A technique for minimally invasive long bone biopsy

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Infrapatellar fat pad: an aid in revision total knee arthroplasty

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The authors declare they have no conflicts of interest.

In order to obtain a cancellous bone biopsy from the distal tibia using a minimally invasive technique, we suggest the use of the bone graft harvesting system from Acumed (Hillsboro, OR, US). It allows direct and controlled access into the bone with minimal cortical disruption, all via a mini incision. The bone is loaded directly into the flute, thereby reducing the risk of contamination during extraction (Fig 1). The smallest cutting flute measures 6mm in diameter and provides sufficient graft (0.48cc) while leaving an acceptable defect in the bone.

Figure 1 Cancellous bone biopsy from the distal tibia using the bone graft harvesting system

BACKGROUND

Excision of the infrapatellar fat pad during primary total knee arthroplasty helps improve exposure of the knee joint. Achieving good exposure in revision knee arthroplasty surgery can sometimes be challenging owing to formation of thick scar tissue over the patellar tendon when the fat pad has been excised. The scar tissue often has to be carefully excised, which risks damaging/thinning the patellar tendon and compromising the extensor mechanism.

TECHNIQUE

During primary total knee arthroplasty, the fat pad can be retained and good exposure achieved by detaching its synovial attachment from the anterior aspect of the tibia. This keeps the scar tissue separated from the patellar tendon (Figs 1–3) during revision surgery, making the identification and excision of the scar tissue easy.

DISCUSSION

A deformable space filler, the infrapatellar fat pad adapts to the changing contours of the articular surfaces during movement of the knee joint; it also facilitates distribution of synovial fluid, and cushions the patellar ligament and exposed articular surfaces during pressure and direct impact.¹ It has a shared blood supply with the patellar tendon.^{2,3} The synovial lining covering it has a rich capillary supply,⁴ which helps in synovial fluid production and removal of debris.⁵

Retaining the infrapatellar fat pad not only has the above advantages but also allows easy identification and excision of infrapatellar scar tissue, providing better exposure during revision surgery by allowing eversion of the patella without compromising the extensor

Figure 1 Fat pad separating patellar tendon and scar tissue

Figure 2 Pointer showing scar tissue

Figure 3 Pointer showing patellar tendon

mechanism. We therefore recommend the infrapatellar fat pad be retained as far as possible during primary total knee arthroplasty.

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Establishing the entry point for in situ pinning of slipped upper femoral epiphysis

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BACKGROUND

Early descriptions of single screw fixation for stable slipped upper femoral epiphysis stipulated a screw perpendicular to the physis¹ and this dogma has persisted. This configuration involves an entry point in the anterior femoral neck,¹ predisposing to 'windshield wiper loosening',² and screw impingement with labral/articular damage.³ To avoid these dangers, where single screw fixation is deemed adequate, we advocate an oblique trajectory,^{3,4} not crossing perpendicular to the physis, with a substantially lateralised entry point (lateral to midpoint intertrochanteric line even for severe slips).

One problem with the oblique screw is difficulty in gaining purchase for the wire because the more acute entry angle makes it prone to slip medially (Fig 1). It is vital to avoid multiple cortical perforations in attempting to obtain the correct entry point as this can cause fracture.⁵

TECHNIQUE

After a percutaneous approach, the desired entry point is defined carefully on anteroposterior/lateral views. A unicortical wire is inserted here, perpendicular to the cortical surface (typically moving the wire driver superomedially). The 4.5mm cannulated drill is used to breach one cortex only (Fig 2). The drill and first wire are removed. The definitive guidewire is placed easily in the cortical breach at the defined entry

Figure 1 Intraoperative lateral view with overlay comparing entry points and trajectories for wire perpendicular to the physis (A), and oblique wire with a more lateral entry point (B). It may be harder to engage the cortex with configuration B because the angle of engagement with the cortex is decreased; the danger here is of having to make multiple perforations to secure the correct entry point.