A 17 year old female athlete presented with Achilles tendinopathy. A protocol of water and land based rehabilitation was designed to achieve non-weight bearing and pain free activity, so that she could rapidly return to her event (400 m hurdles). After three weeks, she returned to regular training, and after a further three weeks she was able to compete at national level symptom free for the last 18 months.

The Achilles tendon is the largest and strongest tendon in the human body and experiences high loads in all sporting activities. It has been shown to have a high capacity to withstand tensional forces. Chronic painful conditions located in the Achilles tendon are relatively common, especially in runners. The cause of such conditions is not known, but they are often associated with repetitive loading and overuse. Achilles tendinopathy is difficult to treat. Most recommend a conservative regimen as the initial strategy. Non-surgical treatments include a combination of rest, anti-inflammatory drugs, correction of malalignments, and stretching and strengthening exercises.

There is sparse scientific evidence that these treatments are successful, and surgical treatment is required in about 25% of patients. In a recent prospective study, treatment with heavy load, eccentric calf muscle training showed very promising results and may reduce the need for surgical treatment of tendinopathy located in the midportion of the Achilles tendon. The short term results of surgery are often very good, but in the few studies with long term follow up there are signs of deterioration with time. In addition, over the last two decades there has been a considerable increase in the incidence of Achilles tendon rupture.

Many athletic trainers propose an active land based rehabilitation training programme for Achilles tendinopathy, which includes strength and stretching exercises and balance exercises on unstable boards. However, many physiotherapists and aquatic exercise specialists have been using water to treat conditions of the lower extremity for many years. They maintain that water is the ideal environment for the rehabilitation of injuries for which weight bearing needs to be limited. Range of motion (ROM), strength, and functional activities performed in deep water are used to prepare the limb for weight bearing. The combination of buoyancy induced skeletal unloading and muscular relaxation can enhance ROM and flexibility. Land based tasks should be initiated before the water programme is finished to facilitate a smooth transition from pool to land. Over the last two decades, many athletes have routinely exercised in the pool when recovering from injury.

This study focuses on a specific rehabilitation programme (combination of aquatic and land based exercises) prescribed for a young female runner with early stage Achilles tendinopathy.
During the third week (the late rehabilitation phase), the time spent on land-based exercises was increased and the amount of time spent in the pool was decreased. Impact exercises were initiated in the pool and progressed to land, first on grass and then to the traditional track and field surface. Passive and active stretching for the ankle and calf was performed. Over the next three weeks, the athlete started a progressive training programme in order to compete in the 400 m hurdle event. She won the race, achieving a new national record (61 seconds). She has had no further symptoms.

DISCUSSION

On initial presentation, the athlete was treated with anti-inflammatory drugs. Although the symptoms decreased, the Achilles tendinopathy was not resolved. Kader et al maintain that Achilles tendinitis is a degenerative, not an inflammatory, condition. Although the present case was an early stage of Achilles tendinopathy, it also was not an inflammatory condition.

In our case study, a water-based exercise programme was devised for the Achilles tendinopathy because it limits weight bearing using buoyancy. During the rehabilitation period, it is very important to protect the muscle-tendon unit from excessive torque or damaging vibrational forces. Premature loading of a damaged Achilles tendon can cause a number of adverse chemical, metabolic, and vascular changes. Rehabilitation progresses consistently when inflammation is kept to a minimum. Therefore, the aquatic rehabilitation programme provided the early initiation of specific exercises (strengthening, stretching, and balance exercises of the ankle joint) to prevent atrophy, motion loss, and abnormal movement pattern development.

The cardiovascular swimming programme had two positive effects. Firstly, it maintained the athlete’s cardiovascular condition, which is also an important aspect of early intervention. Secondly, as supported by many studies, it had positive effects on the healing tissues. These effects include increased blood flow and neurological stimulation, with minimisation of adjacent tissue weakness and adverse psychological effect. However, it is important that the athlete works within the constraints of his/her limitations.

Passive and active (later) stretching exercises were necessary to maintain normal gait and facilitate normal anthropokinematics of the ankle and calf. Both types of stretching can be performed in or out of the water.

