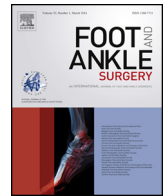




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Review

Non-anatomical or direct anatomical repair of chronic lateral instability of the ankle: A systematic review of the literature after at least 10 years of follow-up

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ABSTRACT

Introduction: A lateral ankle sprain is one of the most frequent reasons for consultation at the emergency trauma unit. Numerous surgical procedures have been described with long-term outcomes that differ. **Hypothesis:** The long-term results of anatomical repair of the anterior talofibular ligament (ATFL) and the calcaneofibular (CFL) ligament are better, with less secondary radiological osteoarthritis than non-anatomical repair.

Materials and methods: A review of the literature after a minimum follow-up of 10 years was performed to analyze the clinical and radiological results of direct anatomical repair (Broström, Duquenois) and non-anatomical repair (Watson Jones, Evans, Castaing). Thirteen articles were selected.

Results: Eight hundred and one ankles were evaluated after a mean follow-up of 15.3 years. The functional outcome was better after anatomical repair but with recurrent instability. Loss of range of motion and secondary osteoarthritis was more frequent after non-anatomical repair.

Conclusion: Anatomical repair of the lateral collateral ligament of the ankle resulted in a better functional outcome and less secondary osteoarthritis than non-anatomical repair.

Study design: Review of the literature; level of proof IV.

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1. Introduction

Ankle sprains are the main cause for consultation in emergency trauma units, with nearly 6000 cases per day in France [1]. This represents a major socioeconomic burden [2] whose management is a subject of debate [3,4]. In case of recurrent sprains, lateral ankle instability develops in 20%–30% of cases depending on the series [5,2,6,7] and results in pain, insecurity and recurrent sprains that are a real handicap. Chronic lateral instability is associated with a risk of secondary osteoarthritis of the ankle joint. The goals of surgical treatment are to stabilize the ankle, treat associated injuries and prevent long-term osteoarthritis [8,9] but no consensus is established in literature. More than 50 techniques have been described in the literature with good and very good intermediate-term functional results but with long-term clinical and radiological outcomes that vary [10–16]. There are direct anatomical repair (DAR) and non-anatomical repair (NAR) techniques. Long-term recurrence of instability has been reported with DAR and joint stiffness of the subtalar joint has been reported with NAR [17].

The goal of this review of the literature was to analyze the clinical and radiological results of direct anatomical repair and non-anatomical repair of chronic lateral instability of the ankle after at least 10 years of follow-up.

2. Materials and methods

This review was designed according to the recommendations in the literature [18] for systematic reviews of the literature and meta-analyses [19].

2.1. Search strategy

In February 2015, a bibliographic search was performed in the databases PubMed, Medline, CINAHL, Cochrane, and Embase. The MeSH keywords were “lateral ankle instability” and “surgical treatment”. Two of the authors (TN and RL) independently selected articles that responded to the question with no time limit for publication. The selection was made after reading the title and the abstract. The selected articles were read entirely and the bibliographic references of each article were analyzed to make sure that no major article on the subject had been excluded.

2.2. Selection criteria

Inclusion criteria were all articles that reported the clinical and radiological outcome of surgical management of lateral instability of the ankle in adults, whatever the surgical technique with at least 5 years of follow-up (initially). Later, a minimum follow-up of 10 years was chosen to increase the scientific value of the article. Included articles had to have a clinical evaluation with one or several functional clinical scores [20] (American Orthopaedic Foot and Ankle Society (AOFAS) [21], Kaikkonen ankle score [22], Roos and Karlsson score [20], Good score [23]), as well as radiological assessment to evaluate secondary osteoarthritis (according to Krips et al. [24]). The following pre-selection criteria were chosen (1) all patients were at least 18 years old, (2) lateral instability of the ankle was the primary indication for surgery, (3) this was the first operation on the ankle, (4) a clinical and radiological evaluation was performed at the final follow-up. Selected studies were (1) not limited in time for the date of publication, (2) written in French or in English, (3) had an abstract that was available online. In case of disagreement on the selection of an article, the two authors reached a consensus. Articles with a follow-up of less than 10 years, with involvement of several medial and lateral

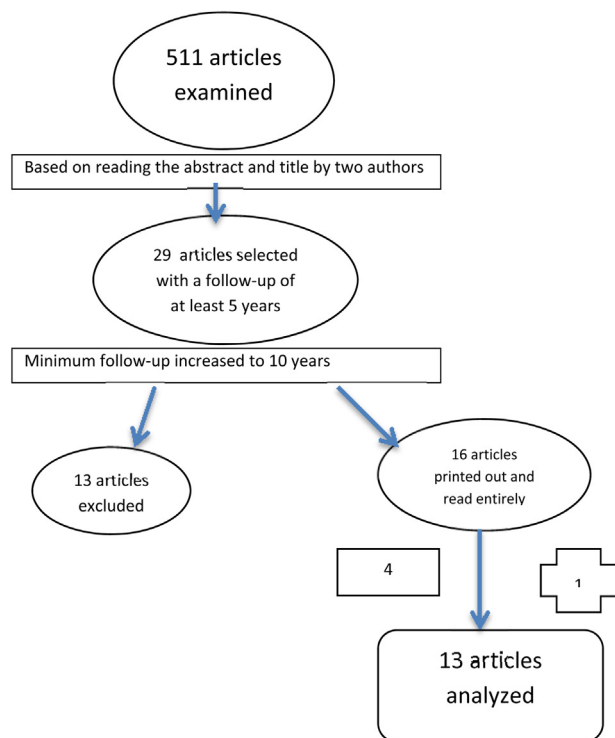


Fig. 1. Selection of articles by two authors.

ligaments, with associated bone injuries [25], or involving bone surgery (calcaneal osteotomy) were excluded.

2.3. Selection process

A total of 510 articles were examined. Twenty-nine articles reported results after at least 5 years of follow-up. An initial selection excluded articles that did not fulfill our criteria (epidemiological articles, articles on prevention, biomechanical studies, decision tree, technical notes, case reports, language criteria, articles on surgical anatomy and with unclear methodology). For the second selection we chose 16 articles with at least 10 years follow-up. Two articles were excluded because they did not present any clinical scores at the final follow-up [26,17], one because the surgical technique was not described [27], and one because there was no radiological assessment [28]. One article was included after it was identified in the discussion of several articles [29]. Finally 13 articles were selected that reported clinical and radiological results at 10 years of follow-up. Fig. 1 summarizes the selection process for articles.

3. Results

3.1. Level of evidence of the study

Clinical case series, level IV.

At total of only 13 articles were selected. Three evaluated surgical management by direct anatomical repair with or without a secondary graft (DAR) [30–32], 6 non anatomical repair (NAR) [33–38], 3 compared the two surgical techniques [39,24,40] and 1 article compared 4 techniques (DAR with and without grafts, NAR with or without peroneus brevis or hemi-Castaing procedures) [41]. Eight hundred and one cases were evaluated in these studies in patients whose mean age was 25.9 years (18–53) at surgery and after a mean follow-up of 15.3 years (10–26.3) at the final follow-up.

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