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Contribution of echography in the management of recent entorses of the ankle (About 25 cases)

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Abstract
Introduction: Ankle sprains are one of the most frequent injuries in traumatology and occur in all types of sport. In most cases, the sprain is of the lateral collateral ligament (LCL) of the ankle. Ultrasound examination of the ankle confirms the diagnosis and assesses the severity of the sprain, enabling proper therapeutic management.
Materials and Methods: This were a prospective analytical and descriptive study conducted over a 6-month period from 1 March 2021 to 30 September 2021 at Aristide Le Dantec Hospital and involving 25 patients.
Results: The mean age of the patients was 30.60±9.80. Ankle sprains were more frequent in young adults (84%). Males predominated (64%). Sportsmen and women were the populations most affected (64%). AS and AD were the most frequent circumstances (36% each). Indirect mechanism was more frequent (88%). Ankle pain and functional impotence were present in all patients. Pain was more marked in the anterior bundle of the LCL (64%). Ankle oedema was more localised on the lateral aspect of the ankle (52%). The LCL had more lesions (92%). On ultrasound, the anterior bundle of the LCL was more affected (95.66%) and elongation was the most frequent type of injury (60.86%). Benign sprains were predominant (60.86%). Mild sprains were predominant (60.86%). Serious sprains were more common in sports accidents (5 cases/6). Orthopaedic treatment was most commonly used (60%). Ankle rehabilitation was performed in 64% of cases. We obtained more excellent results after evaluation of the ankle (76%).
Conclusion: Ankle sprains are very common, and athletes are the population most affected. Ultrasound examination of the ankle assesses the severity of the injury and enables better therapeutic management. Sequelae and recurrences are most often linked to inappropriate treatment.

Keywords: Ultrasound, ankle, recent sprains

Introduction
Ankle sprains are capsulo-ligament injuries to the tibio-talar joint that preserve anatomical relationships. They are one of the most common injuries in traumatology. They account for around 20% of all sports injuries and are the most frequent reason for consultation in traumatology. In most cases, it is a sprain of the lateral collateral ligament (LCL) of the ankle. Sprains of the distal tibiofibular syndesmosis and sprains of the medial collateral ligament are much rarer and more difficult to diagnose [1, 2, 3]. Ultrasound is an under-used technique in ankle sprains because it is very difficult to perform and requires the use of high-performance and expensive equipment. It provides a good analysis of ankle ligament damage in the event of a sprain. As the ankle ligaments are very superficial, they are easily accessible by high-frequency probes with remarkable spatial resolution [3]. The aim of our study was to clarify the ultrasound aspects of ankle sprains, to adopt a treatment and to evaluate patients after follow-up at the Orthopaedic-Traumatology Department of the Aristide Le Dantec Hospital in Dakar.

Materials and Methods
This was a prospective, analytical, descriptive study conducted over 6 months from 1 March 2021 to 30 September 2021 at Aristide Le Dantec Hospital and involving 25 patients. All patients seen for an ankle sprain less than 7 days old and who had undergone an ankle ultrasound scan were included.

Non-consenting patients, patients lost to follow-up and patients with incomplete records were not included in the study. Of 39 files collected during the study period, 25 met our criteria. The mean age of the patients was 30.60±9.80. Ankle sprains were more common in younger adults (84%). Males predominated (64%), with a sex ratio of 1.77. Sportsmen were more affected, accounting for 64% of our patients. Sports accidents (SA) and domestic accidents (DA) each accounted for 36% of the circumstances (9 cases). The indirect mechanism was more frequent, accounting for 88% of patients. The right ankle was the most affected, accounting for 52% of cases. Ankle pain and functional impotence were present in all patients (100%). Pain in the LCL was noted in 76% of patients. In 64% of our patients, this pain was localized only along the anterior fasciculus. Only 12% of patients had pain in both the anterior and middle fasciculus. Only 24% of patients had pain localized to the medial collateral ligament (MCL). Ankle oedema was present in 84% of our patients. The lateral aspect was the most frequent location for this oedema (52%).

1. Methodology-Procedure

1.1 Patient follow-up

- D0 post-trauma
- Systematic request for a standard X-ray of the ankle to rule out a bone lesion,
- Patient consent to participate in our study,
- Immobilization of the ankle if necessary.
- Between D1-J7 post-trauma
- Ultrasound scan of the ankle,
- Treatment adapted according to the lesions found on ultrasound.
- Between D15-45 post-trauma
- Release the ankle if necessary,
- Assessment of treatment effectiveness,
- Start ankle rehabilitation as required
- Between J45-60 post-trauma
- Gradual resumption of sporting activities.
- Between D60-90 post-trauma
- Assessment of ankle function.

1.2 Ultrasound examination technique

Patients were positioned supine on a couch.