The wobble board exercises are good for stimulating proprioception. Water is an ideal environment for proprioceptive training because of its viscosity. Viscosity provides a slow motion, three-dimensional resistive environment which facilitates proprioceptive feedback through functional movement patterns. This proprioceptive activity enables the athlete to incorporate safely advanced levels of dynamic stabilisation earlier in the rehabilitation schedule by decreasing both the demands of deceleration and joint excursion.

During the early phase (first week), static and isometric exercises were performed. Dynamic activity was contraindicated because of the joint compression, vibration, and torsional forces that accompany these techniques, resulting in increased pain and inflammation. The athlete in this study was able to perform mild dynamic exercises (second week) earlier in the pool because of minimisation of some of these forces in this environment. Concentric and eccentric loading in single and then multiple planes (late phase) encouraged normal gastrocnemius and soleus function.

CONCLUSION

Aquatic rehabilitative exercises for Achilles tendinopathy provide an opportunity for the athlete to train in a gravity minimised environment while being immersed in a resistive medium. The unloading is critical as rehabilitation time can be minimised because safe and functional rehabilitation can...
be started immediately. This can minimise the injury and reduce recovery time.

The aquatic and land based programme reported here offered an effective rehabilitation protocol for the female athlete. However, a case study does not allow generalisation of the conclusions. Further investigation is needed to estimate the effectiveness of this early intervention in achieving rapid return to unlimited activity.

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REFERENCES

Surfer wipe out by predator fish
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Needlefish injuries, commonly reported in the Indo-Pacific region, have not been previously reported along the European coastlines. This case report describes a penetrating injury to the heel of a professional surfer during competition off the Portuguese coast. Diagnostic as well as therapeutic recommendations are made.

Reports of hazardous marine animals have increased over the last two decades.1,2 Along the European seaboard, stingrays and catfish commonly cause penetrating injuries, but there are no reports of injury by needlefish. Human injuries by needlefish result from the ability of the fish to leap out of the water at high speed. Injury occurs by impalement of the needlefish beak. This produces a stab wound, often with the beak intact. Injuries by needlefish, especially among windsurfers, divers, and fisherman, have only been reported in New Caledonia, Papua-New Guinea, the Red Sea, and Hawaii.3,4 This case report describes a penetrating injury to the heel caused by a needlefish, which occurred during a professional surf contest in European waters. Management of the injury is discussed.

CASE REPORT
A 25 year old man presented to the emergency department of our hospital with persistent swelling and pain in his right heel. Two weeks before, while riding a wave in a professional competition off the coast in Portugal, he had suddenly felt a violent thump and pain in his right heel. The sharp pain and profuse bleeding caused him to be thrown off the wave and return to shore. On arrival in the Portuguese emergency ward, initial evaluation revealed a foreign body sticking out of the right heel. The doctor removed the protruding part of the foreign body and bandaged the wound. Thereafter the patient was discharged from further care.

Two days later, on return to the Netherlands, the heel was still warm, swollen, and painful. Consultation with the patient’s general practitioner and sports medicine doctor resulted in prescription of rest and antibiotics (flucloxacillin 500 mg four times a day) for seven days. After the antibiotic course had been completed, the swelling and pain persisted although there was no fever. Three days later the patient presented to the emergency department. Initial evaluation showed a painful, inflamed, fluctuating swelling at both the medial and lateral side of the right heel. The lateral wound produced a small amount of pus. Body temperature was 37.1°C.

The presence of a foreign body was noted on a standard lateral radiograph of the heel. This was seen as opacity at the cranial border of the posterior part of the calcaneus. This opacity was shaped as two dense parallel lines (fig 1). With the clinical characteristics and our anamnestic experience, a fish wound was suspected. The fish was found to be a needlefish, a member of the Belonid family (fig 2). The patient was operated on the same day.

The patient underwent surgical exploration of the lateral and medial side of the right heel with removal of the fish remnants and careful debridement (fig 3). Antibiotics were not prescribed, because all the foreign body had been removed. The wound was left to heal by secondary intention.