

OATS for the Foot & Ankle Scientific Support

Outcome of Osteochondral Autograft Transplantation for Type-V Cystic Osteochondral Lesions of the Talus

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Journal of Bone and Joint Surgery. British Volume, Vol 88-B (Issue 5) 2006;614-619.

"The treatment of osteochondral lesions of the talus has evolved with the development of improved imaging and arthroscopic techniques. However, the outcome of treatment for large cystic type-V lesions is poor, using conventional grafting, debridement or microfracture techniques. This retrospective study examined the outcomes of 50 patients with a cystic talar defect who were treated with arthroscopically harvested, cored osteochondral graft taken from the ipsilateral knee. Of the 50 patients, 45 (90%) had a mean good-to-excellent score of 80.3 (52 to 90) in the Karlsson-Peterson Ankle Score, at a mean follow-up of 36 months (24 to 83). A malleolar osteotomy for exposure was needed in 26 patients and there were no malleolar mal- or non-unions. One patient had symptoms at the donor site three months after surgery; these were resolved after arthroscopic release of scar tissue. This technique is demanding with or without a malleolar osteotomy, but if properly performed has a high likelihood of success."

Bone-Cartilage Transplantation from the Ipsilateral Knee for Chondral Lesions of the Talus

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Arthroscopy: The Journal of Arthroscopic and Related Surgery. Vol 21 (No 2) 2005;159-166.

"**Purpose:** We present a prospective analysis to review talus dome chondral and osteochondral lesions treated with autogenous bone-cartilage transplantation harvested from the ipsilateral knee since 1998. The clinical outcome of osteochondral defects is investigated by using a method for resurfacing that supplies hyaline cartilage. The outcome analysis also considers defect size and the number of transplanted osteochondral cylinders. **Methods:** Included in the study were 43 patients with ankle joint pain resulting from osteochondritis dissecans stage III-IV, post-traumatic cartilage defects, and focal osteoarthritis. The Osteochondral Autograft Transfer System (OATS; Arthrex, Naples, FL) was used for transplantation. **Results:** All grafts showed bony integration in the talus as seen in the radiographs and by magnetic resonance imaging. Second-look arthroscopy found integration of the osteocartilaginous graft with surrounding cartilage within the first year. A series of needle biopsies showed hyaline structure. **Conclusion:** Autogenous osteochondral transplantation of the talus using ipsilateral knee osteochondral grafts is a very promising surgical procedure to treat local cartilage lesions of the ankle joint."

Osteoarticular Transplantation of Lesser Metatarsal Articular Deficits: A Preliminary Study

Matthew S. Rockett, DPM, FACFAS; and Keith Jacobson, DPM, FACFAS

63rd Annual Scientific Seminar of American College of Foot and Ankle Surgeons. New Orleans, LA.

"Treatment of osteoarticular deficits of the lesser metatarsal heads can be challenging for the foot & ankle surgeon. A 'joint restorative' procedure using OATS was developed. A preliminary prospective study on a new technique for the repair of lesser metatarsal head deficits utilizing osteoarticular transplantation between 2/2003 and 2/2004. Average preoperative AOFAS score was 44 (range 14-77) for the seven patients. Postoperative AOFAS score was an average of 82 (range 49-100). Six of the seven patients healed their graft and had a decrease in pain and increase in activity. Average time to radiographic healing was 12 weeks (range 10-16 weeks). Six of the seven patients would have the procedure again and would recommend the procedure to a friend or family member. The surgeons rated the success of the procedure as five excellent, one good, and one poor. Early results of this procedure are very favorable and exciting."

Osteochondral Autograft Transfer of the First Metatarsal Head: A Case Report

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The Journal of Foot & Ankle Surgery. Vol 44 (5) 2005;406-411.

"A case of an osteochondral autograft transfer performed at the head of the first metatarsal for an acute incidence of traumatic osteochondritis dissecans was presented. The donor site for the osteochondral graft was from the medial and plantar aspect of the talar head, which was found to be composed entirely of articular hyaline cartilage, yet was not part of the functional talonavicular articulation. Six months postoperatively, the graft was well seated at the head of the first metatarsal, as confirmed by magnetic resonance imaging, and the graft donor site was asymptomatic. At 12 months' follow-up, the patient had a functional metatarsophalangeal joint range of motion."



Position Statement: The Use of Osteochondral Transplantation for the Treatment of Osteochondral Lesions of the Talus

Position Statement

The American Orthopaedic Foot and Ankle Society (AOFAS) endorses the use of osteochondral transplantation for the treatment of osteo-chondral lesion of the talus, especially large diameter and cystic lesions, and does not consider this procedure to be experimental in a patient population that has failed non operative management.

The American Orthopaedic Foot and Ankle Society is a medical specialty society whose 2,000 members are orthopaedic surgeons specializing the surgical and non-operative treatment of injuries, disease, and other conditions of the foot and ankle. The AOFAS promotes quality patient care through education, research and training of orthopaedic surgeons and other health care providers, and serves as a resource for government, industry and the health care community on issues concerning the medical and surgical care of the foot and ankle.

