

The impact of Achilles tendon thickness and Kager's fat pad thickness on clinical and functional outcomes following open surgical repair of acute Achilles tendon rupture

✉ Bilge Kagan Yılmaz,¹ ✉ Caglar Tuna Issi,² ✉ Murat Yesil,¹ ✉ Furkan Kaya,³ ✉ Ozal Ozcan¹

¹Department of Orthopaedic and Traumatology, Afyonkarahisar Health Science University, Afyonkarahisar-Türkiye

²Department of Orthopaedic and Traumatology, Ministry of Health Aksaray Training and Research Hospital, Aksaray-Türkiye

³Department of Radiology, Afyonkarahisar Health Science University, Afyonkarahisar-Türkiye

ABSTRACT

BACKGROUND: Acute Achilles tendon ruptures (ATR) are among the most common sports-related injuries. The aim of this study was to evaluate the correlation between Achilles tendon (AT) and Kager's fat pad (KFP) thickness with clinical and functional outcomes, measured using the Achilles Tendon Rupture Score (ATRS) and the Foot and Ankle Outcome Score (FAOS), in patients treated with open surgical repair for acute ATR.

METHODS: This retrospective study included 42 patients who underwent surgery for ATR at our institution between January 2017 and December 2021. All patients were treated using the open surgical Krackow suture technique. ATRS, FAOS, and Visual Analogue Scale (VAS) scores were recorded one year postoperatively. AT and KFP thicknesses were measured via ultrasonography by an independent radiologist at one-year follow-up.

RESULTS: The mean age of the patients was 45.38±9.68 years, with 22 male patients (52.4%). The mean ATRS was 65.17±24.46, the mean FAOS was 76.14±16.75, and the mean VAS score was 3.02±1.44. The mean AT thickness on the operated side was 15.54±2.89 mm, compared to 14.58±2.28 mm on the contralateral side (p=0.009). The mean KFP thickness on the operated side was 8.42±2.99 mm, compared to 6.32±2.67 mm on the contralateral side (p=0.005). A strong correlation was found between ATRS and FAOS (r=0.742, p<0.001). For AT thickness, there were moderate negative correlations with both ATRS and FAOS (r=-0.544, p=0.013; r=-0.451, p=0.003, respectively). For KFP thickness, a moderate negative correlation was found with ATRS (r=-0.506, p=0.001).

CONCLUSION: AT and KFP thicknesses had no significant direct effect on ATRS and FAOS. However, ATRS and FAOS scores following open surgical repair of acute ATR were correlated with each other and with functional outcomes. Despite its specific complications, open surgical repair of acute ATR is an effective option for patients eligible for surgery.

Keywords: Achilles tendon; Kager's fat pad; rupture; thickness.

INTRODUCTION

The Achilles tendon (AT) is the thickest and strongest tendon in the human body.^[1] Each year, Achilles tendon rupture (ATR) occurs in an estimated 11-37 individuals per 100,000 popula-

tion.^[2] ATR accounts for 20% of all large tendon ruptures.^[3] The incidence of acute ATR (AATR) is higher in young adult men, with rates reported to be 2 to 12 times greater than in women.^[4,5]

ATR treatment is still a controversial topic, with a variety of

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Address for correspondence: Bilge Kagan Yılmaz

Department of Orthopaedic and Traumatology, Afyonkarahisar Health Science University, Afyonkarahisar, Türkiye

E-mail: yilmazbk@gmail.com

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available approaches. While non-surgical methods such as casting or functional bracing are commonly used, surgical options include open repair and minimally invasive techniques.^[6,7] After surgical repair of AATR, the re-rupture rate ranges from 1.4% to 2.8%, whereas this rate is higher (between 12% and 17%) with conservative treatments.^[1] Open surgical repair may lead to complications such as infection, adhesions, suture reactions, or wound healing problems. Minimally invasive methods, on the other hand, promote a quicker return to full loading by preserving more of the natural tissue structure. They also support complete restoration of muscle strength and full recovery of ankle movements.^[8] Compared to conservative treatment, minimally invasive repair is associated with a lower re-rupture rate.^[8] Compared to open surgery, it offers advantages such as reduced wound complications, improved cost-effectiveness, and better cosmetic outcomes.^[9]

