Management of Acute Ankle Sprain in Athletes

Abstract
Management of acute ankle sprain is an important socio-economic healthcare problem. This compact overview provides evidence from current literature on both treatment and prevention of acute ankle sprains.

Diagnosis is made by delayed physical examination 5 to 7 days post trauma.

Treatment: We recommend that for athletes as much as any other patient treatment decisions should be made on an individual basis. The best available option for most patients is functional treatment.

Prevention: Use of external ankle support devices, in the form of semi-rigid ankle orthosis or Aircast brace, prevents mainly lateral ankle ligament injuries, during high risk sporting activities.

Introduction
Lateral ankle ligament injuries of the ankle (ankle sprains) are a common problem in acute care, with an estimated rate of one ankle injury per 10,000 people per day [Katcherian 1994]. Statistics for casualty departments reveal that patients with sprained ankles account for two to six percent of all those seeking treatment [Stephensen 1981], also for about 25% of all injuries to the musculoskeletal system and therefore an acute ankle ligament injury is the most frequently observed injury in the emergency room [Boruta 1990]. Injuries to the lateral ankle ligament complex form 25% of all sports injuries [Keeman 1990]; some sports (e.g. basketball, football and volleyball) have a particularly high incidence of ankle injuries [Lindenfeld 1994]. A recent study of ankle injuries in basketball found that players with a history of ankle injury were nearly five times more likely to sustain an ankle injury [McCay 2001]. The total annual cost to society for ankle injuries has been estimated to be varying between 35 million US dollars per one million people [Makuloluwe 1977] and 40 million Euro per one million people [Zeegers 1995]. Treatment for acute lateral ankle ligament injuries is diverse. Most authors use the term «sprain» to describe a morphologic condition, representing a diversity of pathology ranging from a simple overstretching of the ligament to a complete rupture with instability of the joint [Watson-Jones 1976]. In a recent systematic review of available literature, treatment for acute lateral ankle ligament rupture that was too short in duration or did not include sufficient support of the ankle joint, tended to result in more residual complaints [Pijnenburg 2000]. Therefore, post trauma it is important to distinguish a simple distortion from an acute ligament rupture, as it is proven that adequate treatment is associated with better prognosis. Treatment has remained somewhat controversial throughout the years, mainly because of the variety of modalities used. The three main modalities being: 1) operative treatment, 2) conservative treatment with immobilisation and 3) functional treatment.

Diagnosis
Diagnosis is made by delayed physical examination 5 to 7 days post trauma [van Dijk 1996, Klenerman 1998]; stress radiography,arthrography, magnetic resonance imaging and sonography are often performed as well [Kannus 1991]. However, these methods are expensive and their reliability is debatable. The accuracy of physical examination has been determined in a series of 160 patients, comparing physical examination performed within 48 hours of the injury and 5 days post injury. The specificity and sensitivity of the delayed physical examination for the presence or absence of a lateral ankle ligament rupture were 84% and 96% respectively. Therefore it was concluded that a precise clinical diagnosis is possible [van Dijk 1996].

Treatment
The treatment practice variation identified for lateral ankle ligament complex injuries suggests a lack of evidence-based management strategies for this problem. Dehne [1933] was one of the first to describe immobilisation with a plaster cast below the knee. Many studies presenting results of this type of immobilisation
have since been published. Freeman [1965] introduced a new concept in the conservative treatment of ruptures of the lateral ankle ligaments by suggesting the use of proprioceptive training. Consequently, many patients were treated with non-specific elast-ic bandage combined with co-ordination training. Functional treat-
ment forms became more popular the last two decades of the 20th century [Jacob 1986, Moller-Larsen 1988, Vaes 1985]. The use of other treatments such as ultrasound, cryotherapy, laser or homeopathy is either not effective in treatment of acute ankle sprains [van der Windt 1999, de Beie 1998, Ogilvie-Harris 1995] or data are too marginal to draw definitive conclusions [Zell 1988].

