATP patients found that these treatments may be beneficial for treating chronic painful ATP, reducing pain by approximately 4 VAS units on a 0-10 scale on average [76].

Injections of platelet-rich plasma/autologous blood, corticosteroids, anesthesia are routinely utilized in the treatment of foot and ankle injuries, according to one study. Achilles tendinosis, Plantar fasciitis, and ankle impingement are the most common reasons for injections in athletes, with different clinical outcomes [77].

Non-operative treatment should be used for at least 3 to 6 months before surgery is considered, as ATP may resolve during this time [56].

Unless ATP becomes chronic and debilitating, operational treatment for paratenonitis consists of debridement, excision of thickened sections of the paratenon, and lysis of adhesions [78]. In one study, 85 percent of 45 patients (48 foot) who had their Calcific Insertional Achilles Tendinopathy surgically treated said they were very satisfied [79]. Non-operative treatment fails to ease symptoms and restore strength in about 25% of people with tendinosis [80,81]. Early surgical treatment with debridement or tendon transfer in individuals with paratenonitis and tendinosis may result in a faster return to function [75].

For youthful, athletic, and energetic patients, surgical treatment for acute ATR is frequently preferred. After operative treatment, the average time to return to play was 2 months, and after non-operative treatment, it was 3 months and 18 days, according to a randomized controlled trial involving 83 individuals. There was no significant variance in return to sport [84].

Traditional management of acute ATR has been operative based on early evidence suggesting that non-operative treatment leads to a higher re-rupture rate of 12.6 percent compared to those treated surgically with a 3.5 percent re-rupture rate; however, operative treatment has a higher incidence of complications such as adhesions, altered sensation, and wound infection (34.1 percent operative, 2.1 percent non-operative) [85]. Recent meta-analysis research found no significant variance between non-surgical and operational treatment in terms of re-rupture rate, strength, range of motion, or calf circumference [86].

2.8 Rehabilitation

All kinds of ATP are treated non-operatively at first, with the goal of symptom relief, resolving training errors, restoring limb alignment with orthotics, and enhancing flexibility, and generally begin with PRICEMM (Protection, Rest, Ice, Compression, Elevation, Modalities, Medication) as well as the termination of the triggering activity [95].

Physical therapy for ATT focuses on increasing dorsiflexion strength (eccentric Achilles training), eccentric training programs, and exercises are performed even if they are uncomfortable, with the load gradually increasing until the pain is felt [75].

Eccentric training has been shown to be effective in up to 90% of patients with non-insertional ATP in multiple trials [88,89,90,91,92].

According to one study, ultrasonographic follow-up evaluation of 25 patients (26 tendons) treated with eccentric training revealed a localized decrease in tendon thickness and normalized tendon structure in 19, with 22 of the 25 patients satisfied with their outcomes after an average of 4 years [93].

Eccentric exercise regimen



Figure 5-39 Eccentric exercises. A, Starting position, where the ankle joint is in plantarflexion. The knee is slightly bent. B, Eccentric loading of the calf muscle with the knee slightly bent. C, Increasing the load by adding weight in a backpack. (Reprinted with permission from Öhberg L, Lorentzon R, Alfredson H. Eccentric training in patients with chronic Achilles tendinosis: Normalised tendon structure and decreased thickness at follow-up. *Br J Sports Med* 38:8–11, 2004. Figs. 1, 2, 4.)

Figure 6: Eccentric Exercises[75].

According to one study, (82%) of 22 patients treated with an eccentric exercise program returned to their previous activity level, compared to just (36%) of 22 patients treated with a concentric exercise program [94]

General consideration for Rehabilitation after tendon debridement

- Weight-bearing is allowed when the swelling and pain have reduced, usually in 7 to 10 days
- Strengthening exercises are started after 2 to 3 weeks
- Running is started after 6 to 10 weeks
- Athletes usually compete after 3 to 6 months
- Return to play could take up to a year if the tendon involvement was significant or a more sophisticated treatment was undertaken. Following tendon transfer, immobilization is required for 6 weeks. [75].

Furthermore, contemporary trends promote early weight-bearing and minimum surgical immobility. Physical activity has been shown to expedite tendon recovery, with re-rupture rates not being considerably greater than early weight-bearing [96,98]. In a meta-analysis of randomized trials comparing it versus cast immobility, early weight-bearing was found to have no difference in re-rupture rates and superior subjective results. [97].

2.9 Return to play

The main goal for all athletes with different types of injuries is to return to play, Early mobilization is associated with a shorter time to return to work and sports activities [99]. In accordance with one study, there was no significant difference in complication rates between operational and non-operative therapy groups. However, the time for the operation group returned to play was substantially faster than the non-operative group, at 59 days and 108 days, respectively [100].

According to one study, 57 percent of players in the National Football League (NFL) attained RTP, with wide receivers and running backs having the lowest RTP rates and tight ends and linebackers having the highest RTP rates [101]. Another research of 118

athletes found that 96% of athletes return to unrestricted practice after an average of 19953 days, with national team players recovering faster [102].

2.10 Orthotic insoles

The prevention effects of prefabricated and custom-made orthotic insole have been investigated in 10 different studies of military personnel, including a total of 4788 subjects. Insoles were found to have a significant preventative impact for a variety of lower limb overuse problems, including stress fractures, medial tibial stress syndrome, patellofemoral discomfort, and Achilles tendinopathy, according to seven investigations. Based on these findings, several high-quality meta-analyses have supported the use of orthotic insoles for injury prevention [118].

2.11 Assessment methods for foot and ankle

2.11.1 The American Orthopedic Foot and Ankle Society (AOFAS) clinical rating scales

The AOFAS ankle and hind foot scale, which is often found to be an excellent standard, is one of the most regularly used tools for assessing the outcome of treatment in patients who have suffered a complex ankle or hind foot injury. It is divided into two parts: patient-reported and physician-reported [103].

The examiner reported data about alignment, gait, and mobility within three subscales: pain, function, and alignment, and the patient reported pain, activity, functional limits, and footwear. Each of the four scores involves a clinical evaluation with eight to nine questions and three to four response alternatives. The most severe impairment is represented by a total score of 0 points, whereas 100 normal functions are represented by a total score of 100 points [105].

2.11.2 The Foot and Ankle Outcome Scale

is a patient-reported outcome tool that gives patients a patient-centered viewpoint on their foot health when delivered to individuals with symptomatic hallux valgus [104].

Sport, Symptoms, Pain, Activity of Daily Living and Recreational Activities, and Foot and Ankle Related Quality of Life are among the 42 items on the FAOS, which are divided into five subscales.

Symptoms were assigned as none (0), mild (1), moderate (2), severe (3), or extreme (4). This scale goes from zero (no symptoms) to one hundred (severe symptoms) [106].

2.11.3 The Foot and Ankle Ability Measure (FAAM)

The FAAM was created to evaluate physical performance in people who have a variety of musculoskeletal problems in their legs, feet, and ankles. [107].

The FAAM scored from 0 to 100, 0 represent the inability to perform any usual daily activities, and 100 represent the level of function before the foot and ankle problem [108].

2.11.4 The Foot and Ankle Disability Index (FADI)

The FADI, which comprises 22 activity-related items and four pain-related items, is used to measure functional impairment in patients with chronic ankle instability. The best possible score (104) refers to a complete lack of any difficulties in everyday activities and no pain, while the worst conceivable condition is (0) [109].

2.11.5 The Foot Function Index (FFI)

The FFI was created to evaluate foot and ankle pain, stiffness, psychosocial stress, disability, and activity limits [110].

It has 23 visual analogue scales, 9 for pain, 9 for problems, and 5 for patient limits, with an 0 score indicating no constraints and a 230 indicating a terrible outcome [111].

2.11.6 The Ankle Osteoarthritis Scale (AOS)

The AOS is a modified version of the FFI designed exclusively for ankle OA. It is broken into two 9-item subscales. The first segment assesses discomfort, and the second assesses functional limitations. A visual analogue scale [112] is used to answer each question. A number of 0 indicates no pain, while a score of 100 represents the most excruciating suffering possible. [113].

2.11.7 The Self-Reported Foot and Ankle Score (SEFAS)

The SEFAS is a physical function test used to assess individuals with foot and ankle fractures. It has 12 items pertaining to pain, limbing, swelling, and the use of orthotics and walking, as well as pain 7, function 3, and other 2 items, with a response score range

of 0-4, and a total score of 0-48, with a higher score signifying the lowest potential pain and function. [115].

2.11.8 The Foot Posture Index (FPI)

The Foot Posture Index (FPI) is a new method of assessing foot posture. It measures how pronated, neutral, or supinated a foot is. Because it is a measure of standing foot posture, it is not a substitute for gait analysis when time and resources are available [116].

2.11.9 The Cumberland Ankle Instability Tool (CAIT)

The CAIT used to evaluate the severity of ankle instability and monitoring progress, consists of only 9 items, score >25 consider unstable ankle [117].

2.11.10 The Lower Extremity Functional Scale (LEFS)

For assessing lower extremity function, the LEFS is a commonly used and well-validated outcome measure. It was created in 1999 by Binkley et al. in a group of individuals with different musculoskeletal diseases. The score is based on 20 questions that are separated into four categories: unable to execute (zero), easy (one), and difficult (two) (four).

The physical demands of the group activities are growing. Walking between rooms to racing on the hard ground are all instances of activity questions [114].

