



## Correlation Between Clinical and Radiographic presentations in Patients with Insertional Achilles Tendinitis, 2019

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### Abstract

**Background:** Disorders of the Achilles tendon can occur in adolescents and adults and include both traumatic and non-traumatic problems such as insertional tendinitis, intra-substance tendinopathy, complete rupture. Insertional tendinitis radiographically present as Huglund's deformity, posterior calcaneal spur and retro-calcaneal calcification. Diagnosed based on history clinical examination to radiography.

**Objectives:** to correlated between clinical and radiographically finding in patents with insertional Achilles tendonitis.

**Methodology:** This study is a descriptive cross-sectional hospital-based study conducted in Khartoum state, Sudan. The study was total coverage, data collected questionnaire and patents' X-rays were studied.

**Results:** A total of 25 patients and 30 feet was studied most of them were within age group (41-60) representing 53.3% and 14 were female representing 46.7%. concerning the severity 12 case were severe (40%), 13 were moderate (43.3%) and 5 cases were mild in their presentation with 16.7% of total cases. 8 cases (mild) had posterior calcaneal spur (26.7%), 10 cases (4 mild, 4 moderate and 2 sever) had patchy calcification (33.3%), 8 cases (severe disease) had both spur and Huglund's deformity and calcification. The relation between the severity of the Insertional Achilles Tendinitis and the radiographic finding was found to be statistically significant (p-value less than 0.05).

**Conclusion and Recommendations:** Our study concluded that there is significant correlation between radiographic and clinical presentation but this correlation is weak. Based on this finding X-rays alone is not valid method for diagnosis and severity determination of Achilles tendonitis. Our study was done on a short period so a recommendation to be done over long duration, in order to involve more cases. Also we recommend that the size and the length of posterior calcaneal prominence taking in consideration over is presence or absence. And the study group must be matched to the control group for more accurate and reliable results.

**Keywords:** Clinical; Radiographic; Patients; Insertional Achilles Tendinitis

## Introduction

Disorders of the Achilles tendon can occur in adolescents and adults, and include both traumatic and non-traumatic problems, such as insertional tendinitis, intra-substance tendinopathy, and complete rupture. Paratenonitis and retro-calcaneal bursitis are one of the differential diagnosis of pain around the Achilles tendon. Symptoms include swelling and pain in the posterior aspect of the ankle or heel [1].

Traditionally, numerous terms have been used to define a description, including tendinitis, tendinosis, and Paratenonitis. However, recent histopathological researches illuminate that those diseases as an outcome of a failed healing response, which may cause degenerative changes in the tendon [2].

Achilles tendinitis is a frequent problem. It is a multifactorial syndrome. With an anatomical vibrational characteristic along with biomechanical variations which can lead to developing a problem with the Achilles tendon. Excessive mileage, improper training techniques, and inadequate footwear have been implicated as the causes of Achilles tendinitis [3].

## Problem statement

Insertional Achilles tendinitis is clinical diagnosis which confirmed using ultrasonography, MRI and X-ray which occasionally shows presence of Bony spur, Haglund's deformity, and posterior calcification in the posterior calcaneal portion which is proposed to correlate with the severity of the condition.

## Research hypothesis

Severity of Achilles tendinitis correlates with extent of posterior calcaneal involvement that appear as posterior calcaneal spur, postero-superior projection or retro-calcaneal calcification.

## Research question

Dose the presence or absence of calcaneal bony spur, Haglund's deformity or posterior calcification on lateral foot X-ray correlate with the severity of Achilles tendinitis.

## Justification

Using this study to figure out any correlation between the radiographic finding in plain X ray and the clinical picture of the patient

with Achilles tendinitis if the result is satisfactory so it is better to use plain radiograph because of easy accessibility and low cost for the patient.

## Material and Methods

### Study design

Our study design is descriptive cross-sectional hospital-based study.

### Study area

This study was conducted at Bashaer University Hospital.

### Study population

All patients diagnosed as a case of insertional Achilles tendinitis during the time of study.

### Inclusion criteria

- The inclusion criteria for the study composed of patients at least 18 years old with a diagnosis of insertional Achilles tendinitis.
- Diagnosis was made by the senior author based on his clinical examination as well as radiographic review.

## Sampling

### Sampling technique

Because of insufficient literature and records regarding patient number a total coverage technique is used.

