Mosaicplasty for Osteochondral Lesions of the Talus: 17 Year Experience
Laszlo Hangody, MD, PhD, DSc
Head of Department, Department of Orthopaedics
Uzsoki Hospital
Associate Professor, Department of Orthopaedics
Debrecen Medical School
Budapest, Hungary

Treatment of full-thickness cartilage defects of weight bearing articular surfaces of the knee and ankle remains central to clinical orthopaedics. Numerous surgical resurfacing treatment options are available to treat these defects but none of them represent a long-term solution. In the past 2 decades, several authors have developed new techniques aiming to provide hyaline or hyaline-like cartilage in an articular defect. Most of these techniques are supported by experimental data, but only autologous chondrocyte transplantation, autologous osteochondral and fresh allograft transplantation have been used in extensive clinical practice. Initial experiences with autogenous osteochondral grafting have shown consistent survival of the transplanted hyaline cartilage. However, two problems have been encountered in the process: the donor sites must be taken from surfaces that do not bear much weight, which limits the procurement field, and the use of large grafts can cause incongruity at the recipient site, which permanently alters the biomechanics of the joint.

Initially, the mosaicplasty concept was tested in German Shepherd dogs and horses and in cadaver studies. Macroscopic and histological evaluations of the resurfaced areas and the donor sites showed: (1) survival of the transplanted hyaline cartilage (2) formation of a composite cartilage layer consisting of ≈80% transplanted hyaline cartilage and ≈20% fibrocartilage ingrown from the bony base of the defect; (3) deep matrix integration at the recipient site; and (4) the donor sites were filled to the surface with cancellous bone capped by fibrocartilage by 8 weeks. Fibrocartilage coverage of the donor holes seemed to be acceptable gliding surface for these less weight bearing areas.

Clinical application was begun on February 6, 1992. During the following 17 years, clinical results by various authors matched the animal results, and since 1995, the procedure has been used with equal success at numerous clinics throughout the world. These results were identical with the authors’ follow up. In a series of more than one thousand cases involving various diarthrodial joints with varying function and biomechanical loads, the composite results have been in the good to excellent range with a low complication rate. Emphasizing the age limitations of the procedure (patients younger than 50 years), it is not surprising that patients who are older (older than 35 years) have fared less well. Beside knee applications talar implantations represent the most frequent indications of he mosaicplasty. Clinical outcome of ankle mosaicplasties seems to be more advantageous, than knee results. However technical difficulties represent certain limitations of the indication and there is no reliable arthroscopic technique for talar mosaicplasties. Perpendicular insertion of the transplanted grafts is an important requirement of the technique. For a proper approach medial talar dome defects usually require medial malleolar osteotomy, but at lateral lesions the osteotomy sometimes can be avoided.
Fig. 1. Arthroscopic graft harvest from the ipsilateral knee and medial malleolar osteotomy to treat OCD defect of the medial talar dome

Concerns of donor site morbidity remain an integral part of the current evaluations. Of the entire study group only transient symptoms, which can be attributed to the donor sites were seen. The authors think that the full restoration of the donor site centers on the peripheral position of the donor area and the small size and proper spacing of the individual grafts.

Cartilage and bone characteristics of the femur and talus are different. However, in spite of these different features long term outcome of talar mosaicplasties is promising. Talar procedures are technically more demanding, but – in case of precise operative technique - clinical outcome is reliable. From these encouraging results from an increasingly large series and similar results from other centers, it seems that autologous osteochondral mosaicplasty may be a viable alternative treatment of localized full-thickness cartilage damage of the weight bearing surfaces of the ankle, knee and other joints.

References:


3:31 – 3:36 pm

Long Term Results of ACI of the Talus
Richard D. Ferkel, MD
Associate Clinical Professor of Orthopaedic Surgery
UCLA School of Medicine
Director, Sports Medicine Fellowship Program
Southern California Orthopaedic Institute
Van Nuys, California

I. INTRODUCTION
   A. In 1851, Paget said “There are, I believe, no instances in which a lost portion of cartilage has been restored, or a wounded portion repaired, with new and well formed permanent cartilage, in the human subject.”
   B. Grade 0-4 classification of chondral lesions by ICRS
   C. Treatment options include drilling, microfracture, ACI, OATS or mosaicplasty with autograft or allograft

II. Autologous Chondrocyte Implantation
   A. Definition – implantation of in vitro cultured autologous chondrocytes using a periosteal or membrane tissue cover after expansion of isolated chondrocytes
   B. ACI – Generations
      1. Generation 1 – Carticel suspended under periosteal flap
      2. Generation 2 – Carticel inserted under a tissue patch or onto a carrier scaffold
      3. Generation 3 – Carrier-free immature cartilage tissue
   C. Indications for ACI in the Ankle
      1. Indications
         a. Patients aged 15 to 55
         b. Focal defect
         c. Unipolar (only talus affected)
         d. Contained
         e. Edge loading
         f. Failed previous surgery
         g. Large lesions with extensive subchondral cystic changes
      2. Relative Indications
         a. Multifocal unipolar lesions
         b. Uncontained lesions