Following ATR surgical repair, changes in the morphological structure and dimensions of the AT may occur.^[10,11] Kager's fat pad (KFP) is a fatty tissue mass located within the Kager's triangle. It is closely associated with the AT and is believed to stabilize and protect the mechanical function of the ankle joint.^[12] Its dimensions may change following tendinopathy or surgery, which can influence functional outcomes. Various scoring systems, such as the Achilles Tendon Rupture Score (ATRS) and the Foot and Ankle Outcome Score (FAOS), are used to assess functional recovery; however, their relationship with AT and KFP thickness has not been previously reported. To date, no studies have examined the correlation between changes in AT and KFP morphology and dimensions and clinical outcomes.

The aim of this study was to evaluate the correlation between AT and KFP measurements and clinical and functional outcomes, assessed using ATRS and FAOS, in patients with acute ATR treated with open surgical repair.

MATERIALS AND METHODS

Patients

This retrospective study included patients with AATR who underwent surgery at a single institution between January 1, 2017, and December 31, 2021. The study was approved by the local institutional ethics committee under decision number 2011-KAEK-2. Informed consent was obtained from all participants included in the study. Patients were included if they had an ATR located 2-6 cm proximal to the calcaneal tubercle, with symptom duration of less than 10 days, aged between 25 and 65 years, treated with the Krackow repair technique using non-absorbable sutures, and had a minimum follow-up duration of one year. Exclusion criteria included a prior history of Achilles tendinopathy or enthesopathy, chronic ATR, previous surgery and/or significant skin wound in the surgical region, hypermobility syndrome, diabetes mellitus, rheumatological disease, diagnosis of deep vein thrombosis, or missing data. This study was performed in line with

the principles of the Declaration of Helsinki.

Surgical Management

All patients diagnosed with AATR were evaluated for tendon gap formation, a positive Thompson test, and skin wrinkling. ATR was confirmed via ultrasound examination. Surgical repair was performed under spinal anesthesia with the patient in the prone position, without the use of a pneumatic tourniquet, by the same experienced surgeon. We prefer to use an open approach in appropriate patients to reduce the risk of sural nerve injury and re-rupture. Open surgery involves direct suture repair through a medial para-Achilles incision (6-15 cm), using non-absorbable sutures with the Krackow repair technique.^[13] All surgical procedures utilized Polisl sutures (Boz, Ankara, Türkiye), made from high-molecular-weight linear polyester (ethylene terephthalate).

Postoperative Follow-up

After surgery, patients were placed in a short-leg cast with the ankle in 20° plantar flexion and received a single dose of low-molecular-weight heparin (enoxaparin sodium, 4000 IU, subcutaneous) for 14 days to prevent deep vein thrombosis. Patients were mobilized immediately after surgery. Weight-bearing was restricted for the first two weeks, followed by partial weight-bearing until the sixth week. Full weight-bearing was permitted after six weeks. During the postoperative period, all patients performed active and passive knee flexion and extension exercises. In our clinic, patients are routinely followed up at two, four, and six weeks, and again at 12 months postoperatively. At the second-week follow-up, the cast was removed and the rehabilitation program was initiated. Active resistance and stretching exercises began after six weeks.^[14]

Data Analysis

The Turkish versions of the ATRS and FAOS scales are used in our clinic due to their high levels of reliability and validity.^[15,16] At the 12-month follow-up, ATRS, FAOS, and Visual Analogue Scale (VAS) scores were recorded for all patients. To assess the range of motion (ROM) of the ankle joint, the patient was positioned supine, ensuring that both feet and ankles were unrestricted. The neutral ankle position was defined as 90 degrees. Movements in the plantar flexion direction were referred to as 'flexion,' while dorsiflexion movements were termed 'extension.' The extent of these motions was measured using a goniometer and compared with the contralateral joint. Wound site complications, sural nerve injuries, and re-rupture rates were recorded. Postoperative clinical outcomes were assessed by the same orthopedist.

