

# Lack of Medical Treatment From a Medical Professional After an Ankle Sprain

Tricia Hubbard-Turner, PhD, ATC, FACSM

Department of Kinesiology, University of North Carolina, Charlotte

**Context:** Despite the prevalence of ankle sprains and the potential for developing chronic ankle instability and ankle osteoarthritis, ankle sprains are often perceived as an innocuous injury.

**Objective:** To understand the initial management and treatment sought by patients after a lateral ankle sprain (LAS) and to identify any differences in subjective function and self-reported injury.

**Design:** Cross-sectional study.

**Setting:** Research laboratory.

**Patients or Other Participants:** A total of 175 participants with chronic ankle instability (73 men, 102 women; age =  $20.9 \pm 3.4$  years, height =  $173.5 \pm 13.2$  cm, mass =  $81.4 \pm 24.6$  kg) were involved in the study.

**Main Outcome Measure(s):** Participants were administered a questionnaire regarding their initial LAS. All participants also completed the Foot and Ankle Ability Measure (FAAM). The primary questions of interest were (1) Did the participants seek treatment from a medical professional for their initial LAS? (2) Did the participants perform rehabilitation? (3) Was the initial LAS immobilized? and (4) Did the participants use crutches? The other variables measured were scores on the FAAM and

the FAAM Sports subscale, total number of ankle sprains, and incidents of giving way.

**Results:** Sixty-four percent of participants did not seek medical treatment after their LAS. Those who did not seek medical treatment scored worse on the FAAM ( $81.21\% \pm 3.1\%$  versus  $89.23\% \pm 2.8\%$ ,  $P = .03$ ) and the FAAM Sports subscale ( $72.34\% \pm 5.3\%$  versus  $81.26\% \pm 3.1\%$ ,  $P = .001$ ). Those not seeking treatment also reported more ankle sprains since the initial injury ( $4.7 \pm 2.4$  versus  $1.9 \pm 0.90$ ,  $P = .02$ ) and more incidents of giving way each month ( $3.8 \pm 1.9$  versus  $1.1 \pm 0.87$ ,  $P = .04$ ).

**Conclusions:** It is not surprising that those who did not seek medical treatment for their LASs had worse subjective function, more ankle sprains, and more incidents of the ankle giving way. The public needs to be educated on the significance of ankle sprains and the need for medical attention to provide appropriate management. However, we also need to continue to evaluate initial management and rehabilitation to ensure that those who seek treatment receive the best care in order to reduce reinjury rates.

**Key Words:** exercise, physical activity, rehabilitation, function

## Key Points

- The majority of participants in this study did not seek medical treatment for their initial lateral ankle sprains.
- Those who did not seek medical treatment for their ankle sprains scored worse on the Foot and Ankle Ability Measure.
- The public needs to be educated on the significance of an ankle sprain and the need for proper treatment and management to prevent long-term joint dysfunction.

Ankle sprains continue to be one of the most prevalent injuries sustained by athletes.<sup>1</sup> Individuals with a history of lateral ankle sprain (LAS) and chronic ankle instability (CAI) often develop posttraumatic osteoarthritis. Specifically, up to 75% of those who sprain their ankles will go on to develop CAI.<sup>2–4</sup> Later in life, patients with a history of an LAS and CAI frequently develop posttraumatic ankle osteoarthritis.<sup>5</sup> To prevent the negative outcomes of an acute LAS, researchers need to continue to examine initial management and treatment.

Two primary theories have been articulated in a recent consensus statement of the International Ankle Consortium regarding why patients develop CAI after an ankle sprain.<sup>6–8</sup> The first relates to a lack of initial care or management of the LAS. A number of authors have reported on this topic. McKay et al<sup>2</sup> found that only 50% of athletes who sprained their ankles sought medical care. In a more recent study, Hiller et al<sup>9</sup> noted that of the 62

participants in their community-based study with ankle disorders, 63.9% did not seek medical care within the preceding year. Based on the current evidence, less than 63.9% of patients sought medical treatment after an ankle sprain.<sup>2,9</sup> Therefore, it should not be surprising that more than 75% of patients develop CAI after an LAS.<sup>2</sup> The high percentages of patients who do not seek medical treatment after an LAS and who develop CAI should be significant public health concerns.

