Commentary

A guide to an improvised femoral traction splint in a resource-limited setting

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ABSTRACT

A femoral traction splint is a mechanical device that uses traction to align and provide stability to femoral fractures. The use of this device has many benefits however there is still limited availability in low- and middle-income countries. This article provides the reader with a step by step guide to improvised a femoral traction splint built from recyclable materials readily available in most hospitals. The authors' concept will give patients access to a potentially life-saving device in a resource-limited setting.

African relevance

- Femoral traction devices are an essential piece of equipment in the emergency centre
- The use of a femoral traction splint decreases patient morbidity and mortality.
- There is still limited availability of femoral traction splints in low- and middle-income countries.
- An improvised femoral traction splint is an ideal alternative to commercial traction splints.
- This will give patients access to a potentially life-saving device in a resource-limited setting.

Introduction

A femoral traction splint is a mechanical device that uses traction to align and provide stability to femoral fractures. The use of the device minimizes pain, pulmonary complications, blood transfusions and neurovascular complications to the limb [1].

The basic concept is to overcome deformating forces around the fracture. The traction splint is positioned with the proximal end against the ischial tuberosity and the distal part is connected to skin traction. Increasing the tension of the skin traction produces a caudally directed force at the hip creating traction through the limb.

Femoral traction devices are an essential piece of equipment in the emergency centre and the benefits largely outweigh the known complications associated with the application of these devises which include peroneal nerve palsy, pressure sores, compartment syndrome and soft tissues injuries [2]. Unfortunately, despite the many benefits of traction splints, there is still limited availability in low- and middle-income countries [3].

An improvised femoral traction splint, built from an axillary crutch, is presented below as an alternative to the traditional commercial traction splints which are not widely available.

Guide to building an improvised femoral traction splint

Components needed to build the device include a large axillary crutch, orthopaedic padding bandage and three strips of collar and cuff padded sling material (Fig. 1).

Step 1
Remove the handgrip and the rubber crutch tip/foot from the crutch (Fig. 2).

Step 2
Fold one strip of padded sling material in half and attach it to the proximal axillary bar by means of a hitch knot (Fig. 3).

Step 3
Place 2 additional strips of sling material around the body of the
crutch. These can be adjusted to support the leg at several points along its length (Fig. 4).

Step 4

Apply multiple layers of orthopaedic padding bandage around the proximal rubber axillary bar. This aims to prevent potential pressure ulcers and improve patient comfort (Fig. 5).

Application

Apply skin traction to the affected leg and slide the traction splint underneath the thigh ensuring the proximal axillary bar is placed against the ischial tuberosity. Secure the splint at the level of the groin with the sling material from the hitch knot. This will prevent proximal migration of the splint when traction is applied (Fig. 6).

Depress the spring loaded buttons and adjust the telescopic shaft to its shortest position. Apply modest traction to the skin traction rope. Make an overhand knot where the rope of the skin traction meets the most distal end of the crutch shaft. Feed the excess rope with the knot into the shaft and replace the crutch tip/foot securely (Fig. 7).

Depress the spring loaded buttons and pull on the telescopic tube to adjust the traction force as required (Fig. 8). The two distal padded slings can now be adjusted and tied to the leg so that the fracture ends align in the sagittal plane (Fig. 9).

Cautionary note

It must be noted that all of the above equipment is necessary to build the femoral traction splint including the availability of skin traction. We...
Recall using padded slings with a width greater than 5 cm applied loosely enough to allow two fingers’ space between the strap and the skin to prevent soft tissue injury and possible circulatory compromise.

Instructional video

Click here for link to instructional video on the application of an improvised femoral traction splint using a large axillary crutch.

https://youtu.be/svYB2UjFpIg

Alternatively, scan QR code:

![QR Code]

Advantages and pitfalls

This improvised femoral traction splint is advantageous in low- and middle-income countries as it is a suitable alternative to unavailable traditional traction splints. It is cost effective, reusable and easy to build from recyclable materials readily available in most hospitals.

The adjustable padded slings improve the efficacy of the traction splint by supporting the thigh and leg, thereby improving fracture alignment, patient comfort and can be discarded after use. In the authors’ opinion, the absence of any part of the traction device in the groin prevents potential pressure sores in that area and additional padding aims to improve patient comfort at the ischial tuberosity.

The aluminum components of the crutch are lightweight which allows for easy and quick transfer of the patient. Metal artifacts from traditional femoral traction splints prevent adequate radiographic examination of the hip and proximal femur potentially leading to missed injuries such as minimally displaced neck of femur fractures [4]. The radio-lucent nature of the proximal axillary bar results in improved radiographic exposure of the hip (Fig. 10)

This improvised femoral traction splint is currently being used exclusively in the authors’ district hospital in the acute management of femur shaft fractures due to the lack of availability of commercial splints. Doctors have shown willingness to participate in the application of the device after dispersion of the instructional video. At present 8 midshaft femur fractures in 8 patients have temporarily been stabilized using this femoral traction splint. No major complications were
reported. Two patients reported minor discomfort at the ischial tuberosity which was rectified by placing additional padding on the proximal axillary bar.

We present our personal experience using the improvised femoral traction splint and acknowledge that further studies are required to provide evidence of the efficacy and safety of the device. Commercially available splints need to meet regulatory standards and should be preferentially used if available.

Conclusion

This step by step guide will help the reader improvise a traction splint that will give patients access to a potentially life-saving device in a resource-limited setting.

CRediT authorship contribution statement

Authors contributed as follow to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content:

SS contributed 25%, BB 15%, BS 15%, KE 15%, SM 15%, JK 15%.

All authors approved the version to be published and agreed to be accountable for all aspects of the work.

Authors’ contribution

Authors contributed as follow to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: SS contributed 25%, BB 15%, BS 15%, KE 15%, SM 15%, JK 15%. All authors approved the version to be published and agreed to be accountable for all aspects of the work.

Declaration of competing interest

The authors declared no conflicts of interest.

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