Ultrasound Measurements

Magnetic resonance imaging (MRI) is frequently used in evaluating AT-related pathologies. However, MRI is relatively expensive and does not allow for a dynamic assessment. Ultrasonography, by contrast, is useful for evaluating tendon

dynamics, gap distance, and tendon thickness. Therefore, in the present study, AT and KFP thickness measurements were performed using ultrasound. At the 12-month follow-up, ultrasound assessments were performed by a single radiologist experienced in musculoskeletal imaging, using a Hitachi Preirus device (Hitachi Ltd., Tokyo, Japan) with a 4-18 MHz linear probe. The radiologist had 15 years of experience in ultrasound evaluation. Ultrasound measurements of AT and KFP thickness were conducted with the patient in the prone position, both feet dangling freely off the end of the examination table. In this position, the AT enthesis on the calcaneus was identified via ultrasound. The probe was placed in the central region of the medial gastrocnemius, aligned with the medial longitudinal axis as determined by the orientation of the soleus fibers. The thickest part of both the midportion and insertion region of the tendon were identified in the longitudinal plane and estimated by the researcher. Next, the repair area was identified. These areas of the tendon were then evaluated in the transverse plane, and the maximum diameters of the tendon were measured (Fig. 1). KFP measurements were performed by aligning the transducer with the calcaneal enthesis and recording three images in the longitudinal view. The caliper was placed on the upper and lower borders of the fat pad for measurement (Fig. 1).^[17] Simultaneously, AT and KFP thickness measurements of the non-operated lower extremity were performed by the same radiologist using the same ultrasound device. All data were recorded for comparison with measurements from the operated side.

Statistical Analysis

All statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 20 (IBM Corp., Armonk, NY, USA). The normality of data distribution was assessed using the Kolmogorov-Smirnov test, histograms, and skewness-kurtosis coefficients. Nominal and ordinal variables were compared using the Pearson chi-square or Fisher's exact test. For comparison between two groups, the Student's t-test was used for normally distributed data, while the Mann-Whitney U test was applied for non-normally distributed data. Descriptive statistics are presented as mean \pm standard deviation for normally distributed variables. The KFP and AT thicknesses on the operated side were compared with those on the contralateral side using the Student's t-test (paired samples test). Correlations between KFP thickness, AT thickness, ATRS, FAOS, and VAS values were analyzed using the Pearson correlation test. A p value of <0.05 was considered statistically significant.

Post-Hoc Power Analysis

A post hoc power analysis (Compute achieved power—given α , sample size, and effect size) was conducted using G*Power 3.1 (Faul et al.)^[18] under the statistical test Correlation: Bivariate normal model, with an alpha of 0.05 and correlation p $H1=0.03$. The results showed that a sample of 42 participants achieved a power of 0.624.

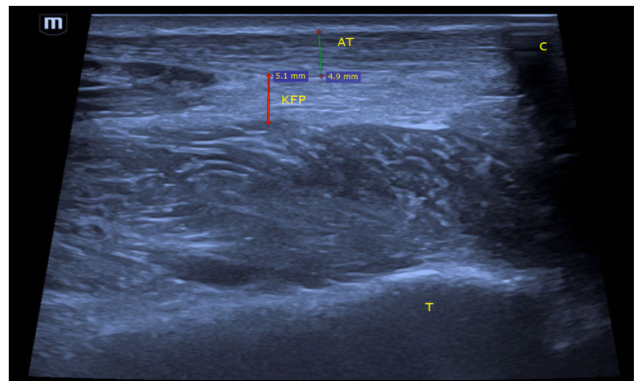


Figure 1. Ultrasound measurement of Achilles tendon (AT) and Kager's fat pad (KFP) thickness. (AT: Achilles Tendon; KFP: Kager's Fat Pad; C: Calcaneus; T: Tibia.)

