Introduction

Damas caused by sports injuries are among the most prevalent cases which a physician is encountered in clinics or emergency departments. The statistical analyses show that ankle damages account for nearly 16% of sport injuries [1]. Ankle ligament injuries are classified into three cases based on the injuries intensity. For the first type, joint is stable but the ligaments are strained. For the second type, ligaments are ruptured very trivially, but in the third type the rupture of ligament is complete [2]. In spite of high frequency of such injuries, there is no single acceptable treatment preferable to the other current treatments. The common treatments are surgical repair of injuries, immobilization with plaster, elastic bondage, injection of steroid and prescribing non-steroid sedatives [3]. Decreasing treatment period, achieving a stable joint, preventing from recurrence and repetition of such injuries are of the most important objectives which are followed by treating acute ankle injuries. Ankle ligament damages bring about wide degrees of disabilities; Hence on-time diagnosis and treatment of such injuries are helpful in the final outcome of such treatment [4]. Most authors prefer on-surgical treatments to heal mild to intermediate injuries. However, there are disputes over treating severe injuries, what is more accepted is that both the initial non-surgical treatments and the late surgical treatments will achieve similar results [5]. The experimental studies have shown that following immobilization technique applying the functional treatment to heal the second type injuries is effective to repair and strengthen the damaged ligaments [6, 7]. According to a number of reports, the range of motion is limited in the result of ankle acute injuries and in turn decreases collagen synthesis in the damaged ligament which slows down the healing process [8].

Moreover, a long-term immobilization of a limb by plaster makes short and tender the soft tissues around the joints of athletes, as their return to athlete world will be very hard or even impossible. In this case, there is much controversy among authors on how to treat acute ankle injuries. Those who propose immobilization with plaster emphasize that the treatment bring about further stability for the ankle joint; while specialists who believe in the functional treatment point out to faster regain of the range of motion before injury and lower muscular atrophy as the advantages of the treatment [9]. In order to achieve a common objective in using the motor treatments, it is suggested to examine these methods in various clinics and for various kinds of ankle injuries and their resulted to be compared. Thus, in this study, we have tried to analyze different variable such as pain, inflammation, back to
work and joint motion in both functional and immobilization by plaster treatment of ankle ligament acute injuries.

Materials and Methods

A non-blind clinical trial study was carried out in the emergency department of Yasuj’s Shahid Beheshtii Hospital after verification by the Ethics Committee of Yasuj University of Medical Sciences. After explaining all condition and constraints of the study to patients, they enrolled for the study after signing the preset written consent. 16-50 year-old patients with acute ankle injuries were qualified for being included in the study. Moreover, they should refer to the hospital in less than 48 hours from injury, and they should have ankle sprain history. The patients who didn’t show cooperation or a condition in which follow up was impossible made up our exclusion condition. All patients were examined precisely and routinely lateral and oblique radiographs of patients’ ankles were obtained. They were analyzed in terms of pain, inflammation, ecchymosis, range of motion and joint stability. The pain intensity was evaluated based on the Visual Analogue Scale (VAS) in patients.

Ankle injuries were classified into three degrees: I, II, and III, based on clinical examination and radiologic results. The qualified patients were allocated to one of the two mentioned groups through block randomization and with foursome blocks. Sampling was continued until reaching the required sample size (100 patients, 50 for each group). Regardless of their injury degree, patients were divided into two allocated and treatment groups. The first group was subject to functional treatment including elastic bondage along with an axillary crutch without bearing the body weight for 48 hours since experiencing injury. The bondage was wrapped after 48 hours and the patient was given a brace and the initial movements along with physiotherapy were started. The second group was treated via immobilization with plaster method. The plaster was removed after two weeks and the physiotherapy program was started. The patients were examined after 48 hours, 2, 6 and 12 weeks and pain intensity, range of motion, tenderness, arthritis and back to work were examined each time and they were recorded in the questionnaires which have been prepared formerly. The collected data were analyzed using SPSS-17 and independent t-Test. All data were expressed as Mean ± SE and p < 0.05 was considered as the significance level.

