Written instructions versus physiotherapist-supervised rehabilitation after acute ankle sprain

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Title

Written instructions versus physiotherapist-supervised rehabilitation after acute ankle sprain

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Declaration of interest

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Written instructions versus physiotherapist-supervised rehabilitation after acute ankle sprain

Abstract
The aim of this study was to compare the effects of written instructions versus physiotherapist-supervised rehabilitation on patient-rated ankle function, satisfaction, and physical activity ability after an acute ankle sprain. Thirty-nine patients with an acute ankle sprain, recruited from an emergency department, received written instructions on functional rehabilitation (WI group). The patients were evaluated 6 weeks and 3 months after their injury with the disease-specific Foot and Ankle Outcome Score (FAOS). The patients also rated how satisfied they were with their ankle and physical activity ability using visual analogue scales. The results from the WI group were compared with a group of patients (n=33) who received physiotherapist-supervised rehabilitation in a previous study (PT group). We found that compared with the PT group, the WI group had significantly worse scores in all of the FAOS subscales 6 weeks after the injury, and in three of five subscales 3 months after the injury. They also rated significantly lower satisfaction and significantly lower physical activity ability at both follow-ups. In conclusion, physiotherapist-supervised rehabilitation was more effective than written instructions on improving patient-rated ankle function, satisfaction, and physical activity ability after an acute ankle sprain.

Key words: Patient education hand out, home-based physiotherapy treatment, self-care, FAOS
Introduction

Ankle sprains are the most commonly treated sports and recreational injury (1, 2), and account for a significant number of consultations in emergency departments (EDs) (3). The incidence has been estimated to be one ankle sprain per 10,000 people per day (4). The injury generates a cost to society that is larger than many earlier have realised (2). Approximately 30% of patients with ankle sprains report chronic ankle problems such as pain, instability, and stiffness several years after their injury (5, 6). These persistent disabilities can lead to chronic ankle instability (CAI) and an increased risk of posttraumatic osteoarthritis (PTOA) in the injured ankle (2). In 16% of the PTOA cases the cause is a ligamentous lesion (7). The high rate of residual symptoms suggests that ankle sprains are not always managed correctly (8), since the risk of residual symptoms increases if the ankle treatment and rehabilitation are inadequate (9). There is a need for clearly defined acute care, increased knowledge about rehabilitation methods and continued research to determine the optimal treatment of an acute ankle sprain (10, 11); as a result, there is still no uniform management of this injury (9, 12).

Several studies (9, 13-15) have shown that early functional treatment (14, 15) is most effective and emphasize the importance of supervised rehabilitation after an acute ankle sprain. However, early functional treatment is rarely used in daily clinical practice since ankle sprains are assumed to recover naturally with little or no rehabilitation (16). In EDs, it can be hard to prioritize the patients’ needs regarding accurate information and instructions (15) and patients with an acute ankle sprain are not routinely referred to physiotherapy departments for further rehabilitation (16, 17). Chorley demonstrated that less than 1% of patients discharged from an ED with acute ankle sprain received information on the essential components for management and rehabilitation (18). Patients who participate in organized athletics more often receive supervised rehabilitation compared with a general population (14).
Previously, the authors of this article (15) showed physiotherapist-supervised rehabilitation had a more positive effect on patient-rated ankle function, satisfaction, and physical activity ability than receiving no specific rehabilitation in the first 6 weeks after an acute ankle sprain. After that study the question arose if the worse result in the group receiving no specific rehabilitation was due to a lack of information or lack of supervision. There is evidence supporting that patient information interventions (e.g. pamphlets) are effective for several orthopaedic conditions (19), but their utility in rehabilitation after an acute ankle sprain is still unclear. In a systematic review comparing supervised rehabilitation with home exercise programs reported some benefits for the patients receiving supervised rehabilitation (14). However the included studies focused mostly on objective measures and resprains or included scheduled appointments also for the patients receiving home exercise programs. The effect of written instructions alone on patient-reported outcome measures is still to be considered unclear. Therefore, the aim of this study was to compare the effects of written instructions versus physiotherapist-supervised rehabilitation on patient-rated ankle function, satisfaction, and physical activity ability after an acute ankle sprain.

