WILDERNESS & ENVIRONMENTAL MEDICINE, **26,** 305–311 (2015)

ORIGINAL RESEARCH

Femoral Traction Splints in Mountain Rescue Prehospital Care: To Use or Not to Use? That Is the Question

Harriet Runcie, MB ChB; Mike Greene, FRCS, FCEM

From the North Cumbria University Hospitals NHS Trust, Emergency Department (Dr Runcie), and Emergency Medicine (Mr Greene), West Cumberland Hospital, Whitehaven, UK.

Objectives.—To determine the incidence of femur fractures in mountain rescue in England and Wales. To investigate the attitudes of rescuers toward the use of femoral traction splints. To review the literature for evidence on the use of traction splints in prehospital medicine and test the hypothesis that femoral traction splints reduce morbidity and mortality in patients with a fractured femur.

Methods.—The Mountain Rescue England and Wales database was searched for cases of suspected fractured femur occurring between 2002 and 2012, a questionnaire was sent to all mountain rescue teams in England and Wales, and a literature review was performed. Relevant articles were critically reviewed to identify the evidence base for the use of femoral traction splints.

Results.—Femur fractures are uncommon in mountain rescue, with an incidence of suspected femur fractures on scene at 9.3 a year. Traction splints are used infrequently; 13% of the suspected femur fractures were treated with traction. However, rescuers have a positive attitude toward traction splints and perceive few disadvantages to their use. No trials demonstrate that traction splints reduce morbidity or mortality, but a number describe complications resulting from their use.

Conclusions.—Femur fractures are rare within mountain rescue. Traction splints may be no more effective than other methods of splinting in prehospital care. We failed to identify evidence that supports the hypothesis that traction splints reduce morbidity or mortality. We advocate the use of a femoral traction splints but recognize that other splints may also be appropriate in this environment.

Key words: femoral fracture, splints, traction, wilderness medicine, prehospital care

Introduction

The first femoral traction splint was designed in 1875 by Hugh Owen Thomas for the treatment of chronic joint problems, in particular tuberculosis of the knee.[1] During the First World War, Dr Jones introduced femoral traction splints into military practice.[2] They became the standard definitive treatment for femur fractures until the development of femoral nailing in the 1950s. From the 1980s onward, femoral nailing became the definitive treatment and traction splints were only used before surgery.[3] Traction splints are believed to reduce the complications of a femur fracture: bleeding, pain, and nerve damage. They are regarded as standard treatment for the initial management of fractures of the shaft of the femur in prehospital care and are advocated in prehospital care and mountain medicine texts both in the United Kingdom and the United States.[4–9]

In the challenging environment of mountain rescue, traction splints can be difficult to use. They require training and may not fit into the package of stretcher, casualty bag, and vacuum mattress. In addition, they have to be carried to the scene and can only be used for a single type of injury.

This study was designed to investigate the strength of literature supporting the use of femoral traction splints and the attitudes of rescuers who use them. The incidence of these fractures in mountain rescue in England and Wales has not been previously reported. This study has relevance to all those in prehospital care and in particular to those who practice wilderness medicine.

Disclaimers: The authors have no financial ties to disclose. This study has been discussed with the U.K. NHS Research Authority Research Ethics Committee. No concerns were identified and it was deemed further review was not required. M.K. Greene is Medical Officer for Mountain Rescue England and Wales and a member of The International Commission for Alpine Rescue Medical Commission.

Corresponding author: Harriet Runcie, MB, ChB, North Cumbria University Hospitals NHS Trust, Emergency Department, West Cumberland Hospital, Whitehaven, CA28 8JG (e-mail: harriet.runcie@gmail.com).