The second theory addresses the lack of appropriate treatment or rehabilitation (or both) after the LAS. Initial management of an LAS is important to facilitate tissue healing and restore joint stability.<sup>10</sup> If an individual does not seek initial medical care, rehabilitation or exercises to improve function of the ankle will likely not be prescribed or performed. Yet even for patients who seek medical treatment, the focus appears to be on return to play and activity, not restoration of ankle function, although this is

not supported in the literature.<sup>11</sup> Previous researchers<sup>8</sup> reported that increased mechanical laxity was still present 8 weeks after an initial LAS. This joint instability may be secondary to improper ligament healing or to the ligaments' healing in an elongated state, which could be the result of a lack of medical care. Lamb et al<sup>12</sup> demonstrated that rigid immobilization (below-the-knee cast, Aircast brace [DJO Global, Dallas, TX]) resulted in the best outcomes for LASs. In addition to joint instability, sensorimotor impairment has been consistently observed in patients with CAI.<sup>13–15</sup> Investigators<sup>16–18</sup> have also shown that balance-training programs can restore or improve balance in those with CAI. Therefore, appropriate rehabilitation programs performed after an LAS could potentially enable individuals to avoid long-term sensorimotor impairments. However, patients who do not seek medical care from a professional will not know the true severity of the injury and may not appropriately treat (brace, cast) or manage (modalities, initial exercise) their LASs. No current studies in the literature have addressed outcomes (eg, range of motion, strength, balance) among those who did not undergo rehabilitation. Therefore, more research on the treatment and rehabilitation of patients with acute LASs is needed.

The 2 theories discussed earlier help us to understand that those who do not seek care after an LAS may underestimate the severity of injury and the subsequent instability and may not recover sufficiently through rehabilitation to appropriately resolve their impairments, activity limitations, and participation restrictions. Thus, the purpose of this retrospective examination was to explore the relationship between self-reported medical attention and self-reported function. I hypothesized that those who did not seek care after an LAS would have worse self-reported function than those who did seek care.

## METHODS

### Participants

A total of 175 participants with CAI (73 men, 102 women; age =  $20.9 \pm 3.4$  years, height =  $173.5 \pm 13.2$  cm, mass =  $81.4 \pm 24.6$  kg) took part in the study. Participants were recruited from classes at the university. To minimize recall bias, all participants had to have sustained their first LAS within the previous 5 years. Inclusion and exclusion criteria used were in accordance with the International Ankle Consortium criteria for CAI.<sup>6–8</sup> Inclusion criteria were a history of at least 1 significant LAS that occurred at least 12 months before study enrollment; that the LAS was associated with inflammatory symptoms (pain, swelling, etc) and resulted in at least 1 interrupted day of desired physical activity; and a history of the previously injured ankle joint giving way or recurrent sprain or feelings of instability. Participants had to score less than 24 on the Cumberland Ankle Instability Tool and answer *yes* to at least 5 yes/no questions on the Ankle Instability Instrument. Exclusion criteria were an LAS within 3 months of study enrollment, a history of surgery to either lower extremity, a history of fracture in either lower extremity requiring realignment, or acute injury to the musculoskeletal structures of other joints of the lower extremity in the previous 3 months that affected joint integrity and function. All participants

**Table 1. Ankle Sprain Treatment Questionnaire<sup>a</sup>**

Please answer the following questions in regards to your first ankle sprain: When did your first ankle sprain occur:	
Did you seek or receive medical treatment for that ankle sprain (physician, athletic trainer)?	Yes
	No
If yes, who provided your treatment:	
Was the initial ankle sprain immobilized (example: wrap, brace, cast)	Yes
	No
If yes, what type of immobilization:	
Were you provided with (and did you use) crutches for the initial ankle sprain?	Yes
	No
Did you perform rehabilitation for the initial ankle sprain:	Yes
	No
If yes, how long did you perform rehabilitation?	
If yes, who supervised your rehabilitation?	
If yes, what types of exercises did you perform?	
Since your first ankle sprain, have you sought medical treatment for subsequent ankle sprains?	Yes
	No

<sup>a</sup> Questionnaire is reproduced in its original form.

provided written informed consent before the study, and the testing procedures were approved by our university's institutional review board.