The ultrasound probe was used to systematically explore the lateral ligament plane, the medial ligament plane, the syndesmosis and the fibular tendons.

Internal rotation of the limb and varus of the ankle allowed exploration of the lateral aspect of the ankle. External rotation of the limb and valgus of the ankle better exposed the medial aspect.

Plantar flexion and dorsiflexion of the ankle revealed whether or not the anterior tibiofibular syndesmosis had been ruptured. Eversion of the ankle was used to assess the fibular tendons.

1.3 Parameters studied

In this study, we were interested in the ultrasound, therapeutic and evolutionary aspects.

- For diagnostic data, we looked for the following parameters:
- Ligament injuries to the talocrural joint diagnosed by ultrasound (ligament affected, site of injury and type of injury);
- Associated lesions (fractures, lesions of the anterior tibio-fibular syndesmosis and peroneal dislocation).
- For therapeutic data, the following parameters were studied:
- Start and duration of treatment;
- Type of treatment (functional treatment, orthopaedic treatment and surgical treatment); and
- And patients who received rehabilitation.
- For the follow-up, we were interested in:
- Pain
- Oedema
- Gait
- Ankle mobility
- Ankle stability;
- Return to sport and time to return.

For prognosis, we used the OMAS score (Olerud and Molander Ankle Score).

2. Statistical analysis

The data were analyzed using Sphinx plus2 version 5 software. Descriptive analysis was carried out by calculating means and standard deviations for categorical variables. Univariate analyses were performed using cross-tabulations, and the Chi-square test was used according to the conditions of acceptability. For statistical analysis, we used p-value (p). The results were statistically highly significant when $p < 0.05$.

Results

Lateral collateral ligament (LCL) involvement was the most common, accounting for 92% of our patients (23 cases). Among them, 68% of patients (17 cases) had involvement of the LCL only, 12% of patients (3 cases) had involvement of the LCL and the MCL, and 12% of patients (3 cases) had involvement of the LLE and the anterior tibiofibular ligament (ATFL). Isolated MCL involvement was noted in 4% of our patients (1 case), and isolated ATFL involvement was also found in 4% of patients (1 case) (Figure 1).

For LLE injuries (23 cases) (Figure 2), ultrasound revealed elongation in 60.86% of cases (14 patients), incomplete rupture in 13.04% (3 patients), complete rupture (Figure 3) in 21.73% of cases (5 patients) and disinsertion of the anterior bundle (Figure 4) in 4.34% (1 patient).

Mild sprains were the most common, accounting for 60.86% of patients.

Serious sprains were more common in sports injuries (5 out of 6 cases).

The average duration of treatment was 32.64±13.76 days, with extremes ranging from 21 to 45 days.

Orthopaedic treatment was used most frequently, in 60% of patients. This was followed by functional treatment (40%).

Of the patients treated orthopedically, most (80%) had received a plaster cast. A removable ankle brace was used in only 20% of these patients.

Ankle rehabilitation was performed in 64% of patients.

At follow-up, ankle pain was noted in 44% of patients, ankle oedema in 28%, lameness in 24% and ankle instability in 4%.

Resumption of sporting activities was noted in 60% of patients, with an average delay of 53.40±14.92 days.

Functional evaluation of the ankle using the OMAS score at M2 post-trauma revealed 19 excellent results, 04 good results and 02 fair results.

The functional results of the ankle according to the severity of the sprain were studied and we obtained:

- Among patients with mild sprains: 12 excellent results,

01 good results and 01 fair results.
- For patients with moderate sprains: 02 excellent results and 01 good results.
- For patients with severe sprains: 04 excellent results, 01 good results and 01 average results.

Similarly, a study on the functional results obtained according to the type of treatment adopted was carried out and we obtained:
- Among patients treated orthopedically (15 cases), more excellent results (12 patients).
- For those who received functional treatment (10 cases), 7 patients had excellent results.

Discussion
This will cover diagnostic, therapeutic and evolutionary aspects.

