

Global ankle instability: clinical and functional assessment at average 26-month follow-up

Instabilidade global do tornozelo:
avaliação clínica e funcional com 26 meses de seguimento

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Abstract

Objective: Ankle sprains are common affecting 2.15 per 10,000 persons per year. They are among the most common athletic injuries and represent 15 to 20% of all athletic injuries. Typically patients injure the lateral ligaments; however, a subset of patients sustain injury to the medial and lateral ligamentous complexes, representing a more severe injury. We present a group of patients with this disease, and evaluate the results of surgical treatment and its evolution. **Methods:** We retrospectively reviewed a consecutive cohort of patients that were treated with medial sided ligamentous reconstruction and were greater than 6 months from their index procedure. Patients that had an isolated medial sided repair or patients that had a medial sided repair in conjunction with a degenerative flatfoot reconstruction were excluded. Patients returned for radiographs, clinical examination by a blinded observer and a functional evaluation. Descriptive statistics were performed. **Results:** The mean follow-up was 26.4 months (range 8 to 62 months). At final follow-up 13 of 14 patients with “satisfied” or “very satisfied” with their surgery. Twelve would have the procedure again, one was unsure and one would not have the procedure again. The average Foot Function Index was 17% (zero to 62%). The average American Orthopaedic Foot & Ankle Society (AOFAS) score was 88.15 (66 to 100). **Conclusion:** Some patients who sustain ankle sprains will have medial and lateral sided pathology or global ankle instability. When treated surgically with medial and lateral ligament reconstruction, these patients can have reasonable outcomes and levels of clinical stability and in the intermediate-term.

Level of Evidence: Case Series IV.

Keywords: Joint instability; Ankle joint/injuries; Lateral ligament, ankle/surgery; Ligaments, articular/surgery; Treatment outcome

Resumo

Objetivo: O entorse de tornozelo é uma lesão frequente que afeta 2,15 pessoas a cada 10 mil por ano. Entre as lesões esportivas mais comuns, ela representa 15 a 20%. Classicamente, ocorre lesão dos ligamentos laterais, no entanto, um subconjunto de pacientes

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apresenta acometimento dos complexos ligamentares medial e lateral, representando uma lesão mais grave. Neste estudo, apresentamos um grupo de pacientes com essa afecção, e avaliamos os resultados do tratamento cirúrgico e suas evoluções. **Métodos:** Foram analisados retrospectivamente, em forma de um estudo coorte, pacientes tratados pela reconstrução ligamentar medial e com no mínimo de 6 meses de procedimento cirúrgico. Os pacientes com reparo medial isolado ou associado com a reconstrução de pé plano valgo degenerativo foram excluídos. O acompanhamento foi feito com radiografia, um exame físico feito por um examinador cego e avaliação funcional. A estatística descritiva foi realizada a partir dos dados obtidos. **Resultados:** O tempo médio de seguimento foi de 26,4 meses (intervalo de 8 a 62 meses). No final do seguimento, 13 dos 14 pacientes estavam “satisfeitos” ou “muito satisfeitos” com a cirurgia. Doze realizariam o procedimento novamente, um não tinha certeza e um não faria. A média da *Foot Function Index* foi de 17% (zero a 62%). A pontuação média da *American Orthopaedic Foot & Ankle Society* (AOFAS) foi de 88,15 (66 a 100). **Conclusão:** Alguns pacientes com entorse do tornozelo apresentaram patologia nas faces medial e lateral do tornozelo, ou instabilidade global. Quando tratada cirurgicamente com reconstrução ligamentar medial e lateral, podemos esperar, na evolução a médio prazo, que esses pacientes apresentem resultados razoáveis, assim como que obtenham estabilidade clínica articular.

Nível de evidência: Série de Casos IV.

Descritores: Instabilidade articular; Articulação do tornozelo/lesões; Ligamentos laterais do tornozelo/cirurgia; Ligamentos articulares/cirurgia; Resultado do tratamento

INTRODUCTION

Ankle ligament injuries are common and estimated to occur in 2.15 per 10,000 people per year; 85% of the injuries are due to an inversion mechanism.⁽¹⁻³⁾ We observe that 20 to 40% of the patients will have chronic ankle instability and some associated functional disability.^(2,4-6) For 85% of patients with an inversion injury who fail conservative management, the results of surgical treatment are favorable.^(2,7-16) Despite generally successful results with lateral ligament reconstruction, a subset of patients will continue to have a sense of “giving way” or functional instability with activity.^(6,17) A suggested etiology for this persistent sense of instability has been injury to the medial ligamentous structures of the ankle.⁽¹⁸⁻²⁰⁾ These patients have either residual medial instability after their lateral ligament reconstruction, or if diagnosed prior to surgical intervention, a global ankle instability pattern.