**Material and Methods**

**Study design and participants**

Fifty-three consecutive patients (representing a general population) from an ED at a general hospital in Sweden were assessed for eligibility to be included in the written instruction (WI) group. The inclusion criteria were (a) acute ankle sprain grade I-III, where x-ray or obvious clinical signs showed no fracture (20), (b) aged 18-65 years old, and (c) proficient in the Swedish language. Exclusion criteria were (a) earlier fracture or surgery of the injured ankle, (b) injuries or disease in the lower extremities causing major activity-limiting disorders, (c)
ankle sprain in the same ankle requiring health care during the previous year, and (d) treatment of the injured ankle by another physiotherapist at the inclusion.

The patients were contacted by phone as soon as possible after the visit to the ED (median 1 day, range 0-6 days) and offered participation. After accepting all patients received oral and written information about the study, and signed their informed consent. The Regional Ethical Review Board in Linköping, Sweden approved the study.

The results of the WI group were compared with a group of 33 patients recruited from the same ED who received physiotherapist-supervised rehabilitation in a previous study (PT group) (15). The inclusion and exclusion criteria for the PT group were the same as for the WI group except for another exclusion criteria (d); no treatment by another physiotherapist outside the study during the whole evaluation time.

There is no standardized treatment regime for this patient group at the ED, all patients seeking care at the ED after an acute ankle sprain receive conventional treatment regardless participation in this study or not. Conventional treatment after an acute ankle sprain includes an examination of the ankle, usually a short period of weight unloading with crutches, elastic wrap, and verbal and/or written information from the attending physician or nurse, but since the staff at the ED changes frequently, the conventional treatment can differ from patient to patient depending on whom they meet.

**Intervention**

Patients in the WI group received written instructions about functional treatment and information about when it is appropriate to return to prior levels of activity, training, and competition after the injury (Appendix). The patients in the WI group also had the opportunity to call the physiotherapist in charge of the study (AF) with questions during the follow-up
period. No information was collected regarding what other treatments or self-management, other than physiotherapy, the patients in the WI group used during the follow-up period.

Patients in the PT group received instructions about functional treatment and exercises during four visits to a physiotherapist (AF). The first visit took place as soon as possible after the injury (median 4 days, range 1-14 days), and follow-ups after 3 weeks, 6 weeks and 3 months. The visits included an examination of the injured ankle, information of the ankle anatomy and function, and instructions about home exercises. The exercises were functionally based, allowing the patient to progress according to his or her functional ability. They also received the same information about when it was appropriate to return to prior levels of activity, training, and competition orally as the WI group did in writing. Two patients in the PT group used a brace during some weeks of the follow-up period. The intervention for the PT group was previously described in detail (15).

The intent was to measure how well the patients complied to the given exercises by a training diary in the PT group, but most of the diaries were incomplete and the information in the few completed diaries were difficult to compile (15). Therefore it was decided not to measure compliance in the WI group.

**Outcome Measures**

Both groups were evaluated with the same self-administered questionnaires 6 weeks and 3 months after the injury. The questionnaires contained questions about patient characteristics and the primary outcome measures, as described below. Working conditions were self-reported on a scale from 0-6 (modified from Steven Edworthy, McCraig Centre for Joint Injury & Arthritis Research, Calgary, Alberta, Canada) (Table 1).

The PT group completed the questionnaire at their visit to the physiotherapist. The WI group received the questionnaires by mail and non-responders received up to two reminders.
Foot and Ankle Outcome Score (FAOS)

The FAOS was the primary outcome measure to evaluate ankle function. The FAOS is a 42-item, self-administrated questionnaire (21) that assesses symptoms and functional limits across five domains: Pain, Symptoms, Activities of daily life (ADL), Sports and recreation function (Sport/Rec), and Foot- and ankle-related quality of life (QOL). A score from 0 (worse result) to 100 (best result) is calculated for each subscale. The validity and test-retest reliability for the FAOS has been tested with good results indicating it is a useful measure for detecting small changes over time in subjects with lateral ankle ligament injuries (21). A 10 point score change on the FAOS indicates a clinical change (22).