Activities	Extreme Difficulty or Unable to Perform Activity	Quite a Bit of Difficulty	Moderate Difficulty	A Little Bit of Difficulty	No Difficulty
1 Any of your usual work, housework, or school activities.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
2 Your usual hobbies, re creational or sporting activities.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
3 Getting into or out of the bath.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
4 Walking between rooms.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
5 Putting on your shoes or socks.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
6 Squatting.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
7 Lifting an object, like a bag of groceries from the floor.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
8 Performing light activities around your home.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
9 Performing heavy activities around your home.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
10 Getting into or out of a car.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
11 Walking 2 blocks.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
12 Walking a mile.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
13 Going up or down 10 stairs (about 1 flight of stairs).	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
14 Standing for 1 hour.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
15 Sitting for 1 hour.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
16 Running on even ground.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
17 Running on uneven ground.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
18 Making sharp turns while running fast.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
19 Hopping.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
20 Rolling over in bed.	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Column Totals:	0	0	0	0	0

Minimum Level of Detectable Change (90% Confidence): 9 points SCORE: 0 / 80 (fill in the blank with the sum of your responses)

Figure 7: LEFS Questionnaire:

http://regist2.virology-education.com/2014/5HIVaging/20_Galantino.pdf

2.12 The Victorian Institute of Sport Assessment- Achilles Tendinopathy (VISA-A)

Robinson et al. (2001) established the VISA-A questionnaire for patellar tendinopathy, and then developed a questionnaire specifically for use in ATP [15]. It's the only disease-specific, valid, and reliable score for assessing AT [16].

The VISA-A is a self-administered questionnaire that assesses symptom severity and impact on physical activity [20]. With ATP, it's possible to compare diverse populations and make comparisons between studies easier. It can be used to assess a patient's clinical severity and provide therapy recommendations [33].

It consists of 8 questions that evaluate 3 dominants: function, pain, and activity.

The first five questions were about pain, the sixth was about function, and the seventh and eighth were about activity [29]. Each item 1 to 7 has a maximum score of 10, whereas question 8 has a maximum score of 30. As a result, the lower the score, the more severe the symptoms, and a maximum score of 100 denotes asymptomatic status [15].

IN THIS QUESTIONNAIRE, THE TERM PAIN REFERS SPECIFICALLY TO PAIN IN THE ACHILLES TENDON REGION

1. For how many minutes do you have stiffness in the Achilles region on first getting up?

100 min 0 min POINTS

0 1 2 3 4 5 6 7 8 9 10

2. Once you are warmed up for the day, do you have pain when stretching the Achilles tendon fully over the edge of a step? (keeping knee straight)

strong severe pain no pain POINTS

0 1 2 3 4 5 6 7 8 9 10

3. After walking on flat ground for 30 minutes, do you have pain within the next 2 hours? (If unable to walk on flat ground for 30 minutes because of pain, score 0 for this question).

strong severe pain no pain POINTS

0 1 2 3 4 5 6 7 8 9 10

7. Are you currently undertaking sport or other physical activity?

0 Not at all POINTS

4 Modified training ± modified competition

7 Full training ± competition but not at same level as when symptoms began

10 Competing at the same or higher level as when symptoms began

4. Do you have pain walking downstairs with normal gait cycle?

strong severe pain no pain POINTS

0 1 2 3 4 5 6 7 8 9 10

5. Do you have pain during or immediately after doing 10 (single leg) heel raises from a flat surface?

strong severe pain no pain POINTS

0 1 2 3 4 5 6 7 8 9 10

6. How many single leg hops can you do without pain?

0 10 POINTS

0 1 2 3 4 5 6 7 8 9 10

8. Please complete **EITHER A, B or C** in this question.

- If you have **no pain while undertaking Achilles tendon loading sports** please complete **Q8A only**.
- If you have **pain while undertaking Achilles tendon loading sports but it does not stop you from completing the activity**, please complete **Q8B only**.
- If you have **pain that stops you from completing Achilles tendon loading sports**, please complete **Q8C only**.

A. If you have **no pain while undertaking Achilles tendon loading sports**, for how long can you train/practise? POINTS

NIL 1-10 mins 11-20 mins 21-30 mins >30 mins

0 7 14 21 30

OR

B. If you have **some pain while undertaking Achilles tendon loading sports**, but it does not stop you from completing your training/practice, for how long can you train/practise? POINTS

NIL 1-10 mins 11-20 mins 21-30 mins >30 mins

0 4 10 14 20

OR

C. If you have **pain that stops you from completing your training/practice in Achilles tendon loading sports**, for how long can you train/practise? POINTS

NIL 1-10 mins 11-20 mins 21-30 mins >30 mins

0 2 5 7 10

TOTAL SCORE (/100) %

Figure 8: VISA-A Questionnaire, Robinson, J. M., Cook, [15]

3. MATERIALS & METHODS

3.1 Type of Research

This study was planned as an observational descriptive and cross-cultural adaptation study.

3.2 Place and Time of Research

This research was carried out with the athletes assigned at youth clubs in different Arabic countries in the 2020-2021 year. The research was started in September 2020 by reviewing the literature. Preparation of the subject proposal, approval of the department, preparation of the questionnaire and other official approval processes started in February 2021 and were completed by April of that year. The time of data collection was also September 2021. Data entry and analysis were carried out between September 2021 and October 2021. The work was completed in November 2021.

3.3 The Subjects and Sample of the Research

The subjects consist of athletes assigned at youth clubs in different Arabic countries in the 2020-2021 year.

In this study 49 participants were physically active interested, as shown in Fig 1, 51% of them are football players at 5 sports clubs in Jordan and Saudi Arabia, 26 of them continue to the second round after 2 weeks.

According to the sample size calculator website, the required participants are 26 [17].

3.3.1 Inclusion criteria in the study

- Native Arabic patients who have been diagnosed with ATP by a physician., Age 18 to 47, sport committed with moderate activities for at least 30 minutes and 5 times a week, have no neurological problem, or complete cut of AT.

3.3.2 Exclusion criteria from the study

- A patient who is under the age of 18 years.
- A patient who had a total tendon rupture
- A patient who has inflammatory or autoimmune conditions
- Pregnant women or nursing.
- Patients who are unable to complete the survey due mainly to visual, cognitive, or literacy issues.

3.4 Socio-Demographic Survey

This contains patients' sociodemographic information's in general.

3.4.1 The Lower Extremity Functional Scale (LEFS)

The Lower Extremity Functional Scale (LEFS) is a patient-reported outcome measure that assesses the functional status of individuals suffering from musculoskeletal lower extremity diseases. The 20-items questionnaire asks about the degree of difficulty of performing each of these activities on a scale of 5 points, with a score of 80 indicating normal function.

This Arabic version of LEFS has strong validity and reliability values, and it can be used to assess the functional status of Arabic speakers in research and clinical practice [14].

3.5 Data Collection Tools

In this study participants' sociodemographic data and all their disease-related information were collected Via Google Form and both Questionnaires VISA-A and LEFS.

The Arabic VISA-A was completed by all patients in order to assess its internal consistency. After two weeks, patients filled out the tool again to calculate the Test-retest reliability.

3.6 The Process of Adaptation

As illustrated in Fig.2, the translation and cross-cultural adaptation processes were carried out according to the criteria for cross-cultural adaptation of self-report measures [13].

3.6.1. Initial Translation

At this step, at least two expert translators worked separately to translate the English version of the VISA-A into Arabic, resulting in T1 and T2 forms.

3.6.2 Synthesis

A bilingual physiotherapist examined the two forms and discussed differences with the translators; the synthesis form T12 was created by combining the two independent translated versions (T1, T2).

3.6.3 Back translation

Completed separately by two translator's native Arabic speakers and fluent in English blinded to the original VISA-A questionnaire, separately translated the T12 form into English, resulting in the BT1 and BT2 variants.

3.6.4 Expert committee review

All involved translators, physiotherapists, and the researcher reviewed all forms and drafted the pre-final format for VISA-A in the Arabic language.

3.6.5 Pretesting

10 patients who have been diagnosed with AT for feedback, the feedbacks were discussed and solved to perform the final form for VISA-A in the Arabic language. After their feedback, some words changed to be more clear like explaining AT, the shape of question 8 on google form was changed to be more clear, and the translation of "with normal gait cycle" in question number 4 making confusion for participant and it was deleted.

Through this step, one more piece of advice was received, which is to replace the scoring on the separated page, but this advice was unfollowed since this study has been made only for translation. Explanations and changing some words were done to make it clear for the participants and to be culturally adapted.

3.6.6 Final form (VISA-A-AR) development

After studying the interviewees' thoughts and ideas, modifications were made to create the final edition (VISA-A-AR) [13].

Questionnaires questions and sociodemographic questions were prepared on the google form. The scoring was deleted from the form and score given for each question by the researcher through transferring data to the Excel sheet, 20 participants who were healthy and who had ATP filled it as pretesting and feedback collected, it was simple to fill out, and all of the participants completed it in about 10 minutes.

3.7 Analysis Data

All statistical analysis was performed using IBM SPSS statistics 26 and Microsoft excel. For all of the VISA-A-AR questions across all samples, internal consistency was evaluated using Cronbach's alpha, and a value of more than 0.7 was considered good internal consistency [25].

To measure test-retest reliability, the intraclass correlation coefficient (ICC) was calculated using a two-way random-effects model, and a value higher than 0.7 was considered good. Spearman correlation between the VISA-A-AR questionnaire and LEFS questionnaire among all samples was used to assess construct validity due to small sample size, and a value more than 0.7 (p value < .05) considered strong correlation.

The systematic and random error of a patient's score that is not attributable to real changes in the construct of the VISA-A score was termed as measurement error [119]. The standard error of measurement (SEM), which was computed as standard deviation (SD) $\times \sqrt{1 - \text{reliability coefficient}}$ [120], was used to calculate measurement error. The MDC at the personal level was computed using this SEM as $1.96 \times \sqrt{2} \times \text{SEM}$, and the MDC at the group level was obtained by dividing the MDC at the individual level by \sqrt{n} [120].