### Procedures

After providing informed consent, all participants completed 2 questionnaires. The first questionnaire (Table 1) sought to measure the initial treatment and management received for their first LAS. Participants were asked when the first LAS occurred, if they sought treatment, and if yes, from whom. They were asked how they managed the initial LAS. Questions included whether they used immobilization or crutches and whether they pursued rehabilitation. Finally, participants were asked whether they had sought medical care since their initial LAS. For the second questionnaire, all participants completed the Foot and Ankle Ability Measure (FAAM). The FAAM consists of a 21-item subscale for activities of daily living and an 8-item sports subscale (FAAM-Sports).<sup>19</sup> The FAAM has been reported to be a reliable, responsive, and valid measure of physical function for individuals with musculoskeletal injuries to the lower leg, foot, and ankle.<sup>19</sup>

### Statistical Analysis

After completing all questionnaires, participants were split into 2 groups: those who had sought medical treatment and those who had not. All participant demographic and injury-related data were analyzed using an independent *t* test between groups (treatment, no treatment). All statistical analyses were performed using JMP Statistical Analysis software (SAS Institute, Cary, NC). An  $\alpha$  level of  $P < .05$  was used to determine significant effects for each analysis. Hedges *g* effect sizes were calculated to determine the magnitude of the effect. The strength of the effect sizes was identified as *small* (0.02–0.49), *moderate* (0.5–0.79), or *large* ( $\geq 0.80$ ).

### RESULTS

Means and standard deviations for all dependent variables are presented in Table 2. Of the 175 participants

**Table 2. Participant Demographics**

Characteristic	Treatment (n = 63)	No Treatment (n = 112)	Effect Size (95% Confidence Interval)
	Mean $\pm$ SD		
Cumberland Ankle Instability Tool score	22.4 $\pm$ 1.3	21.1 $\pm$ 2.5	0.60 (0.29, 0.92)
Foot and Ankle Ability Measure, %	89.23 $\pm$ 2.8	81.21 $\pm$ 3.1 <sup>a</sup>	2.66 (2.25, 3.08)
Foot and Ankle Ability Measure–Sports, %	81.26 $\pm$ 3.1	72.34 $\pm$ 5.3 <sup>a</sup>	1.92 (1.55, 2.28)
Time since first ankle sprain, y	3.7 $\pm$ 1.2	4.1 $\pm$ 0.8	NA
Ankle sprains since initial sprain, No.	1.9 $\pm$ 0.90	4.7 $\pm$ 2.4 <sup>a</sup>	1.40 (1.05, 1.74)
Giving-way episodes per month, No.	1.1 $\pm$ 0.87	3.8 $\pm$ 1.9 <sup>a</sup>	1.67 (1.32, 2.03)
Who provided treatment?, % (No.)			
Athletic trainer	86 (54)	NA	NA
Physician	14 (9)		
Immobilized?, %			
Any immobilization	100	0	NA
Elastic wrap	86		
Used crutches?	0	0	NA
Pursued rehabilitation?, %	86		
If rehabilitation pursued		0	NA
How long?, d, mean $\pm$ SD	4.9 $\pm$ 3.4		
Supervised by athletic trainer, %	100		
Exercises, %			
Range of motion	100		
Strengthening (tubing)	74		
Balance	0		
Sought treatment since initial sprain?	0	0	NA

Abbreviation: NA, not applicable.

<sup>a</sup> Indicates difference ( $P < .05$ ).

enrolled in the study, 64% did not seek medical care after their LASs. Of those 36% (63) who did seek medical treatment, 54 (86%) received primary treatment from a certified athletic trainer (AT). All of these participants pursued rehabilitation and used some form of immobilization for the injury. None used crutches. Of the 54 who sought treatment from an AT, 48 performed only range-of-motion and strengthening exercises (ie, no balance exercises). The most common type of immobilization was an elastic bandage (86%). The other 9 participants who sought treatment (but not from an AT) went to the emergency room ( $n = 3$ ) or urgent care center ( $n = 6$ ) and saw a physician or physician assistant. These participants were not referred for further care or rehabilitation; they were sent home with a basic prescription for rest, ice, compression, and elevation. Of those who did not seek treatment (64%,  $n = 112$ ), none pursued rehabilitation or used immobilization or crutches to treat the initial injury.