Despite all of these options, it is unclear which treatment is most appropriate. Those in favour of functional treatment cite advantages such as lower cost and decreased morbidity with the same probability of ankle stability when compared to operative treat-
ment. However, underestimating the injury severity may lead to chronic instability of the lateral ankle ligament complex. There-
fore, the treatment approach is important to clarify. In this overview an update of the evidence provided by a number of recent systematic reviews is provided. It is generally agreed that a ‘no treatment’ strategy for acute ruptures of the lateral ankle ligament complex leads to more residual complaints [Pijnenburg 2000]. Following Kannus and Renström [Kannus 1991], who already compared operative treatment, plaster cast and early controlled mobilisation in a narrative review and few years later Ogilvie-
Harris [1995], who performed a narrative review identifying 58 randomised controlled trials (RCTs) on several treatment options for acute lateral ankle ligament ruptures, the first systematic review to be published [Pijnenburg 2000] analysed the results of 27 RCTs. Their results were based on 3 outcomes: time lost from work, residual pain and giving way. The assessment of trial quality was based on 3 criteria: randomisation method, assessor blinding and intention to treat analysis. Authors concluded that operative treatment leads to better results than functional treatment and functional treatment leads to better results than cast immobilisa-
tion for 6 weeks. Another recent review also stated that functional treatment with early mobilisation appears to provide better outcomes for patients compared to immobilisation with a cast [Kerkhoffs 2002b]. In contrast, there are questions to reason the selec-
tion of operative treatment as a treatment of choice. Operative treatment is associated with a higher risk of complications and is also associated with higher costs. Because of the high prevalence of ankle injuries, operative treatment may be performed by sur-
gons in training, which may affect the outcome. Finally, when conservative treatment fails, secondary operative reconstruction of the elongated ligaments can be performed with similar good results, even years after the initial injury [Krips 2000]. Authors state that therefore functional treatment still remains the treatment of choice. In order to provide further insight in this topic, another systematical review restricted the focus to the comparison opera-
tive treatment strategies versus conservative treatment strategies, the review included a greater number of clinically important out-
comes and considered other aspects of trial methodology [Kerkhoffs 2002a]. The conclusions and implications originating from this review stated that there is actually insufficient evidence from available RCTs to determine relative effectiveness of surgical and conservative treatment for acute injuries of the lateral ankle liga-
ment complex. Treatment decisions should be made on an indi-
vidual basis, carefully weighing the relative benefits and risks of each option. However, this review also stated that given the risk of operative complications and higher cost (including hospital admis-
sion) associated with surgery, the best available option for most patients would be functional treatment for acute injuries [Kerkhoffs 2002a]. None of the above mentioned systematic reviews compared different functional treatment strategies. One recent systematic review was performed to analyse which is the best functional treatment [Kerkhoffs 2002c]. For analysis, functional treatment strategies were divided upon 4 categories and trials were included when comparing one treatment with another: 1) elastic bandage/stocking, 2) tape, 3) lace-up ankle support and 4) semi-rigid ankle support. Conclusions were that the use of an elastic

**Prevention**

Prevention of ankle injuries is particularly important for those people who engage in high risk sports and those who have suffered a previous ankle sprain [de Maio 1992, Lindenfeld 1994]. Methods of prevention include use of customised footwear and supports, ankle taping, training regimens and injury awareness. Preven-
tion of recurrent injury may also include other interventions such as wobble board exercises, aimed at co-ordination and proprio-
ception. One recently updated state-of-the-art systematic review [Handoll 2002] provides good evidence from randomised clinical trials for the use of external ankle support devices, in the form of a semi-rigid ankle orthosis or Aircast brace, to prevent mainly lateral ankle ligament injuries, during high risk sporting activities (e.g. basketball, football, volleyball). Participants with a previous sprain should be advised that future sprains can be reduced with the use of these types of external supports when engaging in high risk activities [Handoll 2002]. Whether semi-rigid supports are warranted for individual athletes depends on the risk ratio of the individual activity, previous injury status, any possible or per-
ceived loss of performance and the supply and cost of the support [Handoll 2002]. Further trials on other prophylactic interventions are warranted.

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