Discriminant validity examines disparities across subgroups of participants by identifying similarities in assessments of related constructs [32]. Discriminant validity was investigated in this study by testing the following hypothesis: 1) participants who took NSAID would have higher VISA-A scores. 2) participants who are pre-operation would have lower VISA-A scores than those who are non-operation. The Independent Samples T-test and one-way ANOVA test were employed to examine these hypotheses.

A two-sample T-test was used to compare VISA-A AR validity and reliability with original VISA-A and other culturally adapted versions, as shown in Table (4).

Table 1: Comparison between the current study and other validation studies

Reference	Language	Test-retest reliability (ICC)	Internal Consistency Cronbach's alpha	Validity	SEM	MDC
Robinson, J. M.[15]	English	.81	NR	.58 with groups	NR	NR
Maffulli, N., Longo, U. G.[26]	Italian	.80	NR	NR	NR	NR
Dogramaci, Y., Kalaci, A.[27]	Turkish	.99	.66	.86 with the Stanish tendon grading system	NR	NR
Hernández-Sánchez, Sergio, et al.[121]	Spanish	.99	.80	.6 with SF-36	2.53	7
Kaux, J. F., Delvaux, F.[31]	French	.99	.90	Low correlation with SF-36	NR	NR
Bahari, M., Hadadi, M.[30]	Persian	.90	.95	Strong correlation with FAAM	5.65	15.6
de Mesquita, G. N.[18]	Portuguese - Brazilian	.84	.79	.73 with LEFS	3.25	9.02
Lohrer, H., & Nauck, T.[16]	German	.60-.97	.73	.95 with generic tendon grading system	NR	NR
Chang, R., Tsang, R. C. C.[28]	Chinese	.97	.73	.74 with LEFS, SF-36	NR	NR
Sosa, K. E., Ravarra, P. D.[29]	Filipino	.94	.80	.90	NR	NR
Silbernagel, K. G.[33]	Swedish	.89	.77	NR	NR	NR
Sierevelt, I., van Sterkenburg, M.[34]	Dutch	.97	.78	.56 with AOFS	4.07	11.28
Iversen, J. V., Bartels, E.[35]	Danish	.79	.73	NR	NR	NR

Keller, A., Wagner, P.[19]	Chilean	NR	NR	1.00 within 1 H, .84 within 7 D	NR	NR
current	Arabic	.91	.87	.83 with LEFS	2.37	Individual 6.57 Group 1.3