A difference was evident in the FAAM ( $P = .03$ ) and FAAM-Sports scores ( $P = .001$ ) between those who sought treatment and those who did not. The latter group scored worse on the FAAM (81.21%  $\pm$  3.1% versus 89.23%  $\pm$  2.8%) and FAAM-Sports (72.34%  $\pm$  5.3% versus 81.26%  $\pm$  3.1%). Those also experienced more ankle sprains since the initial injury (4.7  $\pm$  2.4 versus 1.9  $\pm$  0.90,  $P = .02$ ) and more incidents of giving way each month (3.8  $\pm$  1.9 versus 1.1  $\pm$  0.87,  $P = .04$ ).

Effect sizes and 95% confidence intervals are presented in Table 2. For the FAAM and FAAM-Sports scores, the number of LASs since the initial injury, and the number of giving-way episodes per month, effect sizes were high. Effect sizes were moderate for the Cumberland Ankle Instability Tool score.

## DISCUSSION

Based on the previous literature and the high percentage of participants who reported CAI, it was not surprising that 64% of the study participants did not seek medical treatment after their LASs. Given the importance of medical care and treatment, it was also not surprising that those who sought medical treatment had better subjective function, fewer ankle sprains, and fewer giving-way episodes compared with the group who did not seek medical treatment. However, it is important to note that although the participants who sought medical treatment reported better subjective function, they were still classified as having CAI. So their initial management was insufficient to prevent the development of a chronic ankle condition.<sup>11</sup>

These results support those of previous researchers<sup>2,9,20</sup> who noted that a significant percentage of people did not seek medical treatment after an ankle sprain. McKay et al<sup>2</sup> found that only 50% of athletes who sprained their ankles sought medical care. More recently, Hiller et al<sup>9</sup> observed that 63.9% did not seek medical care after an ankle sprain. Similar to the Hiller et al<sup>9</sup> study, I showed that 64% of participants did not seek medical treatment after their LASs. Anecdotally, this finding was not unexpected. Ankle sprains do not seem to be a significant concern for athletes or the physically active. They receive far less public attention than other orthopaedic injuries although they are more common and have potentially significant long-term consequences (eg, lack of physical activity, posttraumatic osteoarthritis). To prevent long-term instability and other joint problems, LASs need to be recognized as a substantial orthopaedic concern that must be treated and managed as such.

After a joint injury, facilitating tissue healing and addressing sensorimotor impairments are integral to the restoration of function. Lamb et al<sup>12</sup> demonstrated that patients with severe ankle sprains who were immobilized in a below-knee cast had a more rapid recovery than those given a tubular compression bandage. Clinically important benefits were present at 3 months postinjury in pain, symptoms, and activity level.<sup>12</sup> Their overall recommendation was to immobilize the ankle for a short period in a below-the-knee cast or Aircast rather than a tubular bandage for faster recovery. Beynnon et al<sup>21</sup> found that for treatment of grade I and grade II ankle sprains, the Air-Stirrup brace (DJO Global) combined with elastic wrap provided better outcomes than a walking cast. However, the outcome with the walking cast was better than with either the Air-Stirrup or elastic wrap alone.<sup>21</sup> So, for patients with less severe injuries, more rigid immobilization is still needed in the form of an Air-Stirrup with elastic wrap to facilitate a return to preinjury function. Of the 63 participants who sought medical treatment, all reported using some form of immobilization, and 86% reported using an elastic compression bandage, which is similar to the tubular bandage used by Lamb et al.<sup>12</sup> The remaining participants (14%) reported being given an ankle brace, with most describing a lace-up-style brace. Although compared with those who did not seek treatment, all the participants in the treatment-seeking group had better function and fewer subsequent LASs and giving-way incidents, the latter group was still classified as having CAI. The lack of a more rigid form of immobilization may have contributed to the development of CAI. Previous researchers<sup>21,22</sup> have demonstrated the presence of mechanical laxity in those with CAI. Use of a more rigid form of immobilization may better facilitate healing and therefore restoration of joint stability after an LAS.

