Association of Achilles Tendinopathy and Plantar Spurs

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Abstract

Plantar spurs and Achilles tendinopathy are common causes of heel pain. In the authors’ practice, it was anecdotally noted that patients with Achilles tendinopathy often presented with plantar spurs. Nonetheless, there is a shortage of studies investigating whether Achilles tendinopathy and plantar spurs exist concomitantly. A better understanding of the association between the 2 pathologies might help physicians recognize and treat both conditions, educate patients about Achilles tendinopathy and plantar spurs, and ultimately investigate possible underlying causes of both pathologies that could be addressed together. The authors examined the prevalence of plantar spurs in patients diagnosed with Achilles tendinopathy as well as demographic differences within the unilateral and bilateral Achilles tendinopathy populations. A total of 785 patient records were retrospectively reviewed. Mean patient age was 56.2±15.5 years (46.9% men and 53.1% women). Seventy-two (9.2%) patients were affected bilaterally by Achilles tendinopathy. Lateral radiographs were reviewed by an orthopedic surgeon to identify the presence of plantar spurs. A total of 329 (41.9%) patients with Achilles tendinopathy were found to have a concomitant plantar spur. Patients with unilateral Achilles tendinopathy and a plantar spur were more likely to be women (58.7% vs 49.8%, \( P = .020 \)) and older (62.7 vs 51.7 years, \( P < .001 \)). In the bilateral Achilles tendinopathy group, there were 46 (63.9%) patients with at least one foot presenting with a plantar spur. The study’s findings suggest a significant association between Achilles tendinopathy and plantar spurs. Older women with Achilles tendinopathy are at greater risk of being affected by plantar spurs.
Achilles tendinopathy is a common cause of heel pain and is described to occur more frequently in middle-aged men.\textsuperscript{1,2} It affects up to 18% of professional and recreational athletes, although it has recently been reported that one-third of patients with chronic Achilles tendinopathy are not physically active and that physical activity does not correlate with histopathological findings of the Achilles tendon.\textsuperscript{1,3,4} Menz et al\textsuperscript{5} studied the prevalence of plantar spurs in 216 individuals who were taking part in a larger study of the effect of osteoarthritis on balance and falls. Participants were recruited from either a retirement community or a university clinic in Australia. Fifty-five percent of patients had radiographic evidence of plantar spurs; of these, 56% had an Achilles tendon spur and 40% experienced current or previous heel pain. Whether the heel pain was related to either insertional or non-insertional tendinopathy was not assessed.

In the current authors’ practice, it was anecdotally noted that patients with Achilles tendinopathy often presented with plantar spurs. Nonetheless, there is a shortage of studies investigating whether Achilles tendinopathy and plantar spurs exist concomitantly. A better understanding of the association between the 2 pathologies might help the physician to recognize and treat both conditions, educate patients about Achilles tendinopathy and plantar spurs, and ultimately investigate possible underlying causes of both pathologies that could be addressed together. Therefore, the goals of the current study were to (1) assess the prevalence of plantar spurs in patients diagnosed with Achilles tendinopathy, (2) assess age and sex differences between patients with unilateral Achilles tendinopathy presenting with plantar spurs, and (3) calculate the rate of bilateral vs unilateral plantar spurs in patients with bilateral Achilles tendinopathy.

**MATERIALS AND METHODS**

After institutional review board approval, the authors retrospectively reviewed patients from the Foot and Ankle Registry at their institution between March 2006 and November 2012. The *International Classification of Diseases, 9th Revision* (ICD-9) codes used to identify patients with a diagnosis of Achilles tendinopathy were 726.71 (Achilles bursitis or tendinitis) and 726.73 (Achilles tendonitis, calcaneal bursitis/Haglund’s disease). Any patient was eligible for inclusion, regardless of the type of treatment (conservative vs surgical). Eighty patients without a lateral foot radiograph archived in the institution’s digital imaging server were excluded from the study. Data regarding age and sex were collected for each patient. A total of 785 patients were included in the study. Mean patient age was 56.2±15.5 years (range, 8-92 years). Of this cohort, 368 (46.9%) were men and 417 (53.1%) were women. Seventy-two (9.2%) patients were affected by bilateral Achilles tendinopathy.