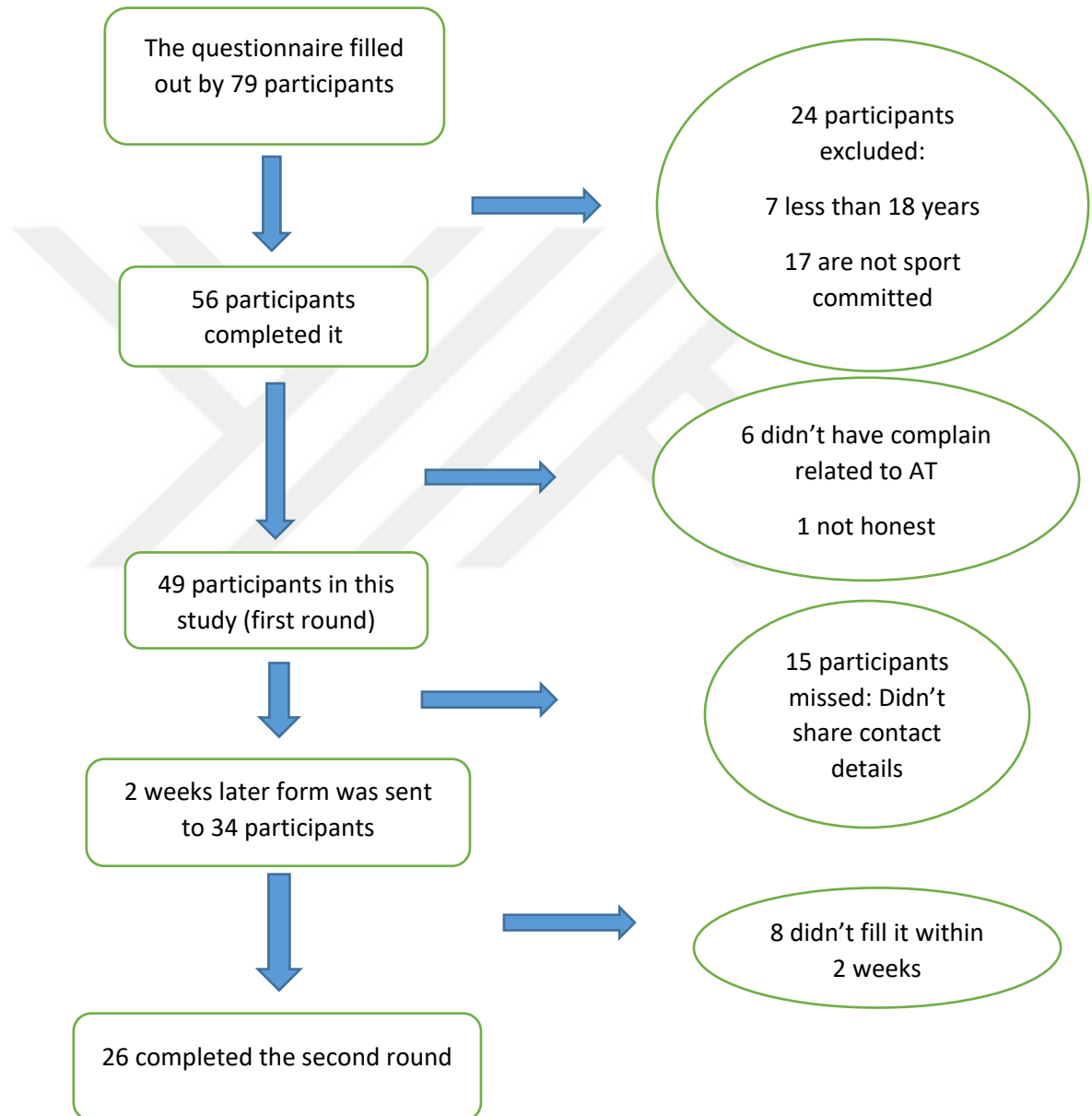


Figure 9 : Inclusion Flowchar

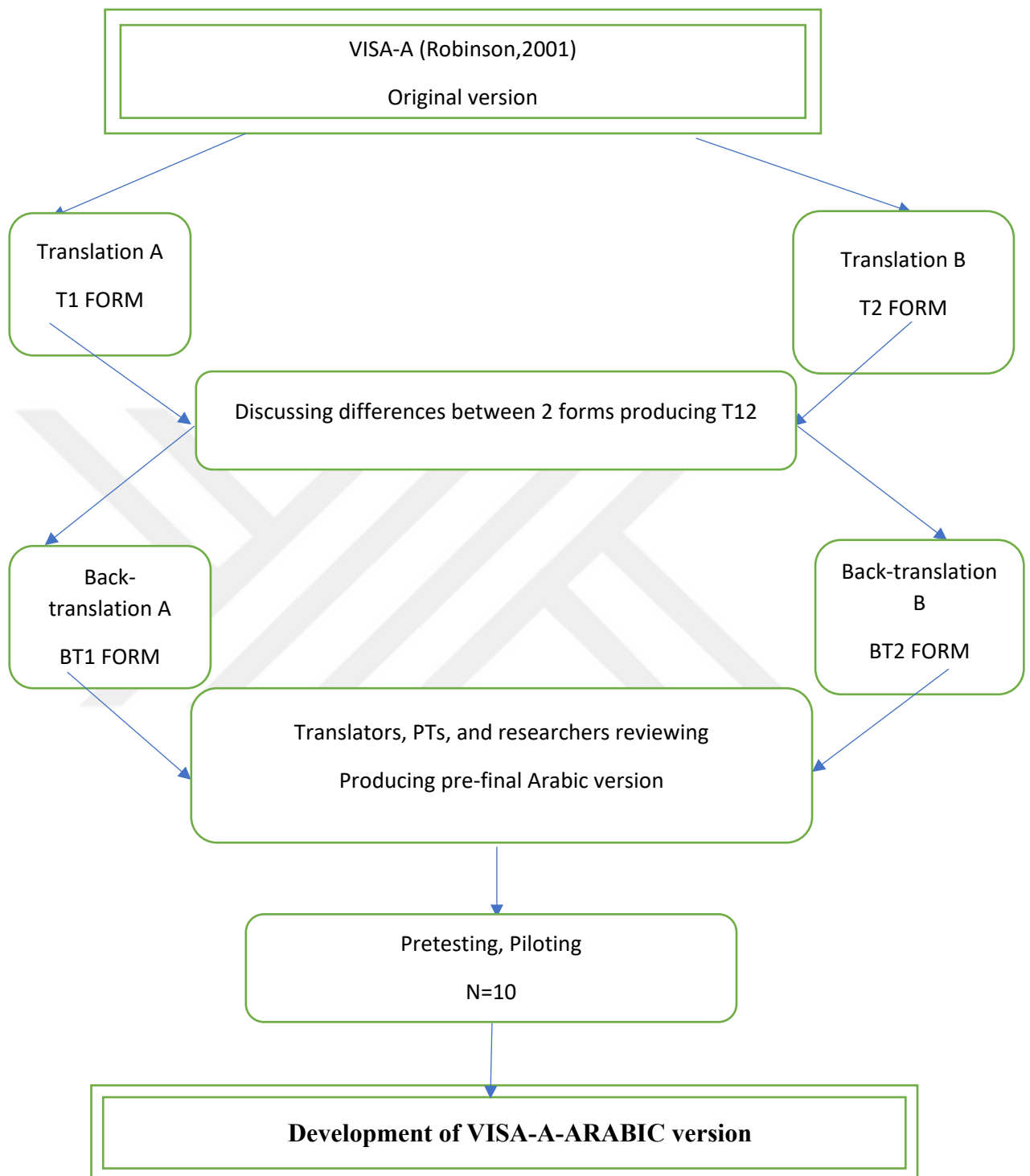


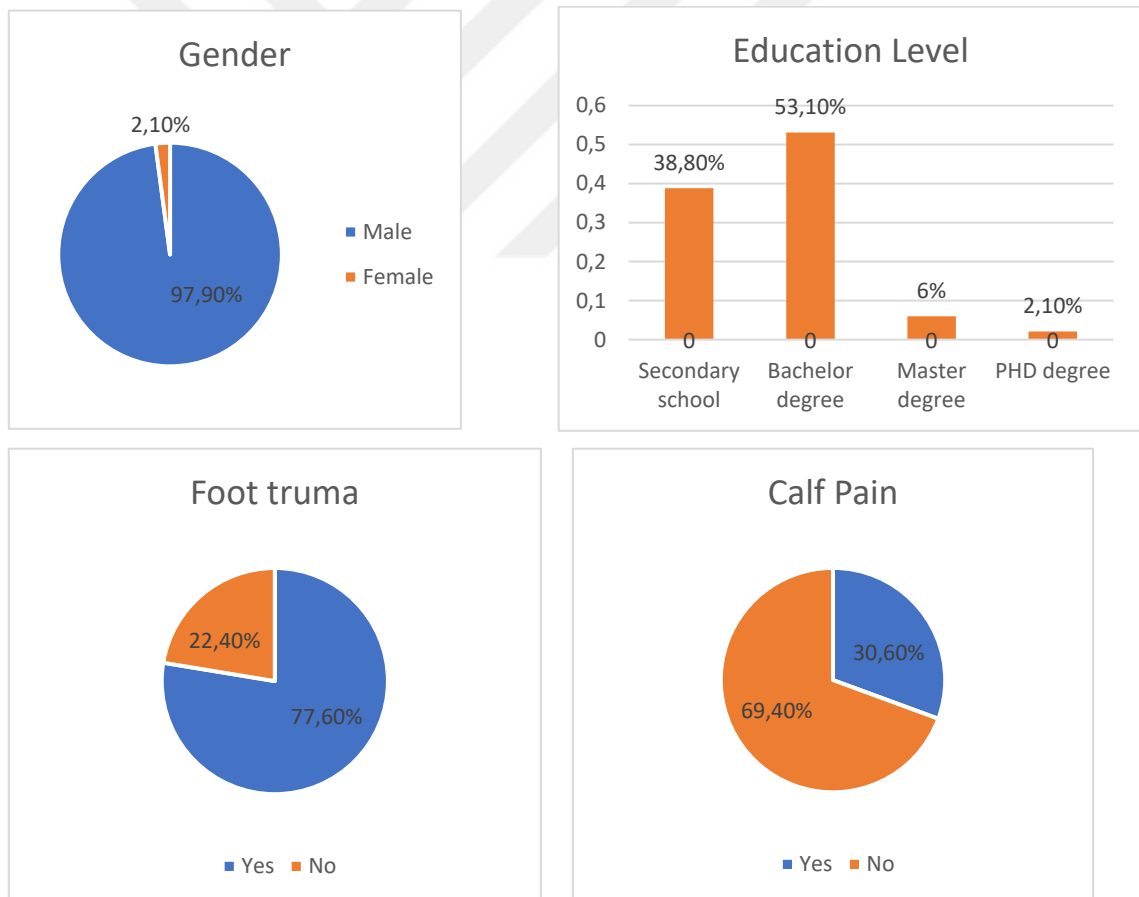
Fig 10: Flow-chart of the steps for translation of the VISA-A (English to Arabi

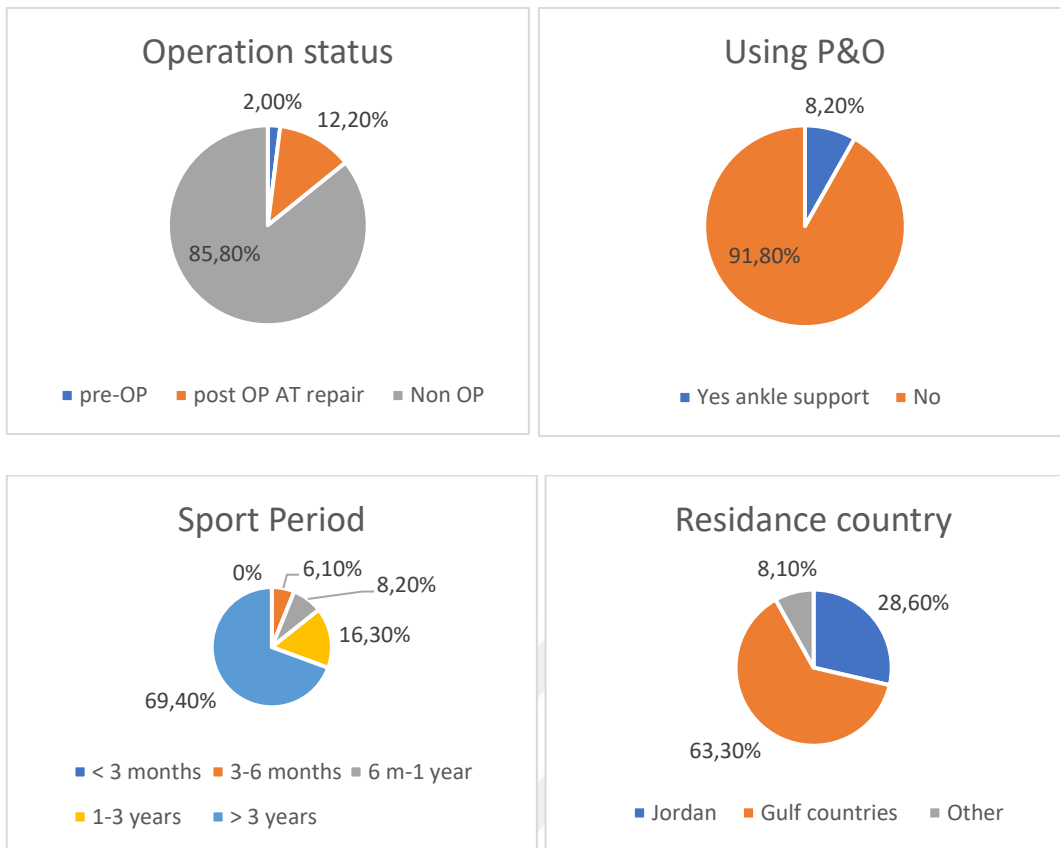
4.RESULTS

Arabic VISA-A questionnaire was performed. Through the piloting process, 10 participants filled the questionnaire and according to their feedbacks, question number 8 was designed in google form prepared as a branching to avoid answering more than one of three branches.

Forty-nine patients with ATP completed the first round, all individuals' symptoms lasted between 1 and 624 weeks, and their ages between 18 to 47 years (mean = 31.7 years). The severity of the pain varied, and 12.2% of the participants were post-surgical and still had AT pain.

Table 2 summarizes the quantity, proportion, and demographic statistics of the patients (N=49) across multiple variables.





Age, Mean(SD)	31, (7.9)
Marital status	
Single	46.9%
Married	53.1%
Work nature	
At office	8.1%
<3 hours of standing	14.3%
>3 hours of standing	26.5%
A professional football player at youth clubs	51.1%
Smoking	
Smoker	18.4%
1-2 PCS/day	4.1%
3-5 PCS/day	4.1%
6-10 PCS/day	4.1%
11-20 PCS/day	4.1%
1 packet/day	2%
Non smoker	81.6%
Alcohol drinking	
Drinker	8.2%
1 cup/day	2.1%

1 cup/ week	6.1%
Non drinker	91.8%
Duration of AT symptoms	
Acute :< 2 weeks	4.1%
Sub-acute: 2 weeks – 6 weeks	8.2%
Sub-chronic: 6 weeks – 6 months	6.1%
Chronic: > 6 months	81.6%
Medication	
Yes	20.4%
supplement	2.1%
NSAID	18.3%
No	79.6%

Reliability Result: When an item was deleted, internal consistency between .84 to.89, indicating that the VISA-A-AR had a high degree of internal consistency (Cronbach's alpha=.87). The test-retest reliability was outstanding (ICC=.91, 95 percent confidence interval:.68-.96, p.001) (table 2)

At the individual level, the SEM was 2.37, while the MDC was 6.57 at the group level.

Table 3: Internal Consistency for the first round, N=49

VISA-A Arabic version	Mean value (SD) (N=49)	Item Total Correlation (round 1)	Scale Mean if item deleted (round 1)	Cronbach α if item deleted	95%CI Lower Upper Bound. p<0.001
				Round 1 (N=49)	
Q1	7.76 (2.78)	.727	65.86	.847	.304-.315
Q2	7.73 (2.596)	.823	65.88	.841	.353-.365
Q3	8.02 (2.428)	.866	65.59	.840	.276-.288
Q4	8.20 (2.558)	.823	65.41	.842	.415-.428
Q5	7.55 (2.858)	.717	66.06	.847	.331-.343
Q6	7.10 (3.236)	.574	66.51	.859	.253-.263
Q7	6.08 (2.388)	.417	67.53	.872	.607-.625
Q8	21.16 (7.633)	.814	52.45	.890	.712-.727

Validity: Table 3 shows the association between the VISA-A-AR and LEFS questionnaires. The correlation was quite good (.827 p-value.001).