Methods

Mountain Rescue England and Wales (MREW) maintains a database of all calls undertaken by mountain rescue teams within England and Wales. It contains details on the incident, the casualty's injures, and treatment. This database was searched using the search criteria "fractured femur" for cases between April 2002 and April 2012. To investigate attitudes toward traction splints, a questionnaire was designed (Appendix 1) and posted on a website. An e-mail containing a link was then sent to all England and Wales mountain rescue teams secretaries, who were asked to distribute it to all their team members. Participants were offered a range of problems and benefits on the use of traction splints and asked to rank them on perceived importance. A literature search was performed using Embase, Medline, and Cochrane databases. Multiple searches were performed using various search terms: "femur OR femoral fracture AND traction splints," "traction splints," "complications AND traction splints," and "benefits AND traction splints." These were combined with other searches using the terms "prehospital medicine" and "femur OR femoral OR shaft of femur AND fracture." The identified articles and any relevant referenced articles were critically reviewed and graded according to quality, using the Oxford Centre for Evidence-Based Medicine tools.[10]

Results

During the 10-year study period, 93 casualties with a suspected femur fracture were identified (9.3 per year). These injuries were identified by the mountain rescue team members and included all clinically suspected femur fractures. It was recorded in the database that 13% of the suspected femur fractures had been treated with a traction splint, 17% with a simple splint without traction, and 70% without any kind of limb splint.

A questionnaire was sent out to all MREW teams to assess attitudes toward traction splints. Responses were received from 26 of the 51 teams, a total of 164 individuals. Responses came from all regions of the United Kingdom covered by the MREW teams. In this survey 44% of team members reported that they had not encountered a femur fracture or used a traction splint in the past 5 years. Figure 1 demonstrates all the estimates given.

When asked about use, 68% of rescue team members who responded reported using a traction splint for every suspected femur fracture, 32% said they used a traction splint selectively and decisions were based on the type of fracture, the other associated injuries, availability of splints, and other forms of analgesia. Ninety-three percent of team members reported having had training on traction splint use within the past year, with 75% of those within the last 6 months.

The survey assessed attitudes toward the perceived benefits and problems of using a traction splint in this environment using a numerical rating scale, where 1 was not beneficial/not problematic and 5 very beneficial/very problematic. The results were generally positive, with most team members perceiving suggested benefits at 5 (very beneficial; Figure 2), and the problems low, suggesting little difficulty in using traction splints (Figure 3).

The literature search initially found 141 articles. These were looked at to assess whether they helped disprove the hypothesis that traction splints reduce morbidity and mortality of femur fractures. Of these 141 articles, we identified 17 plus 1 conference abstract relevant to the hypothesis. Of these, 4 were excluded: 2 because they discussed traction splint use as a definitive treatment before the introduction of femoral nailing or in children, and a further 2 because they were designated as level 5

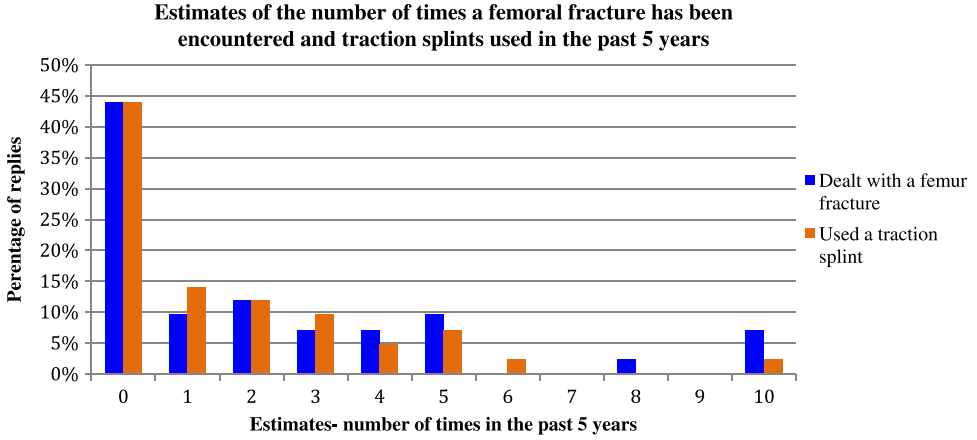

Figure 1. Estimates on femur fracture encounters and on use of traction splints.