These patients with combined medial and lateral ankle instability can have functionally disabling symptoms from combined medial and lateral ankle instability.

OBJECTIVE

To evaluate the patient’s clinical outcomes after surgical repair of the deltoid ligament in conjunction with a lateral ligamentous reconstruction for patients with medial and lateral or what we termed “global ankle instability”.

METHODS

A retrospective chart review was performed from January 2006 to January 20011 for patients with CPT 27698 code for

medial ankle ligament repair and/or lateral ligament repair. Patients’ charts were then reviewed to ensure they had both medial and lateral ligament reconstruction during the index procedure. Patients with a degenerative flat foot or an isolated medial repair were excluded.

Patients were diagnosed with global ankle instability by their treating surgeon based on a combination of patient history, physical examination and radiographic findings. The patients reported and history of “giving way” or instability with activities. Patients were questioned for a history of ankle sprains or prior injuries. Physical examination included: neurological and vascular examination, seated and standing evaluation of hindfoot position, evaluation of arch height, anterior drawer testing, varus and valgus stress testing of the ankle and examination for rotatory instability of the medial and lateral ankle with comparison to the unaffected side. Standing AP, lateral and mortise view ankle radiographs were obtained. Advanced imaging was not routinely obtained and only ordered based on surgeon discretion.

The surgical technique for the superficial deltoid repair consisted of a curvilinear incision from the medial malleolus distally to the navicular. The fibers of the superficial deltoid were examined and the injured portions repaired. The deltoid was repaired by elevating any residual fibers off of the medial malleolus with a sharp transverse incision. After it was elevated, the cortical wall was rongeuired to obtain a healthy bed of bleeding bone for reattachment. The technique of repair varied between surgeons. Some repaired the deltoid with a suture anchor into the medial malleolus while other passed sutures through drill holes in the medial malleolus. The concomitant lateral ankle instability was addressed with modified Brostrom-Gould technique.^(21,22) Additio-

nal foot or ankle pathology, i.e. cavovarus foot position, was also addressed at the time of the ligamentous repair.

Patients were contacted via letter and then by phone to return for a prospective office visit and standing AP, mortise and lateral radiographs of the ankle. An independent attending surgeon evaluated all patients. Patients completed a questionnaire for their Foot Function Index (FFI) score and American Orthopaedic Foot & Ankle Society (AOFAS) ankle-hindfoot score.^(21,23,24) A physical examination was performed to detect presence or absence of an anterior drawer or clinical laxity with varus/valgus ankle stress or any rotatory instability. The patients then performed a series of functional tests including lunge test, hop test and a single limb heel rise. Each test was conducted three times, and the patient was tested for ability to perform the test and questioned for pain associated with performing the test. Radiographs were examined for signs of degenerative changes of the ankle joint and talar tilt.

Statistical analysis

Descriptive statistics were utilized for this consecutive patient series. Statistical analysis included calculating frequency data, proportions, appropriate measure of central tendency and variance.

RESULTS

Fourteen patients were available for final follow-up. There were 9 females, and the average age was 44.5 years. The average time from the index procedure to follow-up examination was 23 months (range 8 to 62 months).

The mechanism of injury was obtained from the medical records and is summarized in figure 1. Of the 14 patients, 13 could recall the date of a specific injury. The average time from the injury to surgery was 11.1 years with a range from 5 months to 43 years.

All 14 patients had a Brostrom-Gould lateral ligament reconstruction. Ten patients had an associated procedure at the time of the index procedure. Three patients had ankle arthroscopy. Nine of them were noted to have osteophytes associates with their instability removed from the medial or anterior-medial tibia. Five patients had an OCD lesion of the talus that was microfractured (Figure 2).

The mean follow-up was 26.4 months (range 8 to 62 months). At final follow-up 13 patients were "satisfied" or "very satisfied" with their surgery. Twelve would have the procedure again, one was unsure and one would not have the procedure again.

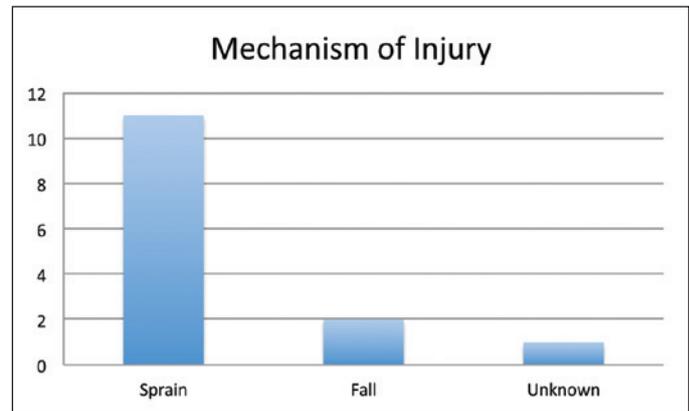


Figure 1. Most patients recalled a history of sprains as the etiology of their injury.