Table 4: VISA-A and LEFS Questionnaire Correlation.

		VISA sum	LEFS sum
VISA sum	Correlation Coefficient N Sig. (2- tailed)	1.000 49	.827 49 <.001
LEFS sum	Correlation Coefficient N Sig. (2- tailed)	.827 49 <.001	1.000 49

5. CONCLUSIONS, DISCUSSION, AND SUGGESTIONS

The goal of this study was to translate the VISA-A questionnaire into Arabic and assess the validity and reliability of the Arabic version. The adaptation was carried out in accordance with the criteria of Beaton et al [13], and was identical to the other three versions [16,18,31]. This commonality is advantageous since it allows studies to be compared.

Athletes diagnosed with ATP were included in this study, and most cross-cultural adaptations of the VISA-A have used ATP athletes to pre-test the questionnaire. [19,26,27,29,30], The Chinese version had 3 groups with 80 participants each, healthy group, at-risk group, and ATP group [28], same like Portuguese version which had 3 groups, control group, at-risk, and ATP group [18]. however, Italian version and Arabic version had only athlete's participants with ATP [26].

This study utilized standard Arabic, which the majority of nations with an Arabic-speaking population, particularly those in the Middle-East and Africa region, should be able to understand [36].

A therapeutic guideline for cultural translation and adaptation of self-report ratings was developed by Beaton et al. [13]. Translation, synthesis, reverse translation, expert committee, piloting, and production of the new Arabic version are all steps in the process.

The changes were made to the form after piloting, which explained the meaning of four words (AT, modified training, competition, AT loading sports), Although VISA-A was not difficult to translate.

The inclusion flowchart in Fig.1, show that some participants didn't write any details to contact them for the second round and some didn't fill it at the desired time which is two weeks, this step consumed 4 months, 49 participants responded at the first round and 26 of them responded at the second round.

98% of participants are male, mean age (SD) 31(7.9),53% had Bachelor degree, 51% professional football players at youth clubs, 81% considered chronic ATP, has ATP symptoms for more than 6 months, 18% taking NSAID if necessary, 77% had a foot

truma, 30% has calf pain, 12% had AT repair and had symptoms those days, and 69% committed to the sport since more than 3 years.

5.1 Internal consistency

The VISA-A-AR had great internal consistency, as measured by Cronbach's alpha (.87), and among the cross-cultural adaptations of the VISA-A, Cronbach's Alpha ranged from .66 to .96, with the Persian version receiving the highest value.

The authors discovered that removing the eighth question boosted the Cronbach alpha to .89, implying that this question may be altered to promote a better understanding and increase the internal consistency of the VISA-A.

Furthermore, because the internal consistency was already within the required range (.7-.95) [38], this rise was deemed inconsequential.

Internal consistency was closer to that of the French and Persian (Cronbach alpha=.9) [15,30], the Filipino (Cronbach alpha=.8) [29], and the Spanish (Cronbach alpha=.8) [19], corroborating these findings.

5.2 Test-retest reliability

The ICC was employed with a 2-way random-effects model (.91) for test-retest reliability, as indicated by Terwee et al [38]. The time between the two measures, between one and two weeks, was long enough for respondents to forget their prior responses and for their clinical status to change minimally. [38]. In this study, the interval was 2 weeks to avoid participants remembering the first round of the questionnaire's response. 53% of participants returned to the second set of the questionnaire, same as Filipino version which had 56% [29], and Dutch version [34].

The Filipino version of VISA-A had an ICC of .94 utilizing 10 minutes – the 1-month gap between evaluations [29], which was similar to the findings of the current investigation. The Swedish version had an ICC of .89 without clearly specifying the times between two rounds [33], the Dutch version had an ICC of .97 utilizing a 5-day gap between evaluations [34], and the Chinese version of the VISA-A had an ICC of .97 without a precise definition of the times between two rounds. [28].

among the cross-cultural adaptation studies of the VISA-A, ICC ranged from .60 to .99, all these versions got the highest value, Turkish, French, and Spanish [27,31,19].

As a measure of absolute reliability, the SEM was calculated to be 2.37. It can describe the difference in magnitude between two measurements that are clinically distinct. The standard deviation of measurement mistakes associated with test scores from a specific group of examinees is known as the SEM. It calculates how a person's "actual" score is dispersed among repeated measures taken on the same instrument. The standard error of measurement equals 0 when the test is entirely dependable. The standard error of measurement is equal to the standard deviation of the observed results when the test is fully inaccurate. The MDC is also the smallest allowed change in a measure's score that can be considered a true change, was calculated from SEM (6.57) at individual level and (1.3) at group level. MDC is an index explaining that at least how many scores should be truly and validly (not randomly) changed in total questionnaire score to determine whether a patient's clinical outcome is getting better or getting worse. These error measurements were calculated for Persian (SEM 5.65, MDC 15.6) [30], Spanish (SEM 2.53, MDC 7) [121], Dutch (SEM 4.07, MDC 11.28) [34], and Brazilian (SEM 3.25, MDC 9.02) [18]. This Arabic version got the closest SEM and MDC to 0 value, which indicate less measurement error and more perfectly reliable. Moreover, the MDC smaller at group level which makes the VISA-A-AR suited for group evaluation.

5.3 Spearman Correlation

The LEFS questionnaire, which measures the functional capacity of patients with lower limb problems [7], had the greatest connection with VISA-A. It was appropriate for use in athletes with ATP because the correlation was (.83). The present study was not the first to use the LEFS questionnaire to assess construct validity in a cross-cultural version of the VISA-A, whereas the Portuguese version used the LEFS questionnaire with correlation .73 [18], and the Chinese version used it together with SF-36 with correlation .74[28].

All cross-cultural adaption and validation results were equivalent to the original study's findings (Table 4).

In this study 77% of participants who suffered from ATP had a foot truma, 98% of participants are male, similar to the Italian version, which had 100% male participants [26], whereas the percentage of Filipino version was 81% [29], the Portuguese version 63% [18], and the Dutch version 53% [34]. 69% are professional sports players for more than 3 years.

Regarding the discriminant validity hypothesis, it was difficult to calculate because the sample is not normally distributed, only 2% of participants' pre-operation and 18% taking NSAID if necessary.

Independent T-test was calculated for Medication, and calf pain, but the results were not significant, it seemed that either the sample was small or the sample was not normally distributed, it would be interesting to calculate it in the future studies.

The lack of a gold standard is a concern with PROMS validation in general, therefore validity should be regarded with caution, one study was collected 14 problems related to inadequate PROMS or using it inappropriately, some of these problems are PROMS developed for the different patient group, using identical questions, using it for diagnosing and evaluating patients and combining subjective and objective measurements [37]. In this study the sample was not normally distributed, the proportion of women was too low only one woman, it would be interesting to analyze gender differences in future studies. And the same regarding pre-operation participants only one, it would be better if the number was higher to be able to calculate Independent T-Test.

5.4 Study limitations

The whole sample was small, since it was difficult to collect a higher number of participants with these inclusions, especially sport committed, 17 participants were excluded since they didn't practice moderate sport activity for at least 30 minutes and 5 times weekly.

Stanish et al Tendon .'s Grading System could not be used in the same way as several translated versions that use it as a standard reference.

For the total score of the VISA-A-AR, no floor or ceiling effects were found. The total score of the French [31], Spanish [121], Dutch [34], and Brazilian [18] versions of VISA-A were examined, and no floor or ceiling impact was seen.

5.5 Conclusion:

Finally, the VISA-A questionnaire was effectively translated and culturally adapted for an Arabic-speaking audience while adhering to the established requirements. VISA-A-AR for patients with ATP is highlighted by its capacity to measure characteristics such as pain and functioning during physical activity.



6. REFERENCES

- [1] Picón-Martínez, Moisés et al. "Acute Effects Of Resistance Training With Blood Flow Restriction On Achilles Tendon Thickness". *Journal Of Human Kinetics*, vol 78, no. 1, 2021, pp. 101-109.
- [2] Maughan, M. D. K., D. O. Boggess, and B. Faafp. "Achilles tendinopathy and tendon rupture." (2018).
- [3] van der Vlist, Arco C et al. "Which Treatment Is Most Effective For Patients With Achilles Tendinopathy? A Living Systematic Review With Network Meta-Analysis Of 29 Randomised Controlled Trials". *British Journal Of Sports Medicine*, vol 55, no. 5, 2020, pp. 249-256.
- [4] Lee, Kawin KW, Samuel KK Ling, and Patrick SH Yung. "Controlled trial to compare the Achilles tendon load during running in flatfoot participants using a customized arch support orthoses vs an orthotic heel lift." *BMC musculoskeletal disorders* 20.1 (2019): 1-12.
- [5] Singh, Dishan. "Acute Achilles Tendon Rupture". *BMJ*, 2015, pp. 1158-1160. *BMJ*.
- [6] Kozlovskaja, Maria, et al. "Biomedical risk factors of achilles tendinopathy in physically active people: a systematic review." *Sports medicine-open* 3.1 (2017): 1-14.
- [7] Alnahdi, Ali H., et al. "Cross-cultural adaptation, validity and reliability of the Arabic version of the Lower Extremity Functional Scale." *Disability and rehabilitation* 38.9 (2016): 897-904.
- [8] Ochen, Yassine, et al. "Operative treatment versus nonoperative treatment of Achilles tendon ruptures: systematic review and meta-analysis." *Bmj* 364 (2019).
- [9] Opdam, K. T. M., et al. "Reliability and validation of the Dutch Achilles tendon Total rupture score." *Knee Surgery, Sports Traumatology, Arthroscopy* 26.3 (2018): 862-868.
- [10] Palazon-Bru, Antonio, et al. "A reliability generalization meta-analysis of the Victorian Institute of Sport Assessment Scale for Achilles Tendinopathy (VISA-A)." *Foot & ankle international* 40.4 (2019): 430-438.