RESULTS

A total of 97 patients underwent surgery for ATR at our institution. Of these, 32 had chronic ATR, 13 had incomplete follow-up data, two had undergone previous surgery in the ATR region, and eight had different suture techniques. These patients were excluded from the study. The study included 42 patients. The mean age was 45.38 ± 9.68 years, and 22 patients were men (52.4%). The mean body mass index (BMI) was 30.72 ± 5.61 kg/m². Seventeen patients (40.5%) were active smokers, and 23 (54.8%) had ATR on the right side. Thirty-two patients (76.2%) did not experience any complications. Wound site problems occurred in eight patients (19%), and two patients (4.8%) developed deep vein thrombosis (DVT). Wound site complications consisted of superficial infections that healed after wound debridement; no additional flap and/or graft procedures were required. Re-rupture was observed in two of the eight patients with wound site complications. In both cases, re-rupture was confirmed by ultrasonography and treated with a second surgical intervention. Measurements were performed by the same radiologist using the same method, timed according to the second surgery. Post-operative muscle strength was rated as 4/5 in 12 patients (28.6%). Fourteen patients (33.3%) had limited ROM in extension, and 17 patients (40.5%) had ROM in flexion. Across all patients, the mean ATRS score was 65.17 ± 24.46 , the mean FAOS score was 76.14 ± 16.75 , and the mean VAS score was 3.02 ± 1.44 (Table 1).

Among the 17 patients who smoked, 6 (35.3%) developed wound problems, compared to two of 25 non-smokers (8%). Wound complications were significantly more common among smokers ($p=0.036$).

When patient gender was compared with age, BMI, smoking status, side of injury, muscle strength, ROM extension limitation, ROM flexion limitation, and KFP thickness (on both the operated and contralateral sides), no statistically significant differences were found ($p=0.190$, $p=0.098$, $p=0.222$, $p=0.352$, $p=0.557$, $p=0.344$, $p=0.333$, $p=0.095$, and $p=0.447$, respectively). However, seven of the female patients (35%) experienced

Table 1. Demographic and clinical data of patients

	N=42 Mean ± SD n (%)			
Age (years)	45.38±9.68			
Sex				
Female	20 (47.6)			
Male	22 (52.4)			
BMI (kg/m ²)	30.72±5.61			
Smoking Status				
Smoker	17 (40.5)			
Non-smoker	25 (59.5)			
Ruptured Side				
Right	23 (54.8)			
Left	19 (45.2)			
Complications				
None	32 (76.2)			
Wound Site Problem	8 (19)			
DVT	2 (4.8)			
Muscle Strength				
4/5	12 (28.6)			
5/5	30 (71.4)			
ROM Extension Restriction (°)				
0°	28 (66.7)			
10°	11 (26.2)			
15°	1 (2.4)			
20°	2 (4.8)			
ROM Flexion Restriction (°)				
0°	25 (59.5)			
10°	9 (21.4)			
15°	3 (7.1)			
20°	5 (11.9)			
Kager's Fat Pad Thickness (mm)		Operated Side	Contralateral Side	p=0.005
		8.42±2.99	6.32±2.67	
Achilles Tendon (mm)		Operated Side	Contralateral Side	p=0.009
		15.54±2.89	14.58±2.28	
ATRS		65.17±24.46		
FAOS		76.14±16.75		
VAS		3.02±1.44		

ROM: Range of Motion; ATRS: Achilles Tendon Total Rupture Score; FAOS: Foot and Ankle Outcome Score; VAS: Visual Analogue Scale; DVT: Deep Vein Thrombosis; BMI: Body Mass Index.

