Acta Orthop. Belg., 2010, 76, 827-829

TECHNICAL NOTE

A simple cost effective technique for soft tissue protection during intramedullary nailing of the tibia

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Intramedullary nailing has revolutionized the management of tibial diaphyseal fractures. However, anterior knee pain remains a common complication. Although knee pain causes are still largely unknown, there is evidence to suggest that adhesions resulting from soft tissue damage may contribute to it. We describe a simple cost-effective technique that utilises a syringe to protect the patellar ligament and Hoffa's fat pad during intramedullary nailing of the tibia.

Keywords : soft tissue protection ; intramedullary nailing ; patella ligament protection.

INTRODUCTION

Tibial diaphyseal fractures are the most common type of long-bone fracture encountered by most orthopaedic surgeons. In an average population, there are about 26 tibial diaphyseal fractures per 100,000 of the population per year (*1*).

Intramedullary nailing has revolutionized the management of tibial diaphyseal fractures. The use of interlocking nails means that virtually all tibial diaphyseal fractures can be stabilized with an intramedullary nail. Anterior knee pain is the most common complication associated with intramedullary tibial nailing. In the three major studies of this complication, Keating *et al* (*4*) reported an incidence of 57%, Court-Brown *et al* (*2*) reported 56.2%, and Toivanen *et al* (*6*) reported 69%. The pain is usually situated over the proximal end of the nail and is associated with most normal activities. Court-Brown *et al* found that 91.8% of patients with knee pain experienced pain on kneeling, 60.5% found pain on squatting, 56.5% experienced pain on running, and even 33.7% were in pain at rest. Keating *et al* (*4*) noted a high incidence of knee pain with a patellar-tendon splitting approach compared with a parapatellar approach. Court-Brown *et al* (*2*) and Toivanen *et al* (*6*), however, could find no association between the approach and the presence of knee pain. There are a number of obvious reasons for the pain such as a prominent nail or heterotopic ossification of the patellar tendon (*7*). In most cases, however, the origin is more difficult to define. Recently Väistö *et al* (*8*) have advanced the

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No benefits or funds were received in support of this study

theory that knee pain is multifactorial in origin and can be caused by nail prominence, patellar tendon injury, fat pad injury, chondromalacia patellae, Infra-patellar saphenous nerve injury, intra-articular damage and pre-existing pain.

In an MRI study of the knee after locked intramedullary nailing, Gustafsson *et al* (*3*) found that the degree of adhesions from the nail insertion in the tibia towards the patellar ligament was proportional to the degree of knee pain.

Using effective soft tissue protectors during the procedure may reduce the risk of knee pain. The bulk of the tendon and surrounding soft tissue poses a problem in both transtendon and paratendon approaches. The application of intermediary reamers is particularly damaging to tendon tissues and Hoffa's fat pad. Bone marrow and knee fluids produce slippery surfaces that prevent maintaining the leaf-shaped standard protector position during the procedure. There have been reported cases of patellar ligament rupture post reamed intramedullary tibial nail (*5*), which emphasizes the need for effective tissue protection.

Fig. 2. — Intraoperative photograph of the syringe in position. The guide wire is inserted into the tibial entry point. Patellar tendon, Hoffa's fat pad and other soft tissues are well protected during the procedure.

TECHNICAL TIP

In our experience we have found that protecting the patella tendon and Hoffa's fat pad, as well as allowing good access to the entry point can be facilitated by the use of a 10 ml syringe. The syringe plunger is removed and the nozzle is cut off (fig 1). After incising the skin, the tendon fibres are either parted gently in the transtendon approach or retracted away in the paratendon approach. The truncated syringe is then inserted down to the nail entry point on the tibia. This will allow easy access to the tibia and protection of the soft tissues until the nail is inserted. The transparent and radiolucent tube will facilitate inspection of the tibia insertion point and radiological assessment of guide wire position. The reamer can then be applied easily without soft tissue damage. Furthermore, the syringe can be cut with a scalpel and removed once the tip of the nail is inside the tibia (fig 1).

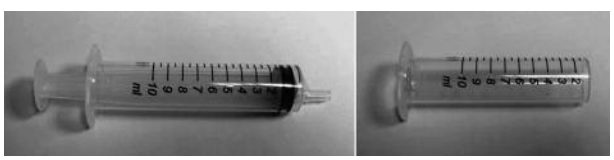

Fig. 1. — The syringe plunger has been removed and the syringe nozzle cut off with a sharp knife.

DISCUSSION

Many different techniques have been described to protect the soft tissues during tibia nailing. Although some of these techniques are relatively easy to use, such as using a self-retainer or a leaf shape protector, they are not always successful, resulting in significant injury to the ligament or the fat pad and subsequent adhesion that may cause anterior knee pain. We have reported a simple and cost effective technique to protect the soft tissues. The only equipment that is required is a 10-ml syringe and in our experience it has been successful at protecting the soft tissue effectively.

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