- [11] Brotzman, S. Brent, and Robert C. Manske. *Clinical orthopaedic rehabilitation e-book: An evidence-based approach-expert consult*. Elsevier Health Sciences, 2011.
- [12] Ortega-Avila, Ana Belen, et al. "Systematic review of the psychometric properties of the Victorian Institute of Sports Assessment–Achilles tendinopathy questionnaire." *Disability and rehabilitation* 43.8 (2021): 1056-1064.
- [13] Beaton, D. E., Bombardier, C., Guillemin, F., & Ferraz, M. B. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine*. 2000. 25(24): p.3186-3191
- [14] Korakakis, Vasileios, et al. "Translation into modern standard Arabic, cross-cultural adaptation and psychometric properties' evaluation of the Lower Extremity Functional Scale (LEFS) in Arabic-speaking athletes with Anterior Cruciate Ligament (ACL) injury." *PloS one* 14.6 (2019): e0217791.
- [15] Robinson, John M., et al. "The VISA-A questionnaire: a valid and reliable index of the clinical severity of Achilles tendinopathy." *British journal of sports medicine* 35.5 (2001): 335-341.
- [16] Lohrer, Heinz, and Tanja Nauck. "Cross-cultural adaptation and validation of the VISA-A questionnaire for German-speaking Achilles tendinopathy patients." *BMC Musculoskeletal Disorders* 10.1 (2009): 1-9.
- [17] Arifin, Wan Nor. "A Web-Based Sample Size Calculator For Reliability Studies". *Education In Medicine Journal*, vol 10, no. 3, 2018, pp. 67-76.
- [18] Wageck, Bruna Borges, et al. "Cross-cultural adaptation and measurement properties of the Brazilian Portuguese Version of the Victorian Institute of Sport Assessment-Patella (VISA-P) scale." *journal of orthopaedic & sports physical therapy* 43.3 (2013): 163-171.
- [19] Keller, Andres, et al. "Cross-cultural adaptation and validation of the VISA-A questionnaire for Chilean Spanish-speaking patients." *Journal of orthopaedic surgery and research* 13.1 (2018): 1-7.
- [20] Maffulli, Nicola, et al. "Achilles tendinopathy." *Foot and Ankle surgery* 26.3 (2020): 240-249.

- [21] Binkley, Helen M., et al. "Rehabilitation and Return to Sport After Nonsurgical Treatment of Achilles Tendon Rupture." *Strength & Conditioning Journal* 42.3 (2020): 90-99.
- [22] Klätte-Schulz, Franka, et al. "Different Achilles tendon pathologies show distinct histological and molecular characteristics." *International journal of molecular sciences* 19.2 (2018): 404.
- [23] Wezenbeek, Evi, et al. "Activity-induced increase in Achilles tendon blood flow is age and sex dependent." *The American journal of sports medicine* 46.11 (2018): 2678-2686.
- [24] Reito, Aleks, et al. "Risk factors for failed nonoperative treatment and rerupture in acute Achilles tendon rupture." *Foot & ankle international* 39.6 (2018): 694-703.
- [25] Streiner, David L., Geoffrey R. Norman, and John Cairney. *Health measurement scales: a practical guide to their development and use*. Oxford University Press, USA, 2015.
- [26] Maffulli, Nicola, et al. "Italian translation of the VISA-A score for tendinopathy of the main body of the Achilles tendon." *Disability and rehabilitation* 30.20-22 (2008): 1635-1639.
- [27] Dogramaci, Yunus, et al. "Validation of the VISA-A questionnaire for Turkish language: the VISA-A-Tr study." *British journal of sports medicine* 45.5 (2011): 453-455.
- [28] Chang, Rui, et al. "Cross-cultural adaptation and measurement properties of the VISA-A questionnaire for Chinese patients with Achilles Tendinopathy." *Physical Therapy in Sport* 52 (2021): 256-262.
- [29] Sosa, Ken Ervin, et al. "Cross-Cultural Adaptation and Measurement of Psychometric Properties of the Filipino version of Victorian Institute of Sports Assessment Ankle Instability (VISA-A) Questionnaire for Achilles Tendinopathy." *PJAHS• Volume 5 Issue 1 2021* (2021): 39.

- [30] Bahari, Milad, et al. "Cross-cultural adaptation, reliability and validity of the Persian version of the Victorian Institute of Sport Assessment-Achilles questionnaire (VISA-A)." *Disability and Rehabilitation* (2020): 1-9.
- [31] Kaux, J-F., et al. "Adaptation transculturelle et validation des questionnaires VISA-P et VISA-A en français." *Science & Sports* 31.2 (2016): 65-72.
- [32] Forsythe LP, Carman KL, Szydlowski V, Fayish L, Davidson L, Hickam DH, Hall C, Bhat G, Neu D, Stewart L, and others. Patient Engagement In Research: Early Findings From The Patient-Centered Outcomes Research Institute. *Health Affairs* 2019;38:359-67.
- [33] Silbernagel, Karin Grävare, Roland Thomeé, and Jon Karlsson. "Cross-cultural adaptation of the VISA-A questionnaire, an index of clinical severity for patients with Achilles tendinopathy, with reliability, validity and structure evaluations." *BMC musculoskeletal disorders* 6.1 (2005): 1-6.
- [34] Sierevelt, Inger, et al. "Dutch version of the Victorian Institute of Sports Assessment-Achilles questionnaire for Achilles tendinopathy: Reliability, validity and applicability to non-athletes." *World journal of orthopedics* 9.1 (2018): 1.
- [35] Iversen, J. V., et al. "Danish VISA-A questionnaire with validation and reliability testing for Danish-speaking Achilles tendinopathy patients." *Scandinavian journal of medicine & science in sports* 26.12 (2016): 1423-1427.
- [36] Van Mol M. Variation in modern standard Arabic in radio news broadcasts: a synchronic descriptive investigation into the use of complementary particles. Peeters Publishers; 2003.
- [37] Krogsgaard, Michael R., et al. "Potential problems in the use of patient reported outcome measures (PROMs) and reporting of PROM data in sports science." *Scandinavian Journal of Medicine & Science in Sports* 31.6 (2021): 1249-1258.
- [38] Terwee, Caroline B., et al. "Quality criteria were proposed for measurement properties of health status questionnaires." *Journal of clinical epidemiology* 60.1 (2007): 34-42.

- [39] Grassi, Alberto, et al. "Eighty-two per cent of male professional football (soccer) players return to play at the previous level two seasons after Achilles tendon rupture treated with surgical repair." *British journal of sports medicine* 54.8 (2020): 480-486.
- [40] Yang, JaeWon, et al. "Factors affecting return to play after primary Achilles tendon tear: a cohort of NFL players." *Orthopaedic journal of sports medicine* 7.3 (2019): 2325967119830139.
- [41] Perez-Gomez, Jorge, et al. "Agility training in football players: A systematic review." *CULTURA CIENCIA Y DEPORTE* 12.35 (2017): 127-134.
- [42] Perry, Jacquelin. "Anatomy and biomechanics of the hindfoot." *Clinical orthopaedics and related research* 177 (1983): 9-15.
- [43] Golanó P, Dalmau-Pastor M, Vega J, et al. Anatomy of the ankle. In: d'Hooghe PPRN, Kerkhoffs GMMJ, editors. *The ankle in football, sports and traumatology*. Heidelberg: Springer; 2014. p. 1–24.
- [44] Tiberio D. Evaluation of Functional Ankle Dorsiflexion Using Subtalar Neutral Position. *Phys Ther.* 1987; 67:955-7
- [45] Starkey C, Ryan J. *Evaluation of Orthopedic and Athletic Injuries*. Second ed. Philadelphia: F.A. Davis Company; 2002.
- [46] Prentice W. *Rehabilitation Techniques for Sports Medicine and Athletic Training*. Fourth ed. New York, NY: McGraw-Hill; 2004.
- [47] Kisner, Carolyn, Lynn Allen Colby, and John Borstad. *Therapeutic exercise: foundations and techniques*. Fa Davis, 2017.
- [48] Fraser, John J., Mark A. Feger, and Jay Hertel. "Midfoot and forefoot involvement in lateral ankle sprains and chronic ankle instability. Part 1: anatomy and biomechanics." *International journal of sports physical therapy* 11.6 (2016): 992.
- [49] Hung, Chen-Yu, et al. "Advanced ankle and foot sonoanatomy: imaging beyond the basics." *Diagnostics* 10.3 (2020): 160.