Visual analogue scale (VAS)

A VAS was used to assess patient-rated satisfaction and physical activity ability. The patients answered the question “How satisfied are you with your ankle?” by marking a cross on a 100-mm line situated between two polar descriptors (“completely satisfied” and “not satisfied at all”). The question “Compared with normal, how would you rate your physical activity ability today?” was answered by marking a cross between “normal, no limitation” and “severely limited” (23). The VAS was previously shown to be a reliable and valid technique for measuring subjective phenomena, such as satisfaction, QOL, and pain (24).

Statistical analysis

Prior to the study, a power analysis was carried out and determined that a total of 60 patients were needed to detect a clinically significant median score difference of 10 points in the subscale pain of the FAOS when comparing two groups, with 80 % power and at p=0.05 (25). Medians, first and third quartile (Q1-Q3), and range were calculated for the descriptive data, since both groups were not normally distributed in all variables. For the comparison between
the WI group and the PT group, the Chi-square test, Fisher’s exact test, and Mann-Whitney U-test were used, as appropriate. The underlying data obtained from questionnaire FAOS and VAS are ordinal and the Mann-Whitney U-test was used. The statistical analyses were performed using the Statistical Package for Social Sciences (SPSS), version 20.0. The level of significance was set at $p<0.05$.

Results

Thirty-nine patients were included in the WI group (Fig. 1). The inclusion of the thirty-three patients in the PT group is previously described (15).

The patients in the WI and PT groups were comparable in all characteristics except one (Table 1). In median all patients visited the ED at the same day as the injury occurred (range WI group 0-18 days, range PT group 0-6 days) ($p=0.883$). Two patients in the WI group utilized the possibility to call the physiotherapist in charge (AF) with questions during the study follow-up period. Four patients in the WI group had physiotherapy contact outside the study during the follow-up period (range 1-4 visits).

The WI group reported heavier working conditions before the injury compared with the PT group ($p=0.022$). However, the patients in both groups returned to work after a median of 2 days (range WI group: 0-35 days, range PT group: 0-25 days) ($p=0.787$). This calculation was based on a five-day workweek with weekends off. Three patients in the WI group and nine patients in the PT group were not included in this analysis since they were students or unemployed.
Physiotherapist-supervised rehabilitation significantly improved the subscales Pain, Symptoms, ADL, Sport/Rec and QOL of FAOS at 6 weeks compared with written instructions alone. After 3 months, there were significant differences in favour of physiotherapist-supervised rehabilitation in the subscales ADL, Sport/Rec, and QOL, but not in Pain and Symptoms (Table 2).

Physiotherapist-supervised rehabilitation significantly improved both patient-rated satisfaction and physical activity ability at both follow-ups compared with written instructions alone (Table 2, Fig.2).

The aim of this study was to examine if written instructions about functional treatment, as a complement to verbal information given at the ED, can replace physiotherapist-supervised rehabilitation after an acute ankle sprain. The main findings of the study demonstrated that physiotherapist-supervised rehabilitation is more effective than only written instructions on improving patient-rated ankle function, satisfaction, and physical activity ability after an acute ankle sprain. The PT group showed significantly better results, compared with the WI group, in nearly all parts of the self-administrated scales (FAOS and VAS), at the follow-ups 6 weeks and 3 months after the injury. Three months after the injury, the WI group reached the same level of ankle function, satisfaction and physical activity ability as the PT group had reached at the follow-up 6 weeks after the injury (Table 2, Fig. 2). The better result for the PT group was not only statistically significant, there was also a clinically significant difference between the two groups. For example, the median score for the PT group was 30 points higher.
than the WI group in the subgroup Sport/Rec at 6 weeks after the injury. One possible explanation for the differences between groups is individualized information and training in the PT group. Individuals respond differently to exercises; thus, each training program needs to be adapted to fit the individual’s needs (26), which is difficult to accomplish without the human meeting between patient and caregiver. The growing area of e-health can however open new possibilities. Dahlberg et al (27) showed potential to deliver individualized treatment to patients with knee and hip osteoarthritis through a web-based platform. The web-based platform combined video and verbal information with a possibility of communication between therapist and patient by chat. This may be a viable treatment developer even for patients after a ankle sprain.

