Osteochondral Autograft Transplantation for Articular Defects in the Hand and Wrist

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PURPOSE

• The osteochondral autograft transfer system (OATS) procedure has been described for osteochondral defects.
• We hypothesize that this procedure can be used for articular defects in the hand and wrist, with good functional results.

METHODS

We performed a retrospective chart review of four male patients who were treated with an OATS procedure for an articular defect of their hand or wrist between May 2010 and February 2011.
The average age was 30 years old and all had failed months to years of conservative management.
Injuries consisted of osteochondral defects in:
• proximal lunate (2)
• proximal scaphoid
• index metacarpal head

Outcome variables:
• four month postoperative grip strength
• range of motion
• time to return to normal activity
• radiographic evidence of osteochondral plug in-growth.

TECHNIQUE

• All cases were performed by the senior surgeon (RWC).
• Diagnostic wrist arthroscopy or arthrotomy was used initially to assess the articular surface.
• For the three patients with scaphoid or lunate lesions (J.D., K.H., N.P.), wrist arthroscopy was used to visualize chondral defects only in the scaphoid and lunate.
• An appropriately sized osteochondral autograft from the contralateral knee was harvested by our sports medicine colleague (PFD).
• A dorsal approach utilizing the third and fourth extensor compartment interval was utilized to perform the graft placement, via a press-fit technique, into the recipient site. Articular congruity was confirmed with both direct visualization as well as with intra-operative fluoroscopy. A bulky dressing and short arm splint were applied.
• An extensor tendon-splitting approach was utilized to visualize the metacarpal head osteochondral defect (A.B.). A dorsal capsulotomy was performed and an osteophyte was removed. The metacarpal head had completely collapsed and no identifiable cartilage could be visualized. The proximal phalanx cartilage was intact.
• Using the same technique to harvest the graft, a 10 mm wide by 14 mm deep osteochondral graft was placed into the tunnel using a press-fit technique as described for the carpal defects.
• A congruent articular surface was achieved intra-operatively and confirmed with fluoroscopy. The dorsal joint capsule was repaired and the patient was placed in a bulky dressing and radial gutter splint.
• Active range of motion was initiated following the first postoperative visit. The patient was also provided a removable splint for comfort. Strengthening typically commenced four weeks post-operatively. Post-operative radiographs were obtained at 6 weeks.

RESULTS

• The average time from injury to surgery was 29 months, with an average follow-up of 5 months.
• Using our technique, we had no significant complications.
• The average gain of wrist motion was 6°.
• Grip strength increased an average of 18 PSI.
• Radiographic evidence of adequate graft position with an improved articular surface was seen in all cases at final follow-up.
• All patients resumed their sporting careers, including minor league baseball, golfing, and ice hockey.

TECHNIQUE

• The OATS procedure represents an appropriate treatment option for the treatment of hand and wrist injuries in young, active patients who have failed conservative management.
• The OATS procedure is technically demanding, but is a reasonable treatment option of focal osteochondral defects in high demand individuals as it incorporates hyaline cartilage into the defect site.
• One can expect a successful outcome after a congruent articular surface is achieved and a motivated patient is able to complete an appropriate course of occupational hand therapy.