Diagnostic aspects
Ankle pain was noted in all our patients. These findings are consistent with those reported in the literature [4, 5]. In our series, absolute functional impotence was found in 16% of patients. In the studies by Bouhdiba *et al.* [4], 33% of their patients had absolute functional impotence. On the other hand, Grémeaux *et al.* [5] noted a very high rate of patients with absolute functional impotence (75%). This can be explained by the fact that functional impotence depends on the intensity of the pain and the severity of the ankle sprain.
Ankle oedema was observed in 84% of patients in our study. Grémeaux *et al.* [5] and Bouhdiba *et al.* [4] noted 100% and 80% respectively.
In our study, pain was noted more on the LCL, in 76% of patients. Our results are similar to those of Grémeaux *et al.* [5] and Bouhdiba *et al.* [4] with 91% and 55% respectively. According to Bouhdiba *et al.* [4], the forces in the ligaments (LCL) vary according to the position of the foot. If traction forces are low, the ligaments guide joint movement, but if these forces become high, the role of the ligaments is to restrain and protect. This exposes them to a high risk of trauma in the event of forced movement. In our series, ultrasound diagnosis showed that damage to the LCL was the most frequent, accounting for 92% of cases. Our results are consistent with those obtained by Bouhdiba *et al.* [8] and Grémeaux *et al.* [5], with 94% and 70.58% respectively.
Among our patients with LCL involvement, the anterior fasciculus was the most affected, at 95.66%. Bouhdiba *et al.* [4] and Guillodo *et al.* [6] found similar results, with 86% and 95.66% respectively. This can be explained by the fact that the weakest point in the ankle ligament complex is the malleolar junction. The weak link in this junction is the anterior fasciculus of the LCL.
In our series, among patients with damage to the anterior fasciculus of the LCL, elongation was the most common injury (60.86%). Only 21.73% had a complete rupture of the anterior bundle. In contrast, some authors, such as Grémeaux *et al.* [5] and Rajhi *et al.* [7], found that complete rupture was predominant, with 67.64% and 52% respectively. We cannot find any explanation for this discrepancy.
Mild sprains predominated, accounting for 60.86% of our patients. These are followed by severe sprains (26.08%). Sports accidents were the most frequent cause of severe sprains (5 cases/6). In the series by Grémeaux *et al.* [5], moderate sprains were more frequent (44.11%).

Therapeutic aspects
Orthopaedic treatment is the most commonly used, accounting for 60% of our patients. It is followed by functional treatment (40%). None of our patients underwent surgical treatment. Perrin [8] chose surgical treatment (144 cases). The only justification being that early intervention for an ankle sprain avoided the occurrence of later complications such as instability, stiffness or osteoarthritis. In contrast, Balliet *et al.* [9] chose orthopaedic treatment (such as a removable splint) in 120 patients with severe sprains.
Ankle rehabilitation was performed in 64% of our patients. In the series by Bouhdiba *et al.* [4], 57.77% of patients received functional treatment and 47.22% orthopaedic treatment.

Prognostic aspects
In our study, we had 19 patients (76%) with excellent results, 04 patients (16%) with good results and 02 patients (8%) with fair results. Our results are similar to those obtained in the Perrin series **[8]** with 72% excellent results, 25% good results and 3% poor results. Among patients treated orthopedically (15 cases), we had more excellent results (12 patients). Among those who received functional treatment (10 cases), 7 patients had excellent results.

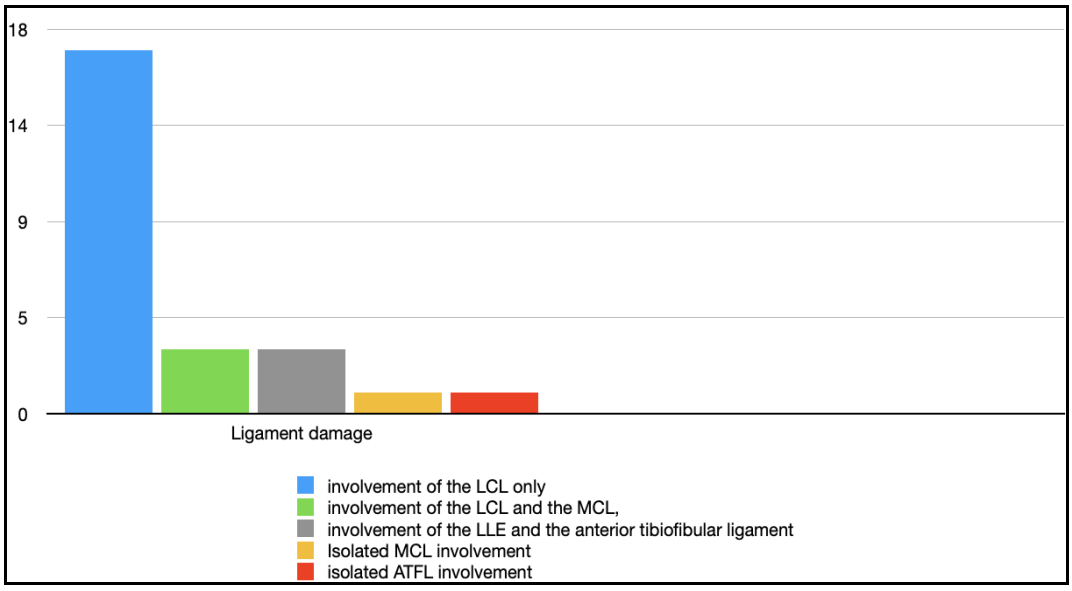

Fig 1: Distribution of patients according to ligament damage (n=25)