The authors of this study previously reported on the positive effect of physiotherapist-supervised rehabilitation compared with a control group receiving no specific rehabilitation, in the first 6 weeks after an ankle sprain (15). The present study examined if this previous positive result for the PT group was due to a lack of information provided to the control group or lack of supervision. The new findings reinforce that patients with an ankle sprain need supervision in their rehabilitation and that it is a misperception in today's clinical practice that ankle sprains are simple and self-heal (15, 16). Thus, patients should be referred for physiotherapist-supervised rehabilitation.

Earlier studies compared clinical or home-based physiotherapy treatment for patients after acute ankle injuries, such as ankle fractures (28) and posterior tibial tendon dysfunction (29). In contrast to our results, these studies did not find a significant difference in physical function after the treatments, indicating that physiotherapy more often can be home-based. In a recently published systematic review comparing supervised rehabilitation and home exercise programs after acute ankle sprain showed that supervised rehabilitation had some benefits compared with home-based programs regarding pain and subjective ankle instability.
the first 8 weeks (14). Supervised rehabilitation also resulted in greater gain in ankle strength and proprioception at 4 months after an ankle sprain. The few included studies (four) were however only partly comparable with our study, due to study design including scheduled appointments also for the home-based treatment group (30) or due to outcome measures focusing on objective measures (31) or re-sprains and longer follow-ups (32). In addition, the review reported that only 11% of patients in a general population that had an ankle sprain, received supervised rehabilitation within the first 30 days (14).

It is likely that patients with an acute ankle sprain only need a few visits early on after the injury. The focus needs to be on information and instilling the confidence to start weight bearing and exercises early after the injury, to regain function faster in the ankle and to decrease the risk of recurrent ankle sprains and the development of CAI . This needs to be performed by trained healthcare professionals (11, 15). At the same time, programs that train physicians who work in the ED need to include education on the proper treatment, rehabilitation, and follow-up of patients with acute ankle sprains (18). Today in health care, there is a trend for fewer visits to all professions after injuries. However, the results in this study indicate that follow-up by a physiotherapist makes a positive difference after an acute ankle sprain.

Studies investigating alternative treatment options in physiotherapy are important from several perspectives. One perspective is the need to prioritize health care resources and these injuries are more costly for society than earlier known (2). Another perspective is that today’s lifestyle tends to have a high tempo and, if possible, patients prefer to perform the rehabilitation where it suits them best. At the same time, home-based treatments require that the patient is responsible for adherence to the treatment (33), as the efficacy of therapeutic exercises can only be established when patients comply with the exercise regime (34). Earlier studies demonstrated that the use of written instructions alone results in poorer exercise
performance compared with oral instructions given by a therapist and appeared to result in fewer improvements in injuries (35).

There are a number of limitations to the present study. The optimal design of this type of study is a randomized control trial (RCT), to minimize the risk of bias. However, there was no difference between the two groups in this study in patient characteristics. The standard management of ankle sprain injuries at the ED was also the same during both data collections. It would have been beneficial to evaluate the presence of residual symptoms and re-sprains one year after the injury to be able to compare the result with other similar studies (32). A longer follow-up would also have contributed with knowledge about if patients in the two groups developed CAI. The distribution of earlier ankle sprains was similar in the two groups, but we don’t know if any of those had CAI before inclusion in the study. Since the recommendation in management of CAI also is functional treatment as for an acute ankle sprain (36), not knowing the prevalence of CAI should not have affected the intervention and the outcome of this study. The prevalence and characteristics of CAI is today well established, but further research are needed about the causes of developing CAI (2) and PTOA (11).