- [50] Zielinska, Nicol, et al. "Classifications of the extensor hallucis longus tendon variations: Updated and Comprehensive narrative review." *Annals of Anatomy-Anatomischer Anzeiger* (2021): 151762.
- [51] Hoppenfeld S. *Physical Examination of the Spine & Extremities*. New Jersey: Prentice Hall; 1976.
- [52] Dayton, Paul. "Anatomic, vascular, and mechanical overview of the Achilles tendon." *Clinics in podiatric medicine and surgery* 34.2 (2017): 107-113.
- [53] Nyysönen, Timo. *Achilles tendon rupture*. Diss. Itä-Suomen yliopisto, 2020.p.23-28.
- [54] Doral, Mahmut Nedim, et al. "Functional anatomy of the Achilles tendon." *Knee Surgery, Sports Traumatology, Arthroscopy* 18.5 (2010): 638-643.
- [55] Malvankar, S., and W. S. Khan. "Evolution of the Achilles tendon: The athlete's Achilles heel?." *The Foot* 21.4 (2011): 193-197.
- [56] Maffulli, Nicola, et al. "Achilles tendinopathy." *Foot and Ankle Surgery* 26.3 (2020): 240-249.
- [57] Longo UG, Ronga M, Maffulli N. 2018. Achilles tendinopathy. *Sports Med Arthosc Rev* Mar 26(1):16-30.
- [58] DeOrio MJ, Easley ME. 2008. Surgical strategies: insertional Achilles tendinopathy. *Foot Ankle Int* 2008;29(5):542–550.
- [59] Roche AJ, Calder JD. 2013. Achilles tendinopathy: A review of the current concepts of treatment. *Bone Joint J Oct* 95-B(10);1299-307.
- [60] Åström M. 1998. Partial rupture in chronic achilles tendinopathy. A retrospective analysis of 342 cases. *Acta Orthop Scand Aug*;69(4):404-7
- [61] William, E. "Rehabilitation techniques for sports medicine and athletic training. North Carolina." (2005).
- [62] Raikin SM, Garras DN, Krapchev PV. Achilles tendon injuries in aUnited States population.*Foot Ankle Int*. 2013;34(4):475-480.

- [63] einfeld SB. Achilles tendon disorders. *Med Clin North Am.* 2014;98(2):331-338.
- [64] Lemme, Nicholas J., et al. "Epidemiology of Achilles tendon ruptures in the United States: athletic and nonathletic injuries from 2012 to 2016." *Orthopedic journal of sports medicine* 6.11 (2018): 2325967118808238.
- [65] eFroda SF, Feller R, Klinge SA. Surgical management of the aging athlete. *Curr Sports Med Rep.* 2016;15(6):426-432.
- [66] antto I, Heikkinen J, Flinkkila T, Ohtonen P, Leppilahti J. Epidemiology of Achilles tendon ruptures: increasing incidence over 33 years. *Scand J Med Sci Sports.* 2015;25(1):e133-e138.
- [67] Huttunen TT, Kannus P, Rolf C, Fellaänder-Tsai L, Mattila VM. Acute Achilles tendon ruptures: incidence of injury and surgery in Sweden between 2001 and 2012. *Am J Sports Med.* 2014;42(10):2419-2423.
- [68] Raikin SM, Garras DN, Krapchev PV. Achilles tendon injuries in a United States population. *Foot Ankle Int.* 2013;34(4):475-480.
- [69] Deitch JR, Starkey C, Walters SL, Moseley JB. Injury risk in professional basketball players: a comparison of Women's National Basketball Association and National Basketball Association athletes. *Am J Sports Med.* 2006;34(7):1077-1083.
- [70] Hodgens, Blake H., et al. "Performance Outcomes After Surgical Repair of Achilles Tendon Rupture in the Women's National Basketball Association." *Orthopaedic Journal of Sports Medicine* 9.9 (2021): 23259671211030473.
- [71] Sponbeck, Joshua K., et al. "Achilles tendon single bout and season-long adaptations during early and late collegiate cross-country season." *Physical Therapy in Sport* 47 (2021): 114-119.
- [72] Cramer, Allan, et al. "Diabetes and treatment with orally administered corticosteroids negatively affect treatment outcome at follow-up after acute Achilles tendon rupture." *Knee Surgery, Sports Traumatology, Arthroscopy* 29.5 (2021): 1584-1592.

- [73] Larson, Peter, et al. "Foot strike patterns of recreational and sub-elite runners in a long-distance road race." *Journal of sports sciences* 29.15 (2011): 1665-1673.
- [74] Almonroeder, Thomas, John D. Willson, and Thomas W. Kernozek. "The effect of foot strike pattern on Achilles tendon load during running." *Annals of biomedical engineering* 41.8 (2013): 1758-1766.
- [75] Brotzman, S. Brent, and Robert C. Manske. *Clinical orthopedic rehabilitation e-book: An evidence-based approach-expert consult*. Elsevier Health Sciences, 2011.
- [76] Morath, Oliver, et al. "The effect of sclerotherapy and prolotherapy on chronic painful Achilles tendinopathy—a systematic review including meta-analysis." *Scandinavian journal of medicine & science in sports* 28.1 (2018): 4-15.
- [77] Ochoa, Jonathan K., et al. "Foot and Ankle Injections in Athletes." *Sports Health* (2021): 19417381211003619.
- [78] Reddy, Sudheer S., et al. "Surgical treatment for chronic disease and disorders of the Achilles tendon." *JAAOS-Journal of the American Academy of Orthopaedic Surgeons* 17.1 (2009): 3-14.
- [79] Howell, Michael A., et al. "Calcific insertional Achilles Tendinopathy-Achilles repair with flexor Hallucis longus tendon transfer: case series and surgical technique." *The Journal of Foot and Ankle Surgery* 58.2 (2019): 236-242.
- [80] Schepesis, Anthony A., Hugh Jones, and Andrew L. Haas. "Achilles tendon disorders in athletes." *The American journal of sports medicine* 30.2 (2002): 287-305.
- [81] Heckman, Daniel S., George S. Gluck, and Selene G. Parekh. "Tendon disorders of the foot and ankle, part 2: Achilles tendon disorders." *The American journal of sports medicine* 37.6 (2009): 1223-1234.
- [82] Den Hartog, Bryan D. "Flexor hallucis longus transfer for chronic Achilles tendonosis." *Foot & ankle international* 24.3 (2003): 233-237.
- [83] Schepesis, Anthony A., Clayton Wagner, and Robert E. Leach. "Surgical management of Achilles tendon overuse injuries: a long-term follow-up study." *The American journal of sports medicine* 22.5 (1994): 611-619.

- [84] Metz, Roderick, et al. "Acute Achilles tendon rupture: minimally invasive surgery versus nonoperative treatment with immediate full weight-bearing—a randomized controlled trial." *The American journal of sports medicine* 36.9 (2008): 1688-1694.
- [85] Jildeh, Toufic R., and Erik B. Eller. "Achilles Tendon Rupture Treatment: Operative Versus Nonoperative." *Techniques in Foot & Ankle Surgery* 20.2 (2021): 82-85.
- [86] Grassi, Alberto, et al. "Minimally invasive versus open repair for acute Achilles tendon rupture: meta-analysis showing reduced complications, with similar outcomes, after minimally invasive surgery." *JBJS* 100.22 (2018): 1969-1981.
- [87] von Wehren, Lutz, et al. "Injection with autologous conditioned serum has better clinical results than eccentric training for chronic Achilles tendinopathy." *Knee Surgery, Sports Traumatology, Arthroscopy* 27.9 (2019): 2744-2753.
- [88] Rompe, Jan D., John Furia, and Nicola Maffulli. "Eccentric loading compared with shock wave treatment for chronic insertional Achilles tendinopathy: a randomized, controlled trial." *JBJS* 90.1 (2008): 52-61.
- [89] Fahlström, Martin, et al. "Chronic Achilles tendon pain treated with eccentric calf-muscle training." *Knee surgery, sports traumatology, arthroscopy* 11.5 (2003): 327-333.
- [90] Roos, Ewa M., et al. "Clinical improvement after 6 weeks of eccentric exercise in patients with mid-portion Achilles tendinopathy—a randomized trial with 1-year follow-up." *Scandinavian journal of medicine & science in sports* 14.5 (2004): 286-295.
- [91] Alfredson, Håkan, et al. "Heavy-load eccentric calf muscle training for the treatment of chronic Achilles tendinosis." *The American journal of sports medicine* 26.3 (1998): 360-366.
- [92] Jayaseelan, Dhinu J., John J. Mischke, and Raymond L. Strazzulla. "Eccentric exercise for Achilles tendinopathy: A narrative review and clinical decision-making considerations." *Journal of Functional Morphology and Kinesiology* 4.2 (2019): 34.
- [93] Öhberg, Lars, Ronny Lorentzon, and Håkan Alfredson. "Eccentric training in patients with chronic Achilles tendinosis: normalised tendon structure and decreased thickness at follow up." *British journal of sports medicine* 38.1 (2004): 8-11.

- [94] Mafi, Nader, Ronny Lorentzon, and Håkan Alfredson. "Superior short-term results with eccentric calf muscle training compared to concentric training in a randomized prospective multicenter study on patients with chronic Achilles tendinosis." *Knee Surgery, Sports Traumatology, Arthroscopy* 9.1 (2001): 42-47.
- [95] Doral, Mahmut Nedim, et al., eds. *Sports injuries: prevention, diagnosis, treatment, and rehabilitation*. Springer Science & Business Media, 2011.
- [96] Valkering, Kars P., et al. "Functional weight-bearing mobilization after Achilles tendon rupture enhances early healing response: a single-blinded randomized controlled trial." *Knee Surgery, Sports Traumatology, Arthroscopy* 25.6 (2017): 1807-1816.
- [97] Suchak, Amar A., et al. "Postoperative rehabilitation protocols for Achilles tendon ruptures: a meta-analysis." *Clinical Orthopaedics and Related Research*® 445 (2006): 216-221.
- [98] Barfod, Kristoffer Weisskirchner, et al. "Nonoperative dynamic treatment of acute Achilles tendon rupture: the influence of early weight-bearing on clinical outcome: a blinded, randomized controlled trial." *JBJS* 96.18 (2014): 1497-1503.
- [99] Brumann, Mareen, et al. "Accelerated rehabilitation following Achilles tendon repair after acute rupture—development of an evidence-based treatment protocol." *Injury* 45.11 (2014): 1782-1790.
- [100] Metz, Roderick, et al. "Acute Achilles tendon rupture: minimally invasive surgery versus nonoperative treatment with immediate full weight-bearing—a randomized controlled trial." *The American journal of sports medicine* 36.9 (2008): 1688-1694.
- [101] Barton, Dane, et al. "Return to play following Achilles tendon rupture in NFL players based on position." *Foot & Ankle Specialist* (2021): 19386400211040351.
- [102] Grassi, Alberto, et al. "Eighty-two per cent of male professional football (soccer) players return to play at the previous level two seasons after Achilles tendon rupture treated with surgical repair." *British journal of sports medicine* 54.8 (2020): 480-486.
- [103] de Boer, A. Siebe, et al. "The American Orthopaedic Foot and Ankle Society Ankle-Hindfoot Scale; translation and validation of the Dutch language version for ankle fractures." *BMJ Open* 7.8 (2017): e017040.

