

## The Medial Femoral Condyle Flap for Reconstruction of Intercondylar Pathological Fractures of the Thumb

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The reconstruction of subcondylar bone defects affecting joint stability and range of motion (ROM) can pose a challenge to the reconstructive surgeon, especially when restoration of fine movements of the hand is required. When rapid bone union is required, free vascularized bone transfer may be preferable over nonvascularized bone grafts.<sup>1</sup> We present a case of free vascularized bone transfer using a medial femoral condyle (MFC) flap<sup>2</sup> for the reconstruction of a pathological fracture of the interphalangeal joint (IPJ) of a thumb in a high functional demand patient. This article represents the first of its kind in the restoration of IPJ ROM after reconstruction of bone defect.

A 20-year-old male patient with a professional career in judo presented to outpatient clinic with pain on movement of his IPJ of the thumb. Radiography revealed the presence of an intercondylar fracture of the IPJ with an area of radiolucency at the distal head of the proximal phalanx of the thumb (Fig. 1). A suspicion of a pathological fracture was explained to the patient, but he was adamant on attending a judo competition in 2 months' time. Options of reconstructing the defect were explained to the patient including nonvascularized bone grafts. Given the time frame to recover, an option of free vascularized bone transfer was offered to the patient with preservation of IPJ ROM crucial for his career performance.

An MFC bone flap was harvested from his left distal femur.<sup>3</sup> Excision of the bony lesion and extended curettage were performed, and the articular surface of the IPJ was preserved. A Kirschner wire was passed through the 2 intercondylar fragments. The fracture was further reduced with a tension band wire. The free bone flap was then placed into the defect, and 4/0 polydioxanone suture was used to tack the periosteum down. The bone flap was anastomosed to the digital artery of the thumb and 2 dorsal veins, and a thumb spica splint was used for joint immobilization.

At the 5-week follow-up, radiographic confirmation and clinical examination revealed complete bone union, and active motion was permitted (Fig. 2). At the 2-month follow-up before his competition, the IPJ of his thumb



**Fig. 1.** Anteroposterior radiograph of the pathological fracture (arrow) involving the interphalangeal joint of the right thumb associated with a subcondylar lesion.

had a ROM of 0 to 60 degrees and the patient had no issue with the donor site, allowing him to run and squat at will. The patient was extremely satisfied with his surgical and functional outcome, which allowed him to successfully complete his competition. Pathology revealed a diagnosis of a giant cell tumor, which has not recurred in the 5 years since his initial operation.

This article represents the first description of an MFC bone flap in the reconstruction of an intercondylar fracture associated with a subcondylar proximal phalanx head defect. A vascularized bone graft facilitated complete bone union within a short period of time and preserved IPJ ROM, which met the needs of a patient with competitive sporting demands. A small piece of bone harvested resulted in minimal donor-site morbidity as well.<sup>4</sup>

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**Fig. 2.** Right thumb anteroposterior radiograph 5 weeks postoperatively demonstrating bony union of the MFC flap (arrow) with maintenance of interphalangeal joint space.