There is no gold standard for how to design written instructions for acute ankle sprains and what information and exercises it should include. The written instructions used in this study (Appendix) were based on the information given to the patients at the visit to the physiotherapist in the initial study (15). The content was similar to other written instructions after acute ankle sprain (37) and these instructions are still used at the ED in the hospital where this study was carried out. We are not aware of the distribution of severity of the injury in the two groups, since the traditional grading system of ankle sprains from grade I (mild) to III (severe) was rarely used by the attending physicians at the ER. This grading is often impossible in an emergency situation, because the pain and swelling prevents full clinical assessment (16). There were no baseline measures in the study which would be of interest to
gain more knowledge about the progress of the patients. However, since the primary aim was to compare two groups with two different treatment methods and not to follow how each patient improved over time, baseline data was not collected.

RCT-studies with larger numbers of patients, longer evaluation periods and complementary health economic analysis, are needed to better determine the appropriate management after an acute ankle sprain.

Conclusion

Our findings indicate that physiotherapist-supervised rehabilitation is more effective than written instructions on improving patient-rated ankle function, satisfaction and physical activity ability; therefore, supervised rehabilitation is to prefer over written instructions alone after an acute ankle sprain.

Acknowledgments

The authors thanks to all patients who participated in the study. Further thanks to Futurum - Academy for Health and Care, Region Jönköping County for financially support.

References


Appendix. Rehabilitation instructions after an acute ankle sprain.
Table 1. Patient characteristics.

<table>
<thead>
<tr>
<th></th>
<th>Written instruction group (n=39)</th>
<th>Physiotherapy group (n=33)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender: male/female (n)</td>
<td>21/18</td>
<td>16/17</td>
<td>0.650</td>
</tr>
<tr>
<td>Age (y) (^a)</td>
<td>37 (23-46)</td>
<td>33 (22.5-45.5)</td>
<td>0.541</td>
</tr>
<tr>
<td>Body mass index (^a)</td>
<td>24.7 (23.2-27.5)</td>
<td>24.4 (22.5-25.7)</td>
<td>0.277</td>
</tr>
<tr>
<td>Injured foot: right/left (n)</td>
<td>20/19</td>
<td>17/16</td>
<td>0.984</td>
</tr>
<tr>
<td>Lateral/medial ankle ligament injury (n)</td>
<td>36/3</td>
<td>30/3</td>
<td>0.580</td>
</tr>
<tr>
<td>Dominant foot: right/left (n)</td>
<td>35/4</td>
<td>29/4</td>
<td>0.546</td>
</tr>
<tr>
<td>Previous ankle sprain: injured ankle (n) (^c)</td>
<td>15</td>
<td>16</td>
<td>0.392</td>
</tr>
<tr>
<td>Previous ankle sprain: uninjured ankle (n) (^c)</td>
<td>17</td>
<td>10</td>
<td>0.211</td>
</tr>
<tr>
<td>Type of activity at the injury (n)</td>
<td></td>
<td></td>
<td>0.125</td>
</tr>
<tr>
<td>Work activity</td>
<td>8</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Everyday activity</td>
<td>17</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Sport/recreational activity</td>
<td>14</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Self-reported working conditions (n) (^a)</td>
<td>4 (3-5)</td>
<td>4 (2-5)</td>
<td><strong>0.022</strong></td>
</tr>
<tr>
<td>6. Heavy work (lumber jack, fire fighter, construction worker, etc.)</td>
<td>9</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5. Moderately heavy work (truck driver, scrubbing floors, etc.)</td>
<td>10</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4. Moderate work (nurse, preschool teacher, housework with kids, etc.)</td>
<td>10</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>3. Light work (hairdresser, sales person, etc.)</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2. Sedentary work (secretary, desk work, student, etc.)</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>1. Do not work for reasons other than my foot</td>
<td>0</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>0. Sick-listed or disability pension because of my foot</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) Medians and first and third quartile (Q1-Q3) are reported. \(^b\) Medians and range are reported. \(^c\) The same patient may have reported both injured and uninjured ankles.
<table>
<thead>
<tr>
<th>FAOS subscales</th>
<th>Written instruction group (n=39)</th>
<th>Physiotherapy group (n=33)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain at 6 weeks</td>
<td>72 (56-83)</td>
<td>83 (69-92)</td>
<td>0.019</td>
</tr>
<tr>
<td>Pain at 3 months</td>
<td>86 (67-100)</td>
<td>94 (83-100)</td>
<td>0.076</td>
</tr>
<tr>
<td>Symptoms at 6 weeks</td>
<td>61 (50-86)</td>
<td>71 (59-91)</td>
<td>0.047</td>
</tr>
<tr>
<td>Symptoms at 3 months</td>
<td>79 (64-96)</td>
<td>89 (73-96)</td>
<td>0.169</td>
</tr>
<tr>
<td>Activities of daily life at 6 weeks</td>
<td>87 (75-97)</td>
<td>93 (90-100)</td>
<td>0.016</td>
</tr>
<tr>
<td>Activities of daily life at 3 months</td>
<td>94 (79-100)</td>
<td>100 (97-100)</td>
<td>0.001</td>
</tr>
<tr>
<td>Sports and recreation function at 6 weeks</td>
<td>45 (35-65)</td>
<td>75 (55-90)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Sports and recreation function at 3 months</td>
<td>70 (30-100)</td>
<td>90 (80-98)</td>
<td>0.005</td>
</tr>
<tr>
<td>Quality of life at 6 weeks</td>
<td>56 (31-63)</td>
<td>63 (53-81)</td>
<td>0.010</td>
</tr>
<tr>
<td>Quality of life at 3 months</td>
<td>69 (44-88)</td>
<td>81 (69-94)</td>
<td>0.015</td>
</tr>
<tr>
<td>VAS questions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction at 6 weeks</td>
<td>31 (20-70)</td>
<td>23 (8-35)</td>
<td>0.023</td>
</tr>
<tr>
<td>Satisfaction at 3 months</td>
<td>24 (5-53)</td>
<td>8 (3-18)</td>
<td>0.023</td>
</tr>
<tr>
<td>Physical activity ability at 6 weeks</td>
<td>28 (20-61)</td>
<td>15 (7-29)</td>
<td>0.006</td>
</tr>
<tr>
<td>Physical activity ability at 3 months</td>
<td>20 (5-42)</td>
<td>4 (2-15)</td>
<td>0.004</td>
</tr>
</tbody>
</table>