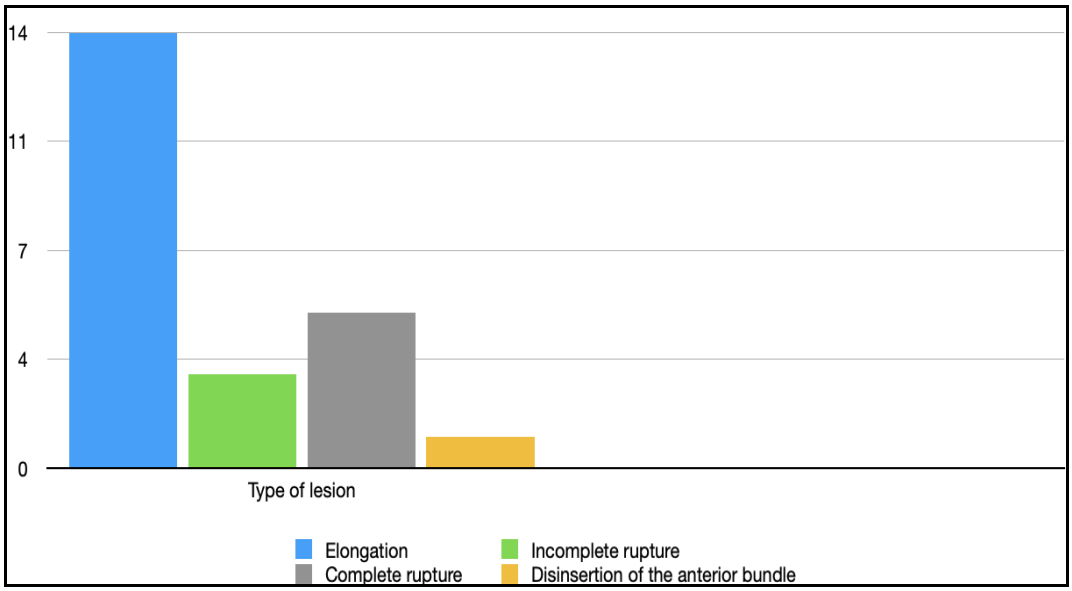

Fig 2: Distribution of patients according to type of lesion of the anterior fasciculus of the LCL (n=23)

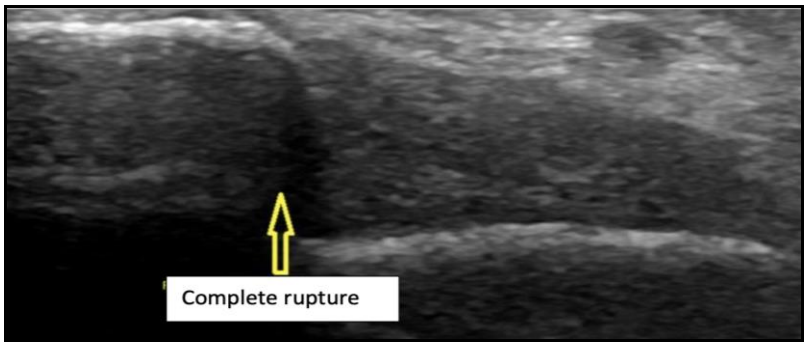

Fig 3: Ultrasound image of a complete rupture of the anterior bundle of the LCL

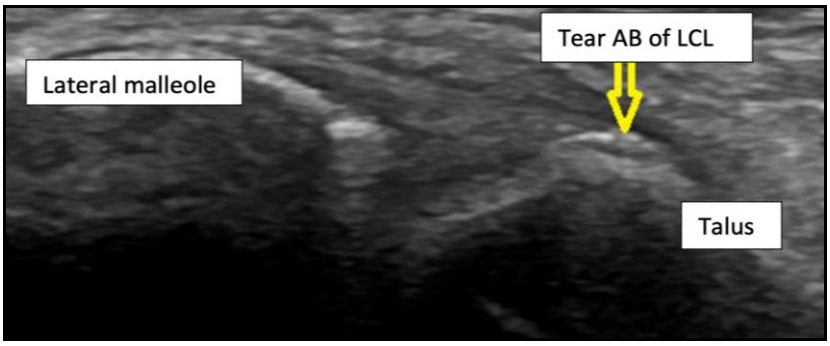

Fig 4: Ultrasound image of a tear in the anterior bundle (AB) of the LCL at its talar insertio

Conclusion

Ankle sprains are a frequent injury, especially in sportsmen and women, and in most cases involve the lateral collateral ligament. Clinical signs such as skin ecchymosis and a cracking sound indicate the seriousness of the sprain. The systematic use of ultrasound in all non-benign sprains may seem excessive, but it is an effective way of assessing the real severity of the sprain. It helps determine the treatment strategy to be adopted and the duration of treatment, with the ultimate aim of achieving a pain-free, mobile and stable ankle.

Conflict of Interest

Not available

Financial Support

Not available

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