

## 'K' Nailing by a Medial Approach for Gustilo IIIC Fractures of the Shaft of Femur

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### Abstract

#### Introduction

Eleven patients with Gustilo IIIC fractures with a medial wound and vascular injury were included in this series from 2003- 2009. Seven of these patients had the vascular repair done by the surgeon doing the bone fixation.

#### Method

The patients are positioned supine and the involved side is brought to the edge of the table with a sand bag placed deep under the ipsilateral buttock. A fasciotomy is undertaken. The original wound on the medial side is debrided and vascular control is obtained. The Vastus medialis is lifted off the medial inter-muscular septum and the bone ends are delivered, irrigated and retrograde insertion of the K- nail is done. When the nail is protruding, the leg is adducted and the nail driven in fully. The fracture is reduced and the antegrade insertion of the K-nail is done. The vascular repair with a reverse saphenous vein graft is done thereafter.

#### Results

Of the 11 patients, one developed non-union and one developed a superficial wound infection. Sixteen patients who had external fixation of Gustilo IIIC fractures of the femur during the same period of time in the same unit, all needed subsequent ORIF and six developed pin site infection.

#### Conclusions

This technique is quick and gives stability for a vascular repair. When the wound is on the medial side, this prevents an additional incision and allows vascular access through the same. Harvesting of the venous graft is made easy as the patient is supine.

**Keywords:** Gustilo IIIC fractures; Fracture shaft of femur; Medial approach k nailing

### Introduction

In this series of cases the authors describe a technique of fixing compound femoral shaft fractures with vascular injury where the compound injury is mainly on the medial aspect of the thigh. This is an injury pattern noted in Sri Lanka where moped bikes are a common mode of transport. The seating of this type of bike is low resulting flexion and abduction of the hip. In the case of a collision with another vehicle the femur under goes an abduction force causing it to fracture often at the mid shaft of proximal one third with resultant medial compound injury and accompanying vascular trauma.

Eleven patients with Gustilo IIIC fractures with a medial wound and vascular injury were included in this series from 2003- 2009. Seven of these patients had the vascular repair done by the first author who also did the bony stabilization.

### Method

#### Surgical technique

The patient is positioned supine and the involved side is brought to the edge of the table with a sand bag placed deep under the ipsilateral buttock. A fasciotomy is undertaken initially and the calf is decompressed. The original wound on the medial side is debrided with extension of the incision and excision of the original wound margins and vascular control is obtained. The Vastus medialis is lifted off the medial inter-muscular septum and the bone ends are delivered and irrigated with pulse lavage. Retrograde insertion of the K- nail is done on the proximal fragment of the femur having reamed it to the appropriate width. The reamers are used to perforate the trochanter

through which the k nail is brought out until the distal end of the nail is flush with the distal end of the proximal femoral segment. When the nail is protruding, the leg is adducted so that the protruding nail comes out beyond the edge of the table. Once the nail is fully protruding the leg is laid on the table once more and the fracture is reduced. The nail is inserted antegrade through the reduced fracture site into the distal segment of the femur. The nail is left protruding about 2 cm above the tip of the greater trochanter. Once the bony stability is achieved the vascular repair is under taken. The need for a saphenous vein graft is assessed and harvesting is done from the uninjured leg. This step is often done while the bony fixation has commenced after vascular control has been achieved. The vein graft is reversed and in order to match the discrepancy of the vein graft and the proximal femoral artery a "Cheatele flap" is created in the vein and the anastomosis is done.

All patients who had this fixation and vascular repair were followed up prospectively and the mean follow up is 2 years with a range of 6 months to 5 years.

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## Results

Of the 11 patients, one developed non-union and one developed a superficial wound infection. The patient who developed a non-union had an exchange nailing done where a femoral locking nail was inserted after removing the k nail. Average time taken for bony fixation was 26 minutes with a range of 18-49 minutes. The average time taken for the vascular repair was 78 minutes with a range of 47-93 minutes.

During the follow up period none of the patients developed re-fractures while the nail was in situ. No rotational instability was encountered as during the procedure careful measuring of the medullary canal width on radiographs and the "feel" during the reaming process was used to choose the correct diameter of the K nail.

## Discussion

Often a patient with a Gustilo IIIC fracture is haemodynamically unstable and the surgical operation under taken will be a damage control procedure. Here the achievement of quick bony stability for a successful vascular repair is a must [1-3]. The out-come for the patient will also depend on the total time spent under anaesthesia and by minimising it, the prognosis is improved considerably.

The Kirschner nail is an intramedullary nail which maintains bony alignment in femoral shaft fractures and was used as a fixation technique during the recent past [4]. With the introduction of the locking nails for long bone fractures which provide rotational stability the K nail gradually fell out of favour [4,5].

The technique described by the authors is a quick method of intra-medullary fixation that can be used where intra-medullary fixation is permissible in a compound fracture and where quick and definitive stability can be achieved in the case of a vascular injury. A traction table is not required for this technique and image intensifier is not needed.

An external fixator would provide stability for a vascular repair but, it almost always necessitates a secondary definitive fixation of the

fracture subsequently [3]. The K nail can be a definitive form of fixation which is quick to insert at a damage control setting [4]. The authors describe a medial approach to the femur where the original compound injury is utilized with an extension to do the bony fixation as well as the vascular repair. This obviates the necessity for a second incision and exposure.

No papers were found in a PUBMED search describing a similar technique and no publications were found on the use of K nails for stabilization of compound femoral shaft fractures.

## Conclusions

In summery it is the view the authors that this technique is quick and gives stability for a vascular repair and minimises the "second hit" effect in a victim of trauma and is a good option to be considered during damage control.

When the wound is on the medial side, this prevents an additional incision and allows vascular access through the same. Harvesting of the venous graft is made easy as the patient is supine.

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