All subjects were informed about their right to abstain from participation in the current study and their option of withdrawing to participation at any time without reprisal.

No information revealing the identity of any patient was included in the closing report or any means of communication was prepared in the course of the research.

### Sample size

All patients diagnosed with Insertional Achilles Tendonitis in the mentioned period were included in this study, Sample size is 25 case and 30 involved foot.

### Data collection methods and tools

all patient were asked using VISA-A questionnaire (score out of 100 where 0 is the worst and 100 is the best) to determine their functional score and pain to determine the severity of condition, to do that we assume that patient with score less than 40 is sever ,40-60 is moderate and more than 60 is mild based on clinical observation of senior treating doctor<sup>(16)</sup> Then lateral foot X ray evaluated for presence or absence posterior calcaneal spur, Haglund's deformity or posterior calcification. The questionnaire records demographical parameters (age, gender, and occupation), and involved side.

### Data analysis

Data was analyzed using Statistical Package of Social Sciences (SPSS 25). The data obtained were analyzed statistically by computing descriptive statistics: Mean, frequency tables, charts, percentages, cross tabulation, Pearson's and correlation coefficients<sup>(17)</sup>, and chi square test, the difference at value of  $P < 0.05$  considered as significant.

### Ethical consideration

- Ethical clearance from the ethical committee of the Sudan Medical Specialization Board Council of Orthopedics and traumatology will was obtained.
- Official agreement from the general directors of Bashaer teaching Hospital specialized hospital was assured preceding the conduction of the study.
- Verbal and written consent, which stated the purpose of the study, was taken from all participants in the study.
- Each potential subject participating in current study was thoroughly informed about aims, methods, the anticipated benefits of the study and the discomfort it may entail.

### Result

A total of 25 patients and 30 feet was studied to determine any correlation between clinical presentation and radiographic findings in lateral foot weight bearing X-ray. 11 case was found to be within age group (18-40) representing 36.7%, 12 was lie within age group (41-60) representing 40% and 7 cases was found to be within age group (61-80) which represents 23.3%. (Table 1).

Regarding sex distribution 16 was males representing 53.3% and 14 were female representing 46.7%. (Figure 1).

Side affected was equally distributed with total of 15 right side and 15 left side with 50% for each one. (Figure 2).

Concerning severity 12 case was sever (40%) ,13 was moderate (43.3%) and 5 cases was mild representing 16.7% (16). (Table 2).

Radiographic finding were found to be as fallow: 8 cases had posterior calcaneal spur (26.7%), 10 cases had patchy calcification (33.3%), 8 cases had both spur and Haglund's deformity (26.7%), 2cases (6.7%) had spur. Haglund's deformity and calcification, 1case (3.3%) had Haglund's deformity and calcification and 1 case (3.3%) with no X-ray findings. (Figure 3).

Cross tabulation of radiographic finding with clinical presentation reveals that there were 8 cases with calcaneal spur with mild disease. (Table 3).

10 cases with retro-calcaneal calcification 4 of them with mild disease whereas 4 with moderate disease and 2 with sever presentation. (Table 3).

8 cases present with Huglund's deformity and spur and they present as sever disease. (Table 3).

2 cases present with spur, Haglund's deformity and retro-calcaneal calcification present as sever disease. (Table 3).

One case shows Haglund's deformity and retro-calcaneal calcification with clinical moderate severity presentation. (Table 3).

One case with no detectable radiographic sign present with mild disease. (Table 3).

The relation between severity of Achilles tendinitis (visa-A score) and radiographic finding was found to be statistically significant (p-value less than .05). (Table 4).

Correlation between the two variables (visa-a score and radiographic finding) found to be weak using Pearson's and Spearman's correlation coefficients. (Table 5).

| Age   | Frequency | Percent |
|-------|-----------|---------|
| 18-40 | 11        | 36.7    |
| 41-60 | 12        | 40.0    |
| 61-80 | 7         | 23.3    |
| Total | 30        | 100.0   |

Table 1: Age groups of the participants in the study.

| Visa-a-score | Frequency | Percent |
|--------------|-----------|---------|
| Moderate     | 5         | 16.7    |
| Sever        | 13        | 43.3    |
| Total        | 12        | 40.0    |
|              | 30        | 100.0   |

Table 2: Clinical presentation (visa-a-score) - pain.

