INTRODUCTION

The Achilles tendon rupture in general population is reported to be 0.02%, two-third being associated with sporting activities and less than 1% bilateral.1 The major risk factors for bilateral Achilles tendon rupture are corticosteroid and fluoroquinolones (ciprofloxacin, ofloxacin, pflloxacin, levofloxacin) therapy, which is frequently reported.1-4 Local steroid injections can increase the risk by several folds.

Bilateral Achilles tendon rupture is an extremely rare injury, especially in a young patient without underlying disease or predisposing factors. Bilateral ruptures of major tendons in healthy subjects only follow intensive or maximal jumping and squatting. The number of athlete and healthy people with heel pain or Achilles tendon injury, seen by physician, has risen in recent years. This is due to increasing participation of adult population in running and jumping sports. Training pattern, especially vigorous training without adequate rest and the nature of the training surface plays important role in acute injuries in athletes.5

We report 2 cases, one bilateral and one unilateral spontaneous Achilles tendon rupture, in patients who did not sustain any vigorous trauma. The patients were healthy and none of the predisposing factor mentioned above were identifiable in them.

CASE REPORT

Five lifeguards were exercising and running on the beach during their refresher course. Two of them, male aged 41 years and a female aged 43 years, complained of severe ankle pain and inability to bear weight while practising during course. They presented to the casualty with the male complaining of bilateral posterior heel pain and the female complaining of right-sided posterior heel pain. Both were unable to bear weight and planter flex the ankle. They denied any history suggestive of significant trauma and were healthy with no history of smoking, use of steroids or any other medication. No past history of chronic ankle or posterior heel pain was documented. On physical examination, Simmonds’ test was positive on all 3 ankles. The ultrasound evaluation revealed complete rupture of Achilles tendon in both patients with bilateral Achilles tendon rupture in the male and right-sided rupture in the female patient (Figure 1). Primary operative repairs were performed and tendons were found to be torn in the critical zone of 3-6 cm, proximal to the calcaneal tuberosity with intact tendon sheaths. Macroscopically, no necrosis, atrophy, abnormal fibre grouping or regeneration of tendons was evident. An end-to-end repair was done for each tendon and the usual postoperative protocol with an equines plaster was followed.

Postoperative period was uneventful. All 3 ankles with the help of graded physiotherapy achieved full ankle and knee movements with good muscles power. At routine follow-up, return to normal running, jumping and practise sports activity was achieved.
Bilateral Achilles tendon injury is rare but well-described in literature and relatively large volumes of case-based evidences are associated with predisposing factors. Spontaneous bilateral rupture in the absence of predisposing factors in healthy individuals are extremely rare. There were only few case reports to-date in English literature but all reported tendon rupture occurring secondary to risk factors.\(^1,6,7\) Most of those patients were professional gymnasts or sky divers and sustained significant trauma due to forceful dorsiflexion of ankle secondary to landing on tip toes or forefeet. The necessity of massive force to push off the floor by foot into a planter flexed position against the ground to enable the gymnast to gain enough height is described.\(^1,6\) Hayes et al. reported metasynchronous (i.e. very close in time but not spontaneous) rupture in the absence of predisposing factors.\(^5\)

The cases described in this report are unique as both patients were healthy. They neither sustained significant injury nor they had chronic Achilles tendinitis. The patients were running on the beach sand, which is usually uneven. The beach sand causes uneven forces to be transmitted across the ankles and the Achilles tendons during running. During normal walking, at the end of the stance phase, the muscle tension through the Achilles tendon is 250% of body weight. The biomechanical force analysis have demonstrated that during running, this tension across the Achilles tendon approaches 6-8 times body weight, which is close to the maximum strength of the tendon. During running, jumping and landing, Achilles tendon acts as a shock absorber due to its elastic recoil properties. Movement at subtalar joint also leads to transmission of forces across the tendons, particularly in hyperpronated or cavus foot. The malalignment due to hyperpronated or cavus foot greatly diminishes the shock absorbing capacity of the Achilles tendon. The uneven beach sand can easily cause malalignment of foot anytime during running. The transmission of massive forces across the Achilles tendon due to running and diminution of its shock absorbing capacity due to malalignment of foot particularly hyperpronation and cavus could be the reason for spontaneous rupture of Achilles tendons in these 2 healthy lifeguards.

In addition, overuse of tendons during the training may have also contributed to their rupture. Chronic overuse injuries of Achilles tendon are well-described in literature and these cause local hypoxia, less of nutrition, impaired metabolism and local inflammatory changes leading to tissue damage and chronic degeneration of the tendon that precedes its rupture.\(^6,9\) However, Maffulli et al. in their study involving muscle biopsies of the triceps surae did not find any muscle abnormality and concluded that muscle abnormality is not the significant factor in determining Achilles tendon rupture in healthy athletes.\(^10\)

Simultaneous bilateral Achilles tendon rupture is extremely rare in healthy athletes but this can happen even in the absence of history of significant trauma. Uneven forces across the ankles, Achilles tendons and malalignment of foot, due to running on uneven ground, cause massive transmission of force and loss of elastic recoil of the Achilles tendon. These could be the reasons for spontaneous rupture of tendon even without severe trauma. Acute overuse of tendon without adequate rest, causing fatigue of the tendon, might be a contributory factor. Therefore, athletes practicing on the beach sand should be forewarned about this risk. An appropriate diagnosis, followed by adequate treatment, can improve or eliminate most of these conditions. Even more importantly, a proper understanding of training environment, especially the nature of the ground or terrain, over which trainee practice, and the acute overuse problems are must. A proper knowledge of these would help the physicians, trainers and coaches to prevent these kinds of injury in trainees and athletes.

**REFERENCES**