In addition to immobilization, early exercises are needed to help restore optimal function after an ankle sprain. The authors<sup>22</sup> of a recent systematic review and meta-analysis examined treatment strategies for acute LASs and those with CAI. They provided strong evidence for early movement and the use of nonsteroidal anti-inflammatory drugs.<sup>22</sup> Moderate evidence supported exercises and manual therapy techniques for pain, swelling, and function. In addition, exercise therapy and bracing helped to prevent CAI.<sup>22</sup> It is important to note that 15 systematic reviews evaluated the effectiveness of exercise therapy for the treatment of an acute LAS. The reviews were unanimous in showing that exercise therapy was critical for improving self-reported function after an LAS.<sup>22</sup> A total of 86% of participants in my study who sought treatment from a medical professional pursued rehabilitation. Of those, 100% performed range-of-motion exercises and 74% performed strengthening exercises. All participants described basic range-of-motion exercises (eg, ankle pumps, writing the alphabet); none received any manual therapy techniques. Seventy-four percent of participants performed strengthening exercises using tubing. The other 14% of participants did not report pursuing any rehabilitation or exercises after their sprain. These participants visited emergency rooms or urgent care facilities and were given information only on basic management, rest, ice, compression, elevation, and immobilization.

Early exercise and manual therapy techniques have resulted in better outcomes after LASs.<sup>23–25</sup> Thus, the lack of balance-training exercises and manual therapy techniques among participants is concerning. However, the participants might not have displayed arthrokinematic impairments or balance deficits, which could explain why those exercises were not prescribed. Also, the grade or severity of the ankle sprain is unknown, which may explain the limited exercises prescribed. Yet the participants who sought treatment were still classified as having CAI, so the immediate treatment and management of their LASs were possibly insufficient.

The current study had a few limitations. First, there was the potential for recall bias. I tried to limit this by not recruiting participants who sustained their LASs more than 5 years before the study. All participants who enrolled were able to answer all the questions, and I must trust that they were honest in their answers. I was not able to report the grade or severity of LASs between groups. The majority of participants “couldn’t remember” when asked about the grade of LAS they experienced.

Investigators continue to demonstrate the negative long-term consequences of an LAS. Even so, 64% of participants did not seek treatment for their LASs. As clinicians and researchers, we must determine how to best communicate the message that LASs are a significant injury and need to be treated as such to prevent long-term dysfunction. As noted earlier, numerous authors have demonstrated effective management of LASs with immobilization and rehabilitation techniques including balance training and manual therapy. However, if patients do not see the need for and importance of seeking treatment, we cannot implement these proven methods. It is also important to recognize that those who did seek treatment were still classified as having CAI, which is not unexpected because they only performed rehabilitation for an average of 5 days and no balance exercises were prescribed. After LASs, the emphasis may be more on a quick return to play than restoration of joint function.<sup>11</sup> If this is the case, clinicians cannot be surprised that even those who seek medical treatment have chronic joint dysfunction. This dysfunction at the ankle can lead to further problems later in life, including decreased physical activity, which could lead to the development of numerous hypokinetic diseases.

Future researchers need to next look at participants who are considered copers. *Copers* have sprained their ankles but experience no chronic symptoms. We must consider the initial management of their LASs compared with those who have CAI. We also need to see if part of the problem is access to medical care. I did not ask participants if they were at a school that provided an AT or if they had access to an AT. I also did not examine socioeconomic status or access to general health care. Numerous factors may affect why a patient does or does not seek medical care; these may have played a role in this study and thus need to be examined.

## CONCLUSIONS

Based on the current findings, it is clear that both patients and ATs must be educated on the importance of medical attention and appropriate treatment of acute LASs to achieve better management. The percentage of people who

do not seek medical care is concerning, but also concerning is the lack of rehabilitation and exercises being prescribed to these patients when they do seek care. The long-term consequences of an LAS are serious, and immediate care and rehabilitation are crucial for decreasing these consequences.

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Address correspondence to Tricia Hubbard-Turner, PhD, ATC, FACSM, Department of Kinesiology, University of North Carolina, 9201 University City Boulevard, Charlotte, NC 28223. Address e-mail to [thubbar1@unc.edu](mailto:thubbar1@unc.edu).