wound site complications, a rate that was significantly higher than in the male group ($p=0.018$). The mean AT thickness on the operated side was 14.59 ± 1.89 mm in female patients and 16.40 ± 3.38 mm in male patients, with the thickness being significantly higher in males ($p=0.040$). The contralateral

AT thickness was similar between genders ($p=0.246$). When ATRS, FAOS, and VAS scores were compared by gender, no statistically significant differences were observed between the groups ($p=0.400$, $p=0.719$, and $p=0.912$, respectively).

Table 2. Correlations of range of motion (ROM) extension restriction, ROM flexion restriction, and muscle strength with Achilles Tendon Total Rupture Score (ATRS), Foot and Ankle Outcome Score (FAOS), and Visual Analogue Scale (VAS) scores

	n (%)	ATRS Mean±SD	p	FAOS Mean±SD	p	VAS Mean±SD	p
ROM Extension Restriction							
Yes	14 (33.3)	53.86±23.41	0.032	65.93±16.33	0.004	3.71±0.91	0.026
No	28 (66.7)	70.82±23.36		81.25±14.72		2.68±1.54	
ROM Flexion Restriction							
Yes	17 (40.5)	69.47±23.23	0.354	76.76±18.15	0.846	2.94±1.56	0.763
No	25 (59.5)	62.24±25.31		75.72±16.11		3.08±1.38	
Muscle Strength							
4/5	12 (28.6)	47.42±20.33	0.002	66.08±16.00	0.012	4.00±0.73	0.004
5/5	30 (71.4)	72.27±22.51		80.17±15.53		2.63±1.47	

ATRS: Achilles Tendon Total Rupture Score; FAOS: Foot and Ankle Outcome Score; VAS: Visual Analogue Scale.

The mean KFP thickness on the operated side was 8.42 ± 2.99 mm, compared to 6.32 ± 2.67 mm on the contralateral side. The operated side had significantly greater KFP thickness ($p=0.005$). Similarly, the mean AT thickness on the operated side was 15.54 ± 2.89 mm, while it was 14.58 ± 2.28 mm on the contralateral side, with the operated side showing statistically significantly greater thickness ($p=0.009$).

At the 12-month follow-up, patients with extension restriction had significantly lower ATRS and FAOS scores and significantly higher VAS scores compared to those without this restriction ($p=0.032$, $p=0.004$, and $p=0.026$, respectively). In contrast, patients with flexion restriction did not show statistically significant differences in ATRS, FAOS, and VAS scores compared to those without flexion restriction ($p=0.354$, $p=0.846$, and $p=0.763$, respectively). Patients with reduced muscle strength (graded 4/5) had significantly lower ATRS and FAOS scores and significantly higher VAS scores compared to those with full muscle strength ($p=0.002$, $p=0.012$, and $p=0.004$, respectively) (Table 2).

Correlation analysis between ATRS, FAOS, VAS, KFP thickness, and AT thickness revealed a strong positive correlation between ATRS and FAOS, which was statistically significant ($r=0.742$, $p<0.001$). There were also strong, statistically significant negative correlations between VAS and both ATRS and FAOS ($r=-0.739$, $p<0.001$; $r=-0.766$, $p<0.001$, respectively). For AT thickness, moderate negative correlations were found with ATRS and FAOS, while a moderate positive statistically significant correlation was observed with VAS ($r=-0.544$, $p=0.013$; $r=-0.451$, $p=0.003$; $r=0.481$, $p=0.001$, respectively). For KFP thickness, a moderate negative correlation was identified with ATRS and a moderate positive statistically significant correlation with VAS ($r=-0.506$, $p=0.001$; $r=0.417$, $p=0.006$, respectively) (Table 3).