Median and first and third quartile (Q1-Q3) are reported. *100 represents the best result; *0 represents the best result.
Figure legend

Figure 1. Study flowchart for the written instruction group.

Figure 2. Self-reported satisfaction and physical activity ability in the written instruction group (n=39) and the physiotherapy group (n=33). A score of 0 = “completely satisfied/normal, no limitation” and 100 = “not satisfied at all/severely limited”.
Patients aged 18-65 years with an ankle sprain assessed for eligibility

53 persons

Excluded:
- Language = 2 persons
- Earlier operation = 1 person
- Other diseases/injuries = 4 persons
- Physiotherapist contact at the inclusion = 1 person

Potential participants
45 persons

Dropouts:
- Did not answer the phone call = 1 person
- Did not return the questionnaire = 5 persons

Included in the study
39 persons
Rehabilitation instructions after an ankle sprain

The foot anatomy

The foot consists of many small bones that are joined together by ligaments and muscles. When your ankle is sprained, often one or more of these ligaments are injured. Most commonly it is the lateral ligaments on the outside of the foot that are injured (about 80% of cases). These ligaments are weaker than those on the inside of the foot. The ligaments can rupture in total or partially. Sometimes a small piece of bone is dislodged from the attachment together with the ligament, but how to take care of and treat the injury is not changed.

Acute care management

Once the injury occurs, there is bleeding in the injured area. This bleeding causes swelling, pain and difficulty in weight-bearing on the foot. To reduce or stop the bleeding you can:

1. Use a tourniquet and a compression bandage
   * Tourniquet - wrap an elastic bandage (pull out the elasticity of the bandage to the maximum). Start on the front foot at the toes, and stop about 10 cm above the ankle. A tourniquet is important and should be used as quickly as possible after the injury. The bleeding is greatest in the first minutes. Leave the tourniquet on for 20-30 minutes, easing it for a minute and then apply a compression bandage.