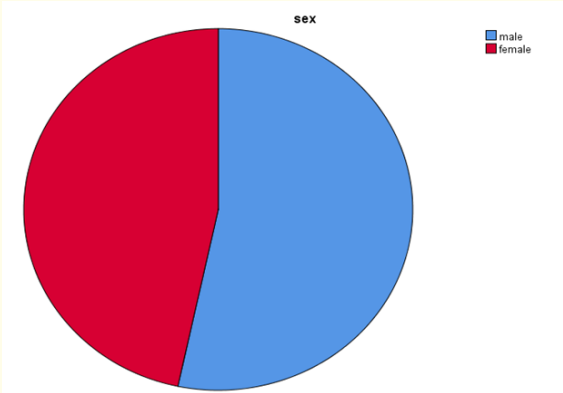


Figure 1: Gender distribution of study population.

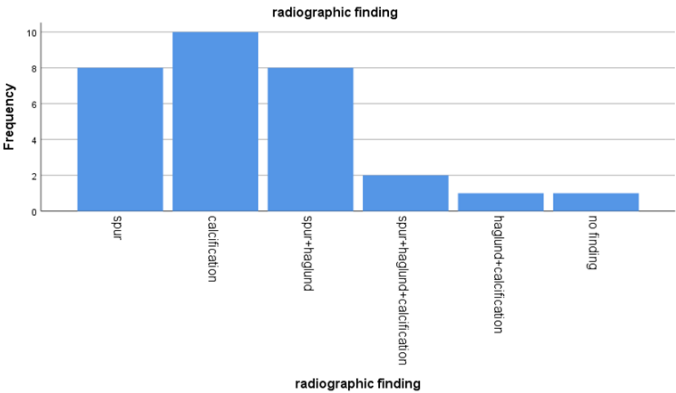


Figure 3: Radiographic presentation of patients with insertional Achilles tendonitis.

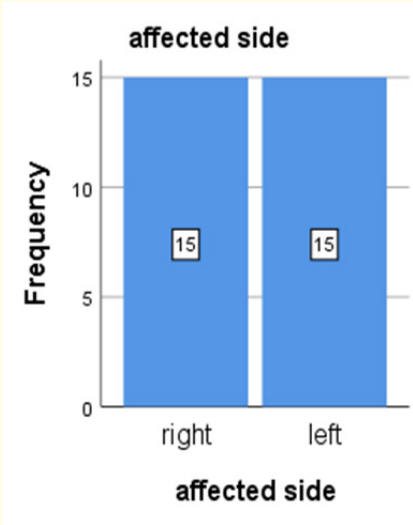


Figure 2: The Affected side of the patients with Achilles tendonitis.

| visa A score * radiographic finding Cross-tabulation |      |               |                |                                |                         |
|--|------|---------------|----------------|--------------------------------|-------------------------|
| visa A scores  | spur | Calcification | Spur + Haglund | Spur + Haglund + calcification | Haglund + calcification |
| sever  | 0    | 2             | 8              | 2                              | 0                       |
| moderate   | 8    | 4             | 0              | 0                              | 1                       |
| mild   | 0    | 4             | 0              | 0                              | 0                       |
| Total  | 8    | 10            | 8              | 2                              | 1                       |

Table 3: Cross-tabulation of Visa-A-score versus radiographic finding.

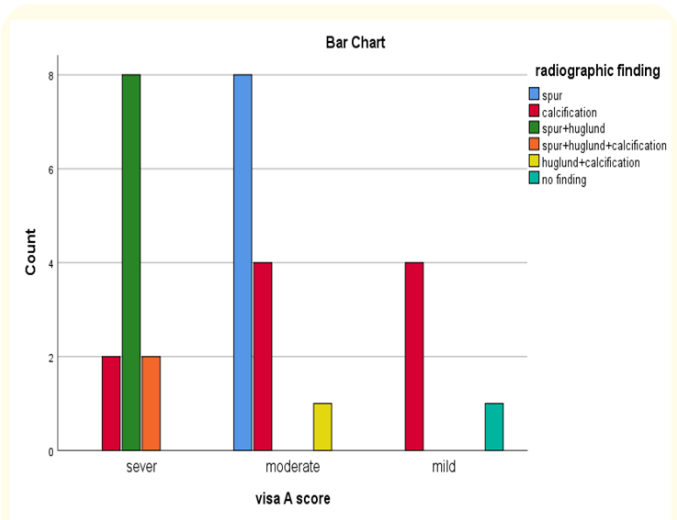


Figure 4: visa-A score versus radiographic presentation of patient with insertional Achilles tendonitis.