Results

During the examination and treatment period, 18 and 13 patients were excluded from group I and group II, respectively. The average age (year) and average weight (kg) of the first group (functional treatment) were 27.2 ± 1.1 and 68.4 ± 5.2, respectively and for the second group they were (immobilization treatment) were 29.2 ± 1.3 and 71.2 ± 3.3, respectively. The comparison of range of motion of ankle after two weeks demonstrated the average plantar flexion (degree) in group I and II were 29.08 ± 1.2 and 13.6 ± 0.1, respectively, so there was a significant difference (p < 0.001). The statistical results showed that since the sixth week onward, there were not significant changes between the two groups (Table 1).

The statistical results showed that in comparison to immobilization with plaster, the functional treatment during the entire treatment period was more effective in maintaining range of motion and the average difference in the second week was found considerably higher than the other weeks. Comparing the pain intensity based VAS showed that after two weeks the pain intensity in group I (33.4 ± 4.1) was considerably lower than that in group II (57.3 ± 11.21), which significant statistical changes were seen in this case. The difference was seen significantly during the 6th week. However, at the end of the 12th week, the pain had been alleviated completely for both groups (Table 2).

The results indicated that the highest difference in pain intensity was recorded in the second week after injury, and the difference was gradually decreased from 2nd week to 12th week.

The arthritis was decreased in both groups over the time. After six weeks, it was increased in group I more than the other group and a significant difference was reported between them in this issue (Table 3). The tenderness degree has been decreased considerably in the group II. There was a significant statistical difference in tenderness degree of the two groups in 2nd and 6th week (p=0.01). Fifty two percent of members of the group I returned to their work after two weeks, while none of members of group II could return to their works in this period. Finally, after two months 96% and 92% of members of group I and II returned to their works, respectively.

Table 1. Comparison of average range of motion in both studied groups during second, sixth and twelfth weeks

<table>
<thead>
<tr>
<th>Time</th>
<th>The first group</th>
<th>The second group</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>29.08±1.2</td>
<td>20.4±2.2</td>
<td>0.03</td>
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<tr>
<td>planter</td>
<td>41.2±2.1</td>
<td>38.5±1.5</td>
<td>NS</td>
</tr>
<tr>
<td>flexion (deg)</td>
<td>44.4±3.5</td>
<td>40.3±1.4</td>
<td>NS</td>
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<tr>
<td>dorsal</td>
<td>15.6±1.1</td>
<td>13.8±1.3</td>
<td>NS</td>
</tr>
<tr>
<td>flexion (deg)</td>
<td>19.8±1.6</td>
<td>18.6±0.3</td>
<td>NS</td>
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<td>NS: Not Significant</td>
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Table 2. Comparison of pain intensity in the studied patients based on VAS

<table>
<thead>
<tr>
<th>Time</th>
<th>The first group</th>
<th>The second group</th>
<th>p-Value</th>
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<tr>
<td>Second week</td>
<td>33.4±4.1</td>
<td>57.3±11.21</td>
<td>0.01</td>
</tr>
<tr>
<td>Sixth week</td>
<td>19.4±0.4</td>
<td>29.1±2.3</td>
<td>0.05</td>
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<tr>
<td>Twelfth week</td>
<td>10.6±1.9</td>
<td>11.1±0.5</td>
<td>NS</td>
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<td>NS: Not Significant</td>
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In this study, a number of undesirable variables such as sport history and people’s former job have been considered effective somehow in repairing acute ankle injuries, hence the mentioned cases can be some of limitations of the study. However, generally, it is concluded that for treating ankle acute injuries functional treatments along with brace or bondage are more effective in pain control, maintain joint range of motion and help patient to return their work than the ankle immobilization with plaster treatment. Therefore, using plaster is only suggested for a limited number of patients and for short-term treatments. Finally, while removing intervening factors, more studies are suggested to compare functional treatments impacts with the surgical ones.

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Authors’ Contributions

All authors had equal role in design, work, statistical analysis and manuscript writing.

Conflict of Interest

The authors declare no conflict of interest.

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References