

OSTEOCHONDRAL AUTOGRAFT TRANSFER SYSTEM TECHNIQUE

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Introduction

Soccer is the most popular sport in the world and is associated with a high rate of ankle injury. During both 2010 and 2014 FIFA world cups, ankle sprains consistently represented a high percentage of injuries, and caused time away from playing in at least 50% of these incidents.

Osteochondral Lesions (OCLs) of the ankle have an incidence between 50% and 70% of all acute ankle sprains and fractures. Cartilage injuries have poor spontaneous healing potential, and therefore it is critical for trainers, therapists, and team doctors to recognize these injuries in a timely manner, so effective treatments can be promptly instituted. Optimal surgical treatment for talar OCL is dependant on defect size and location. Larger lesions can often be treated with Autologous Osteochondral Transplantation (AOTS), or other techniques such as Autologous Chondrocyte Implantation (ACI).

Clinical Outcomes

AOT is a restorative cartilage surgery, replacing like-with-like, i.e. transplanting an autologous osteochondral unit with healthy, viable tissue.

Typically used in large or cystic lesions or after failed microfracture surgery.

The osteochondral graft is harvested from the ipsilateral knee.

General post-operative protocol includes restricted weight bearing for 6-8 weeks, but Range Of Motion (ROM) exercises started as early as 10-14 days.

AOT is a technically demanding procedure, however, results have been good at short to medium term follow up.

Scranton et al. (*J Bone Joint Surg Br* 2006; 88: 614-619) reported 90% of AOT procedures achieved a good to excellent outcomes. Hangody et al. (*Am J Sports Med* 2010; 38: 1125-1133) also reported 92% good to excellent outcomes at 9.6 years follow up. In an AOT review, with a total of 243 patients; Zengerink et al. (*Knee Surg Sports Traumatol Arthrosc* 2010; 18: 238-246) reported an overall success rate for AOT of 87%.

While short-term results indicate AOT may improve outcomes compared to microfracture, further long-term follow up studies are required.

Donor site morbidity is often cited as a concern with this procedure, rates vary from 0-50% in the literature. Some authors have frequently noted transient knee pain, although often resolving with longer-term follow up.

Similarly, postoperative subchondral cyst scan occur following AOT, although there is little evidence to suggest clinical outcome effects; this needs verification through long-term follow up.

Return to Sport

Return to soccer following both reparative and replacement strategies have been evaluated with limited conclusive evidence in both groups.

Saxena and Eakin (Am J Sports Med 2007; 35: 1680-1687) evaluated functional activity after surgical management of OCLs in 44 athletic subjects of which 18 were considered high level, including 6 soccer players.

At medium term follow up (32 months), 17 of 18 high level athletes had returned to pre-injury level. The mean time to Return To Sport (RTS) was 15 weeks after microfractures and 19 weeks after mosaicplasty (not AOT's).

Paul et al. (Am J Sports Med 2012; 40: 870-874) assessed sports activity after talar AOTs in 131 patients (mean age 31 y.o.). 70% were very satisfied / satisfied by the procedure; 85% required no analgesia when involved in sports; 20% were involved in competitive sports preoperatively, only 50% still competing postoperatively. Increasing age may reduce a person's ability to return to sport.

Hangody et al. (Am J Sports Med 2010; 38: 1125-1133) reported on talar and knee OCLs in 354 competitive athletes (67 soccer players). 63% were able to return to their same activity/sporting level, most were under 30 y.o.; 9% had to give up sport completely.

Biologic Augmentation in AOTs

The need for consistent long-term outcomes has lead to increased interest in biologic augmentation of cartilage healing in the sports world.

Concentrated Bone-Marrow Aspirate (CBMA) is a source of Mesenchymal Stem Cells (MSCs) and growth factors. MSCs and growth factors can be delivered directly at the OCL site, enhancing the healing environment. When used in large animal models, the resultant cartilage of the CBMA group demonstrated greater type-II collagen, proteoglycan and glycosaminoglycan content, reflecting a more normal cartilaginous architecture.

No long-term data exists to support the use of CBMA to allow early return to sport following talar OCL surgery.

Platelet-Rich Plasma (PRP) is an autologous blood product containing a milieu of growth factors that may promote anti-inflammation and cartilage repair.

Good evidence shows PRP, on a basic science level, promotes chondrocyte and MSC proliferation, Proteoglycans deposition and type II collagen deposition. PRP may also increase chondrocyte viability and cause migration and chondrogenic differentiation of MSC.

Mei-Dan et al. (Am J Sports Med 2012; 40: 534-541) recently compared intra-articular PRP and Hyaluronic Acid (HA) injection for talar OCLs in a RCT, finding: AOFAS Ankle-Hindfoot scores, visual analogue scale, pain/stiffness/functional scores and subjective global function scores all improved in the PRP group more than the HA group ($p < 0.05$). In a animal study by Smyth et al. (J Bone Joint Surg Am 2013; 95: 2185-2193), PRP improved graft host integration was seen in the PRP groups compared with control ($P < 0.05$)

Postoperative care

Patients are non-weight-bearing for 6 weeks followed by 2 weeks of progressive weight-bearing. ROM exercises are started as early as 10 day post-operatively.

At 8 weeks, formal physical therapy commences and sport-specific training introduced at 12 weeks. Return to soccer is typically at 6 months following surgery.