| Chi-Square Tests   |                     |    |                                   |
|--------------------|---------------------|----|-----------------------------------|
|                    | Value               | Df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 36.062 <sup>a</sup> | 10 | .000                              |
| N of Valid Cases   | 30                  |    |                                   |

Table 4: Chi square Tests.

| Correlations         |                     |                      |              |
|----------------------|---------------------|----------------------|--------------|
|                      |                     | radiographic finding | visa A score |
| radiographic finding | Pearson Correlation | 1                    | .218         |
|                      | Sig. (2-tailed)     |                      | .246         |
|                      | N                   | 30                   | 30           |
| visa A score         | Pearson Correlation | .218                 | 1            |
|                      | Sig. (2-tailed)     | .246                 |              |
|                      | N                   | 30                   | 30           |

Table 5: Pearson correlation.

Discussion

Disorders of the Achilles tendon can occur in adolescents and adults, and include both traumatic and non-traumatic problems, such as insertional tendinitis, intra- substance tendinopathy, and complete rupture.

Morris and colleagues classified retro-calcaneal spurs according to their location, the most common spur, classified as type 1 was described as a true extension of mature calcaneal bone projecting off the posterior calcaneus. Type 2 spurs were defined as separate calcifications within soft tissue 0.5 to 3 cm above the Achilles insertion and were often linear or ovoid. Type 3 spurs were described as calcifications within soft tissue and were found from 3 to 12 cm above the Achilles insertion. These were the least common type [18].

Insertional Achilles tendonitis is spectrum of disorders including Haglund’s deformity, posterior calcaneal spur and retro-calcaneal calcification.

Each of this disorder associated with specific radiographic presentation, in this study a total of 25 patients (30 feet) with established diagnosis of IAT were studied to assess the correlation between clinical presentation and radiographic picture using lateral foot weight bearing X-ray.

Majority of cases studied were lie within age group (41-60 years) with approximately equal sex distribution and in half of them right foot involved and the other half left side involved.

Greater number of cases involved was presented with moderate to severe disease.

Almost all patient presented radiographic features of both Haglund’s deformity and posterior calcaneal spur had moderate clinical picture, whereas patient shows spur alone are presented as moderate disease. This finding going with study by Chimenti., *et al.* [6] demonstrated that insertional Achilles spurs appear to be more common in patients with IAT (65%-80%) than people without foot pain (25%-35%).

All patients presented with; Haglund’s deformity, spur and calcification; or with Haglund’s deformity plus spur had severe clinical presentation, whereas patient in whom there were no radiographic finding are presented with mild disease, there were no patient with Haglund’s deformity alone with any clinical presentation.

this is going with study conducted by Cheng-Chang Lu., *et al.* [19] In their series, the posterior calcaneal step spur and Achilles tendon calcification were both statistically significantly higher in symptomatic patients than the Control group (56.8% compared to 5%,  $p < 0.001$ ) and (78.4% compared to 12.5%,  $p < 0.001$ ), respectively.

In the study by Fiamengo., *et al.* [20] the occurrences of Achilles tendon calcification and posterior calcaneal step spurs were eight ( $p = 0.004$ ) and 9.2 ( $p < 0.001$ ) times higher in patients with chronic posterior heel pain compared to those without heel pain.

### Limitations

The short duration of this study and lack of cases were the major limitations.

This study doesn't take in account patient factors like weight, comorbidities and foot anatomical variance of calcaneus and Achilles tendon which influences the final results.

### Conclusion

After determining the radiographic finding on lateral foot X-ray and measuring visa-a score as index of clinical severity, our study concluded that there is a signification correlation between radiographic and clinical presentation ( $p$ -value=0.01), but this correlation is weak (Pearson Correlation .218).

Based on this finding X-ray alone is not a valid option for diagnosis and severity determination of Achilles tendonitis.

X-ray should be used for assessing the severity of disease and to exclude other serious conditions and not used for diagnosis.

### Recommendation

This study done over relatively short period of time so we recommend to be done over long duration to involve more cases.

We recommend that this study should be conducted taking in consideration size and length of posterior calcaneal bony prominence rather than presence or absence.

The study group must be matched to control group for more accurate and reliable.

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