All lateral radiographs were reviewed on a picture archiving and communication system by a single orthopedic surgeon to identify plantar spurs. Patients were classified as having a bone spur only if it was grossly visible without magnification on the standard lateral radiograph.

Descriptive statistics were calculated to examine the relationship of patient-level characteristics to Achilles tendinosis type (unilateral or bilateral) and plantar spur status. Bilateral patients having plantar spurs in at least 1 foot were classified as positive for plantar spurs. Age was analyzed as a continuous variable using the *t* test. The categorical variables of sex, diagnosis, and plantar spur status were evaluated using the chi-square test. All analyses were performed with SAS version 9.2 software (SAS Institute, Cary, North Carolina).

**RESULTS**

In all, 329 (41.9%) patients with either unilateral or bilateral Achilles tendinopathy presented with plantar spurs (Table 1). There was no significant sex difference between patients with unilateral and bilateral Achilles tendinopathy (53.3% vs 51.4% women, respectively, and 46.7% vs 48.6% men, respectively; *P*=.757). There was no significant age difference between patients with unilateral and bilateral Achilles tendinopathy (56.1 vs 58.3 years, respectively; *P*=.252). Patients with unilateral Achilles tendinopathy with plantar spurs were more likely to be women (58.7% vs 49.8%, *P*=.020) and to be older than patients without plantar spurs (62.7 vs 51.7 years, *P*<.001) (Table 2).

![Table 1](https://orthopedics.healio.com/orthopedics/article-attachment/567845762)
had plantar spurs. Five (10.9%) of these 46 patients had a plantar spur in only 1 foot, and 41 (89.1%) patients had bilateral plantar spurs (Table 3). Compared with the unilateral Achilles tendinopathy group with evidence of plantar spurs, there was a significantly increased number of patients with bilateral Achilles tendinopathy with at least 1 plantar spur (41.9% vs 63.9%, respectively; \( P = .001 \)) (Table 1). Patient age and female sex did not significantly differ between patients with bilateral Achilles tendinopathy with no plantar spurs and those with at least 1 foot with a plantar spur (\( P = .080 \) and .100, respectively) (Table 3).

**DISCUSSION**

Currently, there is limited evidence connecting Achilles tendinopathy and plantar spurs. Menz et al\(^5\) observed high incidences of plantar spurs and posterior calcaneal spurs in 216 elderly patients recruited in a larger study of the effect of osteoarthritis on balance and falls. They found that calcaneal spurs were significantly associated with obesity, osteoarthritis, and current or previous heel pain, despite the fact that 61% of patients with spurs were asymptomatic. However, the authors did not specifically assess the relationship between Achilles tendinopathy and plantar spurs. Furthermore, they focused their study on an elderly population. Given these findings, the current authors aimed to evaluate the association of Achilles tendinopathy and plantar spurs in a large cohort from a broader age group.

In their cohort of 785 individuals affected by Achilles tendinopathy, the authors found plantar spurs in 41.9% of patients. This rate is much higher than the 11% in the general population reported by other authors.\(^6\) Specifically, Riepert et al\(^6\) studied 1027 ankle radiographs in a White European population, with plantar spurs being found on 11.2% of radiographs. They observed that the prevalence of plantar spurs increased with increasing age and were more common in women than in men. Riepert et al\(^6\) did not assess concomitant Achilles tendinopathy.

The large incidence of plantar spurs in patients with Achilles tendinopathy suggests a common cause for both pathologies, such as obesity, diabetes mellitus, excessive running, pes cavus, and gastrocnemius tightness.\(^7-11\) Moreover, an anatomical connection between the Achilles tendon and the plantar fascia, which may be responsible for stress transfers from one structure to another, has been described in cadaver studies.\(^12\) Calf tightness biomechanically increases tension in the Achilles tendon and plantar fascia, which may cause Achilles tendinopathy and plantar spurs. It is not surprising that Achilles tendinopathy and heel pain related to plantar spurs also share similar conservative and surgical treatments, such as eccentric calf stretching and gastrocnemius recession, respectively.\(^13,14\)

Plantar spurs may be the radiographic evidence of a history of plantar fasciitis.\(^15\) The latter has been reported to range from 11% to 16% in younger populations and from 50% to 72% in older patients.\(^16-19\) These data refer to patients with plantar fasciitis, whose extent of correlation with plantar spurs is not fully understood. Nonetheless, it could be argued that the high incidence of plantar spurs seen in older patients who do not necessarily re-
port plantar fasciitis may be unrelated to Achilles tendinopathy. However, the current authors found plantar spurs to be more common in patients with bilateral vs unilateral Achilles tendinopathy. This suggests that plantar spurs are related to Achilles tendinopathy itself and/or to its severity. A possible explanation is a common etiology such as bilateral calf tightness increasing forces in both bilateral Achilles tendons and plantar fascias.