- [104] Yusuf, Fardowsa, et al. "Validating the Foot and Ankle Outcome score for measuring foot dysfunction among hallux valgus surgery patients using item response theory." *Foot and Ankle Surgery* 26.8 (2020): 864-870.
- [105] Cöster, Maria C., et al. "Comparison of the self-reported foot and ankle score (SEFAS) and the American Orthopedic Foot and Ankle Society score (AOFAS)." *Foot & ankle international* 35.10 (2014): 1031-1036.
- [106] Mani, Srinivasan B., et al. "Validation of the Foot and Ankle Outcome Score in adult-acquired flatfoot deformity." *Foot & ankle international* 34.8 (2013): 1140-1146.
- [107] Çelik, Derya, Melih Malkoç, and RobRoy Martin. "Evidence for reliability, validity, and responsiveness of Turkish Foot and Ankle Ability Measure (FAAM)." *Rheumatology international* 36.10 (2016): 1469-1476.
- [108] Hoch, Johanna M., et al. "Continued validation and known groups validity of the Quick-FAAM: inclusion of participants with chronic ankle instability and ankle sprain copers." *Physical Therapy in Sport* 43 (2020): 84-88.
- [109] Leigheb, Massimiliano, et al. "Translation, cross-cultural adaptation, reliability, and validation of the Italian version of the Foot and Ankle Disability Index (FADI)." *Acta Bio Medica: Atenei Parmensis* 91.4-S (2020): 160.
- [110] Yagci, Gozde, Suat Erel, and Vural Okunakol. "Validation of the Turkish version of the Revised Foot Function Index for patients with foot and ankle disorders." *Foot and Ankle Surgery* 26.6 (2020): 624-629.
- [111] Ho, Lai Fun, et al. "Efficacy of electroacupuncture plus warm needling therapy for plantar heel pain: a randomized waitlist-controlled trial." *Acupuncture in Medicine* (2020): 0964528420946048.
- [112] Angers, Magalie, et al. "Cross-cultural adaptation and validation of the Ankle Osteoarthritis Scale for use in French-speaking populations." *Canadian Journal of Surgery* 59.2 (2016): 123.
- [113] Liu, Guiping, et al. "Validation of the ankle osteoarthritis scale instrument for preoperative evaluation of end-stage ankle arthritis patients using item response theory." *Foot & ankle international* 40.4 (2019): 422-429.

- [114] Dingemans, Siem A., et al. "Normative data for the lower extremity functional scale (LEFS)." *Acta orthopaedica* 88.4 (2017): 422-426.
- [115] Erichsen, J. L., et al. "Danish translation and validation of the Self-reported foot and ankle score (SEFAS) in patients with ankle related fractures." *Foot and Ankle Surgery* 27.5 (2021): 521-527.
- [116] Nurai, Tamanna, and Waqar Naqvi. "A research protocol of foot posture evaluation in traffic policeman." (2021).
- [117] Vuurberg, Gwendolyn, Lana Kluit, and C. Niek van Dijk. "The Cumberland Ankle Instability Tool (CAIT) in the Dutch population with and without complaints of ankle instability." *Knee Surgery, Sports Traumatology, Arthroscopy* 26.3 (2018): 882-891.
- [118] Leppänen, Mari, et al. "Interventions to prevent sports-related injuries: a systematic review and meta-analysis of randomized controlled trials." *Sports medicine* 44.4 (2014): 473-486.
- [119] Mokkink, Lidwine B., et al. "The COSMIN study reached international consensus on taxonomy, terminology, and definitions of measurement properties for health-related patient-reported outcomes." *Journal of clinical epidemiology* 63.7 (2010): 737-745.
- [120] Weir, Joseph P. "Quantifying test-retest reliability using the intraclass correlation coefficient and the SEM." *The Journal of Strength & Conditioning Research* 19.1 (2005): 231-240.
- [121] Hernández-Sánchez, Sergio, et al. "Cross-cultural adaptation of the Victorian Institute of Sport Assessment-Achilles (VISA-A) questionnaire for spanish athletes with achilles tendinopathy." *journal of orthopaedic & sports physical therapy* 48.2 (2018): 111-120.
- [121] Gulick, Dawn. *Ortho notes: clinical examination pocket guide*. FA Davis, 2018.
- [122] Silbernagel, Karin Grävare, Shawn Hanlon, and Andrew Sprague. "Current clinical concepts: conservative management of Achilles tendinopathy." *Journal of athletic training* 55.5 (2020): 438-447.

- [123] Deppen, Robert. "From the CORE to the floor—interrelationships." *Sports-Specific Rehabilitation*. Churchill Livingstone, 2007. 145-173.
- [124] Martin, Don. "The role of foot biomechanics in lower extremity pathologies." (1995).
- [125] Reddy, Sudheer S., et al. "Surgical treatment for chronic disease and disorders of the Achilles tendon." *JAAOS-Journal of the American Academy of Orthopaedic Surgeons* 17.1 (2009): 3-14.
- [126] Brotzman, S. Brent. "Achilles tendinopathy." *Any screen. Any time. Anywhere.* (2017): 290.
- [127] Li, Hong-Yun, and Ying-Hui Hua. "Achilles tendinopathy: current concepts about the basic science and clinical treatments." *BioMed research international* 2016 (2016).
- [128] <http://podiatryhq.com.au/foot-muscle-strengthening/>

7- هل تمارس الرياضة أو أي تمارين بدنية حالياً؟

- 0 لا على الإطلاق
- 4 تدريب معدل (معتدل) + تحدي معدل (معتدل)
- 7 تدريب كامل + تحدي / منافسة كاملة ولكن ليست بنفس المستوى عند بداية الأعراض
- 10 التحدي على نفس المستوى أو أعلى من المستوى عندما بدأت الأعراض (الأعراض لم تؤثر على التدريب)

8- الرجاء، أجب على إحدى الأسئلة التالية: أ، ب، ت.

- في حال عدم وجود ألم أثناء ممارسة رياضة التحميل على وتر العرقوب (مثل: الوقوف، المشي، الجري، القفز) فيرجى إجابة السؤال أ فقط.
 - في حال وجود ألم أثناء رياضة التحميل على وتر العرقوب ولكن لم يمنعك من إتمام النشاط، فيرجى إجابة السؤال ب فقط.
 - في حال وجود ألم يمنعك من ممارسة رياضة التحميل على وتر العرقوب، فيرجى إجابة السؤال ت فقط.
- أ- في حال عدم وجود ألم أثناء رياضة التحميل على وتر العرقوب، كم هي المدة التي تستطيع فيها الاستمرار بالتدريب؟

النقاط	لا شيء	دقيقة ١-١٠	دقيقة ١١-٢٠	دقيقة ٢١-٣٠	< ٣٠ دقيقة
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	٠	٧	١٤	٢١	٣٠

أو

ب- في حال كان الألم الذي تشعر به أثناء ممارسة رياضة التحميل على وتر العرقوب لا يمنعك من إتمام النشاط أو الاستمرار، كم هي المدة التي تستطيع فيها الاستمرار بالتدريب؟

النقاط	لا شيء	دقيقة ١-١٠	دقيقة ١١-٢٠	دقيقة ٢١-٣٠	< ٣٠ دقيقة
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	٠	٤	١٠	١٤	٢٠

أو

ت- في حال وجود ألم يمنعك من ممارسة رياضة التحميل على وتر العرقوب، كم هي المدة التي تستطيع فيها الاستمرار بالتدريب؟

النقاط	لا شيء	دقيقة ١-١٠	دقيقة ١١-٢٠	دقيقة ٢٠-٣٠	< ٣٠ دقيقة
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	٠	٢	٥	٧	١٠

مجموع النقاط (/ ١٠٠) %

APPENDIX 2: APPROVAL

The Hashemite University
Institutional Review Board (HU-IRB)



الجامعة الهاشمية
مجلس المراجعة المؤسسي

٢٠٢١/٧/٥

٢١٠٠٩٦٣٤

Dr . Mohammad Madi
Faculty of Applied Medical Sciences

**Re :Cross cultural adaptation, reliability and validity of VISA–A questionnaire in
standard Arabic language**

I am pleased to inform you that the above referenced request for Ethical Approval of Research has been approved by the IRB on the 4July, 2021 (No.2/12/2020/2021). Any changes in the procedures affecting interaction with subjects/participants should be reported to the IRB. Significant changes will require submission of a revised version of your request.

Best wishes for success in this research.

Sincerely,

Prof. ShaherHamaideh, PhD. Chair



Dean, Faculty of Nursing
IRB, The Hashemite University

الزرقاء - (3903333) ☎ (3903352 /3903369) ✉ (150459) الرمز البريدي (13115)
Phone: (390 3333) Facsimile: 3903352 /3903369 P.O. Box(150459) Zarka 13115
e-mail :m.ed@hu.edu.jo

(Signature)

Title, Name-Surname

Director of Institute