   * Compression bandage - (wrap with about 50% of the elasticity of the bandage) decreases the secondary swelling that arises due to the bleeding drawing fluid from the surrounding area. Use a compression bandage as long as the foot swells to counteract secondary swelling.

2. Elevated position

   Place the injured foot as high above the heart as possible to reduce the blood flow to the injured area.

3. Cold

   Cooling has the ability to reduce bleeding/swelling, but primarily has a pain reducing effect. Use crushed ice in a plastic bag. Remember not to put the cold directly to the skin.

Walking technique

It is important to start weight-loading on the foot as soon as possible after an ankle sprain, even if the ankle hurts. Crutches can be used during the first days to ease off the body weight, if you can’t put weight on the foot due to the pain. However, it is important not to jump with your foot in the air. The injury will heal much faster if you quickly start trying to walk as normally as possible on the foot! If necessary, take painkillers to get started.
Healing

It takes at least 6 weeks before the ligaments heal, but you should get started with mobility and rehabilitation exercises directly. These exercises are of importance to regain full function in the foot after an ankle sprain.

It is easier to regain function in your foot if the swelling decreases. Bruising on the foot can be noticed after some days. It is the natural consequence of the bleeding that occurred when tissues were injured. Some swelling may persist for several months. In order to reduce the swelling and thereby optimize the healing process it is important to get started as quickly as possible with mobility exercises. You can start with exercise 1-4 below as soon as possible after the injury, often the same day as the injury occurred.

Rehabilitation exercises

After a couple of days, you can increase the training with strength-, balance- and coordination exercises. In the ligaments, there are sensory cells that detect the position and movement in the foot. When the ligaments are damaged there is an impairment of this function, which means an increased risk to reinjuring the foot. The strength in the muscles are also often lost, which decreases the stability of the foot. By performing the following strength-, balance- and coordination exercises you are going to improve your muscle strength and the ability of the sensory cells in the ligaments to detect the position and movement in the foot. To achieve a good result it is necessary that you gradually increase the severity of the exercises.

Mobility exercises

1. Move your ankle vigorously up and down. 20 repetitions each hour or as often as possible

2. Nip and sprawl with your toes. 20 repetitions each hour or as often as possible

3. Draw letters of the alphabet in the air. Start with small movements and increase gradually

4. Use a towel or a ball to slide with your foot forwards and backwards.

5. Toe raises on both feet at the same time. Increase the load by doing them on one foot. Compare if the feeling is the same between the feet and if you can manage as many on both feet.

6. Stand on one leg. Increase the degree of difficulty by turn your head from side to side, bouncing/throwing a ball, closing your eyes or, if possible, use a balance board.

7. If you have an elastic band or access to a pulling device (available at most gyms) this is a perfect way for exercising your foot. Attach the elastic band around the foot and pull it towards yourself. You can also attach the elastic band to pull the foot sideways, in- and outwards.
8. Stretch your calf muscles with the assistance of a wall. Do it both with your back leg straight and bent.

11. Skate jumps from side to side. Start with small jumps and increase gradually as the foot gets better.

12. Start from the middle. Jump with two feet together in all directions. Increase by jumping only on the injured foot.

Training-competition-game?
You can conduct alternative training from the first day after the injury, to train the rest of your body. You can use an exercise bike or run with a wet vest in water, to maintain your fitness level. If your goal is to return to "tougher" activities, for example soccer, it is important that you do some jumping and running exercises in different directions (exercise 9-12). Before you return to sports it is important that you trust your foot in everyday activities. Some pain is acceptable after activity, but should be gone the next day. It is possible that tape or some kind of ankle support can complement the rehabilitation training. A physiotherapist can teach you how to tape your ankle.

9. Take-offs. Start with small jumps and increase gradually as the foot gets better.

10. Jog in an eight. Switch direction, increase the speed.