DISCUSSION

The most important finding of the current study is the observation of a moderate negative correlation between AT and KFP thickness and ATRS and FAOS scores; however, no significant direct effect on clinical outcomes was identified. The treatment of ATR is still a topic of ongoing debate. Various complications can occur depending on the treatment method applied. Although surgical methods offer specific advantages, selecting the most appropriate treatment based on patient expectations is key to achieving optimal functional recovery. Open surgical repair for acute ATR is associated with a lower re-rupture rate; however, it carries a higher risk of deep infection and cosmetic concerns.^[19-21] Several studies have reported similar overall complication rates among different surgical techniques.^[22-28] In our clinic, we perform surgical treatment for patients deemed suitable for acute ATR repair. In the present study, complications developed in 10 patients (23.8%): eight patients had wound site problems (19%), and two patients developed deep vein thrombosis (4.8%). Re-rupture occurred in two patients with wound site complications (4.8%). Although our complication rate aligns with the literature, the small sample size and relatively short follow-up period limit the generalizability of our findings.

In the general population, smoking and older age have been shown to significantly increase the risk of wound complications following surgery.^[29-31] There is also growing evidence in the literature regarding impaired postoperative wound healing in patients who smoke and undergo ATR surgery.^[32,33] In the current study, six out of 17 patients who smoked (35.3%) and only two out of 25 patients who did not smoke (8%) developed wound site complications. We found that patients who smoked had a statistically significantly higher incidence of wound problems. Although the overall frequency of wound site complications is consistent with the literature, this differ-

Table 3. Correlation of Achilles tendon (AT) thickness and Kager's fat pad thickness with Achilles Tendon Total Rupture Score (ATRS), Foot and Ankle Outcome Score (FAOS), and Visual Analogue Scale (VAS) scores

	Achilles Tendon Thickness (mm)	Kager's Fat Pad Thickness (mm)	ATRS	FAOS	VAS
Achilles Tendon Thickness (mm)					
r					
p					
Kager's Fat Pad Thickness (mm)					
r	0.380				
p	0.013				
ATRS					
r	-0.544	-0.506			
p	<0.001	0.001			
FAOS					
r	-0.451	-0.272	0.742		
p	0.003	0.082	<0.001		
VAS					
r	0.481	0.417	-0.739	-0.766	
p	0.001	0.006	<0.001	<0.001	

ATRS: Achilles Tendon Total Rupture Score; FAOS: Foot and Ankle Outcome Score; VAS: Visual Analogue Scale.

ence may be attributed to smoking.

Functional recovery scores may be influenced by various factors such as age and gender. A prospective study involving 564 patients by Larsson et al.^[34] found that female patients had lower ATRS scores; however, the treatment method itself did not significantly predict ATRS outcomes. The authors emphasized that gender, BMI, and age were important factors affecting total ATRS scores. Hartman et al.^[35] reported that while the incidence of ATR is higher in men, functional outcomes tend to be worse in women. They also identified female gender as an independent risk factor for postoperative complications and the need for revision surgery. Another study examining sex-specific differences in the morphological and mechanical properties of the AT found that men had greater AT length, thickness, and cross-sectional area, suggesting they may be subjected to higher biomechanical loads during daily activities.^[36] In the current study, when clinical data were evaluated according to sex, no statistically significant differences were found in age, BMI, smoking status, side of injury, muscle strength, ROM limitation, or KFP thickness. However, seven female patients (35%) developed wound site complications, a significantly higher rate compared to the male group. Additionally, AT thickness on the operated side was significantly lower in female patients than in male patients, while AT thickness on the contralateral side was similar between sexes. When ATRS, FAOS, and VAS scores were compared by sex, no statistically significant differences were observed between the groups. This may be attributed

to the small sample size and the relatively short follow-up period in the current study.