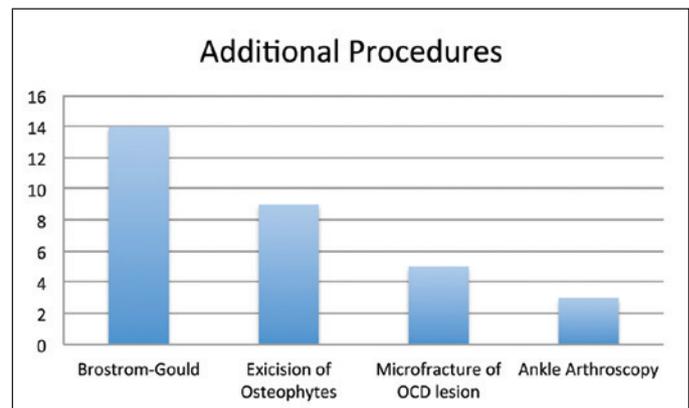


Figure 2. All patients had a Brostrom-Gould lateral ligament reconstruction during the index procedure. Osteophytes were frequently encountered on the medial side of the ankle during reconstruction. Osteochondral lesions were seen in five patients and treated with microfracture.

The average FFI was 17% (zero to 62%). The average AOFAS score was 88.15 (66 to 100).

Of the 14 patients, 13 returned for a physical examination and radiographs. Twelve of 13 patients had a stable medial and lateral ligamentous examination with stress testing. One patient who had an unstable stress test had 1+ both medial and lateral laxity on clinical examination same. Eleven of 13 patients were able to perform the lunge test and 11 were able to do it without pain. Nine patients could perform a hop test and all of them had no pain with this test. Thirteen patients could perform a single limb heel rise, however 10, of the 13 patients, had pain with this test.

DISCUSSION

Brostrom discussed the medial ankle as a source for chronic stability in the 1960s.⁽⁵⁾ However, the majority of the

literature published has focused on the lateral ligamentous complex and its surgical and non-surgical management.

An article by Hintermann et al. prospectively followed 52 ankles with medial ankle instability.⁽²⁵⁾ They found that at an average of 4.4 years after surgical repair of the deltoid ligament, 90% of their patients had good or excellent results. Out the patients, 40% in their series had concomitant lateral instability. They did not analyze the subset of patients with combined medial and lateral instability separately.⁽²⁵⁾

Notably we found that the duration of symptoms patients had prior to surgical intervention was quite varied, ranging from 5 to 43 years. This could mean that patients are able to function at an acceptable level for long time prior to presentation or this could represent a delay in diagnosis of concomitant medial ankle instability. This study is unable to determine which one of these factors plays a larger role. We suggest that patients that do not improve as expected after an ankle sprain may need to have a diagnosis of medial instability considered.

A more recent study by Crim et al. evaluated magnetic resonance imaging of patients with chronic lateral ankle instability.⁽¹⁸⁾ Their review of 47 ankle images in patients with chronic lateral instability without medial pain revealed 72% of patients had an injury to the superficial or deep deltoid. They suggested that patients who were treated surgically with lateral ligament reconstruction have a high incidence of medial sided ankle pathology on magnetic resonance imaging.⁽¹⁸⁾

Our study demonstrated that patients can have a good functional result at intermediate term follow-up after medial

and lateral ligament repair. However, there are several limitations to this study. The patient population is small, fact that can make the results difficult to generalize. Secondly, the patients did not have an AOFAS, FFI measured pre-operatively. Because of this we cannot calculate the improvement in function after surgical intervention. We also had five patients in the study that had a microfracture for an OCD lesion of the talus concomitantly with their ligament reconstruction. However, these patients did not appear to do worse than the other patients that did not have this procedure. Lastly the AOFAS ankle-hindfoot score is not a validated outcome score in this patient population.⁽²⁶⁾

Patients with ankle instability can present with feelings of “giving way” or note functional limitations with activities. These patients should have a thorough history and physical examination with particular attention paid to medial and lateral sided symptoms and any ligaments laxity to anterior drawer and rotatory examination. The rate of medial sided instability concomitantly with lateral instability may have been historically underappreciated based on recent studies by Hintermann and Crim.^(18,19,25)

Attention to the medial side of the ankle should be given to patients with complaints of ankle instability. Some patients with ankle injuries will have medial and lateral sided pathology. Patients who fail non-operative management will necessitate surgical intervention. These patients can expect to see clinical improvement post-operatively at intermediate term follow-up.

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