Is the Distal Medial Tibia a Sufficient Source of Cancellous Autograft for Extended Midfoot Arthrodesis?

**PURPOSE**

Midfoot arthrodesis often requires bone grafting; options include autograft or allograft/synthetic products. The distal medial tibia (DMT) represents a source of autograft that is locally available, easily accessible and safe. The quantity of cancellous bone routinely available from the DMT remains unknown. Therefore, we explored if the DMT provides sufficient autograft for extended midfoot arthrodesis.

**METHODOLOGY and HYPOTHESIS**

We performed a retrospective review of all patients undergoing cancellous autograft DMT harvest for extended midfoot arthrodesis by the senior authors. The technique involved identification of the DMT metaphyseal/diaphyseal junction through topography. Using a trephine, the medial cortex was breached and cancellous bone graft was harvested by curettage until sufficient volume was obtained (Figure 1), but the exact volume was not recorded. For the purpose of this study, the volume of graft harvested was estimated on post-operative plain film using the height ($r_1$) and width ($r_2$) on the anterior-posterior view and depth ($r_3$) from the lateral view (Figure 2) using the prolate ellipsoid formula ($\text{Volume} = \frac{4}{3}\pi r_1 r_2 r_3$).

**RESULTS**

Eight women and two men (mean age: 58.4-years; right: 7, left: 3) were included. The calculated mean volume of graft harvested was $11 \pm 3.4 \text{ cm}^3$. No additional bone graft was required to complete the extended midfoot arthrodeses and there were no complications.

**ANALYSIS and DISCUSSION**

As our data demonstrates cancellous autograft DMT harvest provided sufficient volume for extended midfoot arthrodesis in every instance. Therefore, the DMT should routinely be considered for these procedures. The novel volumetric radiographic estimation is yet to be validated, but warrants further prospective investigation to determine if this can accurately predict the available volume of graft preoperatively.

**References**

1. Raikin SM, Braid C. Local bone graft harvested from the distal medial tibia or calcaneus for surgery of the foot and ankle. Foot Ankle Int 26:449-453, 2005.

Figure 1: Intra-operative anterior-posterior image intensification views demonstrating curettage of cancellous bone graft from marrow of the distal tibia (A-C). Extent of intra-operative curettage (D).

Figure 2: Volumetric radiographic estimations. Anterior-posterior view with height and width (A); Lateral view with height and depth (B).