Background

An osteochondral lesion of the talus (OLT) is a region of focal degeneration or injury of the talus bone that involves the cartilage of the joint surface as well as the “subchondral” bone just beneath the cartilage. OLTs are a common source of ankle pain and can cause substantial disability and lost productivity. While many OLTs are traumatic in origin, the majority of cases are idiopathic.

Numerous surgical options have been described for the treatment of painful OLTs that have not responded to non-operative care. Smaller diameter lesions (< 15mm in diameter) are most commonly treated with “marrow stimulation” techniques.¹ These involve making multiple perforations in the subchondral bone to allow recruitment of mesenchymal stem cells that then differentiate and produce fibrocartilaginous repair tissue. The most commonly utilized form of marrow stimulation is microfracture, in which a small awl or drill is used to make several punctures in the subchondral bone. However, it must be noted that the cartilage produce by marrow stimulation is partly fibrous (“fibrocartilage”) and contains Type I collagen. This differs and is biomechanically inferior to native cartilage, which contains Type II collagen.



Another essential tool in treatment of OLTs is osteochondral transplantation. With this technique, the diseased cartilage and subchondral bone is replaced with one or more autograft or allograft plugs that contain both bone and cartilage. Alternatively, a single “block” of bone and cartilage may be used. Osteochondral transplantation is particularly useful for the treatment of large diameter OLTs (>15mm in diameter) and also for those lesions associated with an underlying void, or cyst, in the subchondral bone (“cystic lesions”).

Peer reviewed Publications on Osteochondral Transplantation

The use of osteochondral transplantation is well supported by the peer reviewed scientific literature.¹⁻⁹

For instance, Hangody and colleagues utilized autograft transplant from the knee for talar osteochondral lesions in 98 patients with 93% good to excellent results.² Meanwhile, Lee et al. reported good-to-excellent results in 100% of patients treated with osteoarticular transplantation.³ Paul et al. reported a very large series (131 patients) in which autologous osteochondral plugs were used to treat advanced OLTs.⁴ These authors reported significant improvement in pain scores as well as a high percentage of return to sport.

Raikin retrospectively reviewed fifteen patients with symptomatic OLTs with a cystic component treated with allograft transplantation.⁵ The average visual analogue scale improved from 8/10 to 3/10, while the AOFAS hindfoot outcome scores (range, 0-100) improved by 45 points. El-Rashidy and colleagues reported similar results. In their series, osteochondral lesions treated with allograft transplants demonstrated statistically significant improvement in both visual analogue and AOFAS hindfoot outcome scores.⁶ Finally, Hahn et al demonstrated significantly improved pain scores in 13 patients treated with osteochondral allograft transplantation with statistically significant improvement in postoperative pain scores.⁷

Long-term follow-up studies have also shown good results.^{2,8-10} Imhoff and colleagues, for instance, reported that clinical outcome scores and follow-up magnetic resonance (MR) imaging remained improved at an average of 84 months following osteochondral autograft transfer.⁹ They reported a significant increase in the AOFAS score (50 to 78 points) as well as a significant improvement in the VAS pain score (7.8 to 1.5). Similarly, Hangody² reported good to excellent results in 93% of patients at long-term follow-up. Valderrabano and colleagues reported on a series of patients who underwent knee-to-ankle autologous osteochondral transplantation. At an average follow-up of 72 months, they found significant improvement in AOFAS hindfoot scores (from 45.9 to 80.2) and good to excellent results in 91% of patients in terms of patient satisfaction.¹⁰



Conclusion

Osteochondral lesions of the talus are common and often result in substantial pain and dysfunction. The American Orthopaedic Foot and Ankle Society supports the use of osteochondral transplantation for the treatment of OLTs that have failed other management, especially for large diameter lesions and cystic lesions. To this end, the AOFAS considers osteochondral transplantation to be a treatment option with demonstrated improved outcomes. This position is based on multiple reports from the peer-reviewed scientific literature.

Definitions

Allograft. Bone or cartilage (or both) that comes from a cadaver.

Autograft. Bone or cartilage (or both) that comes from the patient's own body.

Collagen. A group of proteins that forms the main component of the connective tissues of the body, including cartilage.

Cystic lesion. An osteochondral lesion in which some of the subchondral bone is actually missing, forming a cavity or cyst. The cyst is actually a void, and does not represent a tumor or malignancy.

Microfracture. The use of a small awl or drill is to make several punctures in the subchondral bone.

Osteochondral lesion. Focal degeneration or injury of the articular surface (joint surface) of the talus bone that involves both the subchondral bone and overlying cartilage.

Subchondral bone. In those bones that form a joint and have overlying cartilage, this is the layer of bone just beneath the cartilage.

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