Following ATR surgical repair, changes in the morphological structure and dimensions of the AT may occur. During the early proliferative recovery phase, a callus forms to stabilize the ruptured area.^[37] In addition to callus size, tendon length also affects the recovery process.^[38,39] Heikkinen et al.^[10] reported that after surgery for AATR, the AT on the treated side was, on average, 12 mm longer, and the mean volumes of both the soleus and gastrocnemius muscles were reduced. Similarly, Zhu et al.,^[11] in their study comparing functional performance and tendon morphology after ATR surgery and conservative treatment, found that tendon length and thickness were greater on the affected side. In the current study, the thickness of the operated AT was 15.54±2.89 mm, while the contralateral AT thickness was 14.58±2.28 mm. This difference was statistically significant and is consistent with the findings in the literature. The increased thickness may be attributed to the use of non-absorbable sutures during surgical repair and the formation of fibrotic tissue during tendon healing.

KFP is a mass of fat tissue located within Kager's triangle.^[12] It is believed to help stabilize and protect the mechanical function of the ankle joint. Due to its close anatomical relationship with the AT, KFP may be affected by traumatic changes in the central portion of the tendon.^[40] A study by Cetti and Andersen found positive KFP finding on lateral ankle radiographs in all patients with ATR confirmed by surgery.^[41] In

another study, Pingel et al.^[42] identified gene level KFP related to Achilles tendinopathy. In the current study, the mean KFP thickness on the operated side was 8.42 ± 2.99 mm, compared to 6.32 ± 2.67 mm on the contralateral side. This difference was statistically significant, with the operated side showing greater thickness.

Several studies have emphasized that the choice of suture material (absorbable vs. non-absorbable) can influence complication rates. Feeley et al.^[43] reported a significantly higher rate of wound complications in patients who received non-absorbable sutures. The Krackow suture technique carries the risk of disrupting vascularity due to the excess number of knots;^[13] however, it provides a strong repair in terms of resistance and may lead to further elongation of the AT.^[44] In our clinic, we use the Krackow suture technique with non-absorbable materials for open surgical repairs. In the current study, eight patients (19%) developed wound site problems, and in two of these cases, skin irritation was attributed to the non-absorbable suture material. These patients underwent reoperation, during which the sutures were replaced with absorbable material, and no further complications were observed during follow-up.

Various scoring systems, such as the ATRS and FAOS, are used to evaluate functional outcomes following ATR. Saab et al.^[45] compared the functional outcomes of surgical and conservative treatments in 405 ATR patients after one year of follow-up. The surgical group had significantly higher ATRS scores, which were reported to reflect improved clinical outcomes. Another recent study assessed functional outcomes with a minimum three-year follow-up for both surgical and conservative treatments. Although higher FAOS scores were observed in the surgical group, the difference was not statistically significant.^[11] In the current study, consistent with the literature, higher ATRS and FAOS scores were associated with better functional outcomes. Based on our data, correlation analysis between ATRS, FAOS, VAS, KFP thickness, and AT thickness revealed a strong positive correlation between ATRS and FAOS, and a high-level negative correlation between VAS and both ATRS and FAOS. The main focus of the current study, AT and KFP thickness, showed a moderate negative correlation with ATRS and FAOS, and a moderate positive correlation with VAS.

The current study has several limitations. It was retrospective, had a small sample size, and a relatively short follow-up period. Since outcomes were assessed by a single orthopedist, intraobserver or interobserver assessments could not be performed. Only mid-term outcomes were included. Additionally, ultrasonography was used as the measurement method, the results of which are largely influenced by the examiner's subjective judgment.

CONCLUSION

A moderate negative correlation was observed between the

thickness of the AT and KFP and the ATRS and FAOS scores; however, no significant direct impact on clinical outcomes was identified. ATRS and FAOS scores following open surgical repair of AATR were found to correlate both with each other and with functional outcomes. Despite its specific complications, the AATR open surgical method remains an effective treatment option for patients eligible for surgery. Functional outcomes can be reliably assessed using the ATRS and FAOS scoring systems.

