Introduction

The medial femoral condyle flap (MFC) gained popularity for treatment of nonunions with minimal bone loss. Recently, the indications for use of the MFC flap have expanded to large intercalary defects conventionally treated with fibula harvest. This study characterizes the cortical and cancellous aspects of these donor sites.

Methods

Fifty lower extremity CT scans from an orthopaedic database were reviewed to evaluate osseous composition of the femur and fibula. Cortical and cancellous thickness was measured at 3cm, 6cm, and 10cm proximal to the joint on the femur and at 4cm, 6cm, and 10cm distal to the joint for the fibula.

Results

Average cortical thickness of the medial femur was 1.6mm, 2.4mm and 3.0mm at 3cm, 6cm and 10cm proximal to the joint while cancellous thickness declined from 75.5mm to 43.7mm and 32.2mm respectively. The fibula remained more uniform and therefore averages were used from the points measured. The fibula demonstrated average cortical thickness of 2.3mm and cancellous thickness of 7.0mm.

Cortical:cancellous bone ratios were calculated for half diameter sections of each measurement point. The femur cortical:cancellous ratio increased from 0.04 to 0.11 and 0.18 at 3cm, 6cm, and 10cm. The cortical:cancellous bone ratio for the fibula was 0.65.

Conclusions

The fibula provides greater cortical:cancellous bone ratio than the MFC donor site. This suggests the fibula may provide greater immediate structural support for large osseous reconstructions. The greater proportion of cancellous bone in the MFC corticocancellous flap, however, may provide advantages for osteosynthesis.