The current authors found women with unilateral Achilles tendinopathy to be significantly more affected by plantar spurs than men (58.7% vs 41.3%, respectively). The literature is divided in this regard: some authors observed no difference in the incidence of plantar spurs between men and women whereas others reported a greater incidence in women than in men and a higher incidence in men.

Patients with unilateral Achilles tendinopathy and plantar spurs were found to be significantly older than individuals without plantar spurs (62.7 vs 51.7 years, respectively). This result is consistent with other studies reporting greater incidences of plantar spurs with increasing age. The association between increasing age and development of plantar spurs/ Achilles tendinopathy could be related to higher rates of systemic diseases (eg, diabetes mellitus), hormonal changes in postmenopausal women known to negatively affect connective tissue elasticity, higher rates of osteoarthritis that have been associated with the development of plantar spurs, and increased risk of being obese.

Patients with bilateral Achilles tendinopathy were much more likely to have plantar spurs compared with their counterparts with unilateral Achilles tendinopathy (63.9% vs 41.9%, respectively). Literature comparing the incidence of bilateral vs unilateral plantar spurs is lacking. Bassiouni reported bilateral plantar spurs in more than 92% of patients with osteoarthritis (any location) and rheumatoid arthritis. The current authors’ registry does not contain data such as body mass index or other comorbidities that might help explain the authors’ findings. The authors could speculate that patients with bilateral Achilles tendinopathy are more likely to be obese or diabetic, thereby affecting the incidence of plantar spurs. Obesity and lack of protective sensation from diabetic neuropathy also increase forces in both the Achilles tendon and the plantar fascia, especially if calf tightness is also present. This could result in abnormal distribution of plantar pressure and thus overload of the plantar fascia. Patients with bilateral Achilles tendinopathy with or without plantar spurs did not significantly differ by age or sex, which could further support the hypothesis that other factors (eg, mechanical, systemic) contributed to the development of plantar spurs in the authors’ patient cohort (Table 3).

The current study has several limitations. First, it does not report on body mass index or any other comorbidity (eg, rheumatoid arthritis, diabetes mellitus, hypertension, foot deformity, calf tightness), which could affect the incidence of or association between Achilles tendinopathy and plantar spurs. Second, the authors had no information regarding the clinical presentation associated with plantar spurs. Despite a recent study by Johal and Milner, which found a strong association between plantar fasciitis and plantar spurs, it is possible to encounter patients with plantar fasciitis without a plantar spur and patients with plantar spurs who are asymptomatic (ie, clinically do not have plantar fasciitis).

More detailed clinical and radiographic data would have helped correctly allocate patients into the most appropriate groups. Finally, ICD-9 codes cannot distinguish between insertional Achilles tendinopathy, noninsertional Achilles tendinopathy, and retrocalcaneal bursitis. It would have been interesting to further evaluate associations, if any, between obesity, neuropathy, and calf tightness and distinct types of Achilles tendinopathies and plantar spurs.

**Conclusion**

The current study shows a notable association between Achilles tendinopathy and plantar spurs and is one of the largest available in the literature. Older women with Achilles tendinopathy were more likely to have plantar spurs. This association may be related to systemic factors (eg, obesity, diabetes mellitus, hormonal changes) and/or anatomical-mechanical factors (eg, over-pulling by a tight gastrocnemius muscle or Achilles tendon). The study results do not allow for the identification of a causal effect between the studied pathologies; however, this should be evaluated in future prospective studies. Patients presenting with Achilles tendinopathy should be also evaluated for the presence of plantar spurs and, in light of the potential association of the latter with plantar fasciitis, for disorders of the plantar fascia. In addition, although it was not the methodology used in this study, patients with a radiographic finding of plantar spurs should also be clinically assessed for Achilles tendinopathy. This could result in an earlier detection of Achilles tendon conditions.

**References**