Ethics Committee Approval: This study was approved by the Afyonkarahisar Health Sciences University Clinical Research Ethics Committee Ethics Committee (Date: 02.04.2021, Decision No: 2011-KAEK-2).

Peer-review: Externally peer-reviewed.

Authorship Contributions: Concept: B.K.Y., C.T.I., M.Y.; Design: M.Y., O.O.; Supervision: B.K.Y., C.T.I.; Resource: B.K.Y., C.T.I.; Materials: F.K., B.K.Y., C.T.I.; Data collection and/or processing: B.K.Y., C.T.I., F.K.; Analysis and/or interpretation: B.K.Y., F.K.; Literature review: B.K.Y.; Writing: B.K.Y.; Critical review: B.K.Y., O.O.

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ORİJİNAL ÇALIŞMA - ÖZ

Akut aşil tendon rüptürü açık cerrahi onarımı sonrasında Aşil tendon kalınlığı ve Kager yağ yastığı kalınlığının klinik ve fonksiyonel sonuçlar üzerindeki etkisi

AMAÇ: Akut Aşil tendon rüptürleri (ATR) günümüzde en sık görülen spor yaralanmaları arasındadır. Mevcut çalışmanın amacı, açık cerrahi onarımla tedavi edilen akut ATR hastalarında Aşil tendon (AT) ve Kager's yağ yastığı (KFP) kalınlıklarının aşil tendon rüptür skoru (ATRS) ve ayak-ayak bileği sonuç skoru (FAOS) ile klinik ve fonksiyonel sonuçlar arasındaki korelasyonunu değerlendirmektir.

GEREÇ VE YÖNTEM: Retrospektif çalışmaya Ocak 2017 - Aralık 2021 tarihleri arasında kurumumuzda akut ATR nedeniyle ameliyat edilen 42 hasta dahil edildi. Tüm hastalar açık cerrahi Krackow tekniği ile tedavi edildi. ATRS, FAOS, vizüel analog skala (VAS) ameliyat sonrası birinci yılda elde edildi. AT ve KFP kalınlıkları birinci yılda bağımsız bir radyolog tarafından ultrasonografi ile ölçüldü.

BULGULAR: Hastaların yaş ortalaması 45.38 ± 9.68 yıl olup 22 hasta erkekti (%52.4). Ortalama ATRS skoru 65.17 ± 24.46 , ortalama FAOS skoru 76.14 ± 16.75 ve ortalama VAS skoru 3.02 ± 1.44 olarak bulundu. Ameliyat edilen taraftaki ortalama AT kalınlığı 15.54 ± 2.89 mm iken, karşı tarafta 14.58 ± 2.28 mm idi ($p=0.009$). Ameliyat edilen taraftaki ortalama KFP kalınlığı 8.42 ± 2.99 mm iken, karşı tarafta 6.32 ± 2.67 mm idi ($p=0.005$). ATRS ile FAOS arasında güçlü korelasyon bulundu ($r=0.742$, $p<0.001$). AT kalınlığı için ATRS ve FAOS ile orta düzeyde negatif korelasyonlar vardı (sırasıyla, $r=-0.544$ $p=0.013$, $r=-0.451$, $p=0.003$). KFP kalınlığı için ATRS ile orta düzeyde negatif korelasyon vardı (sırasıyla, $r=-0.506$, $p=0.001$).

SONUÇ: AT ve KFP kalınlıklarının ATRS ve FAOS üzerine belirgin etkisi görülmedi. Akut ATR açık cerrahi onarımından sonra ATRS ve FAOS skorları hem birbirleriyle hem de fonksiyonel sonuçlarla ilişkilidir. Akut ATR açık cerrahi yöntemi, spesifik komplikasyonlarına rağmen, açık cerrahiye uygun hastalar için etkili bir seçenektir.

Anahtar sözcükler: Aşil tendon; Kager's yağ yastığı; kalınlık; rüptür.

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