

## Option for Osteochondral Lesions of the Knee

Articular cartilage provides a low friction and highly durable gliding surface for joints but because it is hypocellular, avascular, aneural and alymphatic, it has minimal reparative potential. Articular cartilage injuries are common and comprise up to 5-10%, in young, active patients with an acute injury. Patient history will help determine if they have had an acute injury resulting in a focal lesion or longer duration process with possible arthritic changes. Sites of point tenderness, crepitus and catching should be carefully examined. It is also very important to assess for ligamentous instability, patellar maltracking, malalignment, or meniscal deficiency prior to considering treatment.

Initial radiographs should include a bilateral standing (AP), 45-degree flexion (PA), lateral, and merchant views. Joint space narrowing, osteophytes, subchondral cyst formation, and sclerosis should provide a relative contraindication to reparative treatment of articular lesions.

Advancement in MRI's using specific protocols allows a more accurate evaluation of articular cartilage abnormalities, which are becoming increasingly important pre-operatively.

Non-operative treatment should be considered prior to surgery that should include non-weight bearing exercise such as swimming or cycling that will allow continued athletic activity with decreased symptoms. Tylenol or NSAIDS along with glucosamine and chondroitin or intra-articular injections of hyaluronans may provide pain relief. In patients with malalignment or patellar maltracking, an unloader or stability brace may provide symptomatic relief in conjunction with physical therapy.

Operative treatment can vary from debridement, transplantation, and biological techniques to stimulate chondrocyte proliferation. Traditionally options were limited, and patient selection is an important in consideration of any of these techniques.

Arthroscopic debridement may benefit patients with mechanical symptoms or concomitant meniscal pathology. Short-term results have shown improvement. However, long-term results have shown to deteriorate over time as no repair is performed. Therefore, these techniques are usually reserved for older, low-demand patients. In a study by Murray et al (1), patients who previously underwent debridement for symptomatic OCD of the knee were followed at 11-years post-op. Younger patients with a small stable lesion on the medial femoral condyle had the best prognosis. However, there was radiographic evidence of early degenerative joint disease in 71% of the patients. Comparatively, those who underwent excision of OCD fragments did worse than in those whom the fragment was preserved.

Techniques that stimulate fibrocartilaginous repair include abrasion arthroplasty, drilling and microfracture. These techniques do not attempt to restore normal articular cartilage but to improve functional status and provide pain relief. Unfortunately the success is variable. Inconsistent formation of fibrocartilage, poor differentiation and bonding, and

inferior biomechanical properties all being cited for failure. Microfracture has advantages over drilling, as there is a lack of potential heat necrosis and maintenance of the integrity of the surrounding subchondral bone.

Post-op rehabilitation is critical as traditionally non-weightbearing status for six-weeks in conjunction with physical therapy has been associated with increased success. Kreuz et al (2), studied 85 patients (mean age 39) with full thickness chondral lesions who underwent the microfracture procedure at 6, 18 and 36 months post-op. Their results showed that deterioration begins 18months after surgery and is significantly pronounced in patients aged older than 40. The best prognostic factor was a patient 40 and younger who met their exclusion criteria.

Similarly, Gobbi et al (3), prospectively studied 109 athletes (age 12-55) who were treated with microfracture technique and noted that knee pain and swelling improved 70% and crepitus 60%. However, at a mean follow-up of 72 months, 80% showed a decline in sport activity level.

Osteochondral autograft and allograft transplantation (OATS) is the only procedure that provides intact hyaline articular cartilage to the defect area. One application of the autograft technique is in the stabilization of unstable OCD lesions and has shown very high success rates. Barber and Chow (4), used pressed-fit autografts that showed no radiographic arthritic changes at 48-month follow-up with good integration of the graft. The mean age was 43.

In a study conducted by Miura et al (5), patient with a mean age of 16 years were treated with autogenous osteochondral plugs to defects in the medial femoral condyle. At 1-year follow-up, MRI showed only a homogenous signal surrounding the cancellous bone with the interface of the graft completely disappearing. Thus indicating the fixation of the OCD lesion with cylinder autografts provided healing of the fragments.

Biological techniques intend to stimulate chondrocytes or cultured cells to produce collagen to replace articular cartilage defects. Autologous chondrocyte implantation (ACI) involves a two-stage procedure of cartilage biopsy and growth of cells in culture followed by implantation of the cells under a periosteal patch. Long-term results have been variable. Biological scaffolds and tissue engineering are proving to be ideal and would be biocompatible, resorbable or remodeled. These are being designed in clinical trials using growth factors, cells and other factors. The Cleveland Clinic is currently involved in testing a new technology known as CaReS offering a minimally invasive technique for treatment of type III/IV lesions with a 3D cell-collagen matrix allowing for formation and replacement of articular cartilage at the defect.

Reference:

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