Microfracture in Cartilage Repair

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Most patients develop degenerative changes associated with the cartilage damage. These degenerative changes are progressive, and they become irreversible if no intervention is applied. In the past there were a variety of relatively unsuccessful cartilage repair techniques, none of which were followed systematically. These included debridement and abrading of lesions and occasional drilling with a burr or a K-wire, which is an older method of treating knee cartilage lesions.

Mechanism of microfracture technique is to induce chondral resurfacing by chondrocyte differentiated from marrow mesenchymal stem cell. The advantages of the microfracture include that less heat, and therefore less necrosis, is produced than with drilling. This technique provides access to mesenchymal stem cells, not phenotypically mature chondrocytes that are used in cell transplants, and biologic modulators of healing.

Between October 1997 and October 2000, 248 knees in 234 patients underwent microfracture surgery. Patients who had moderate to severe pain with no improvement after conservative treatment, moderate osteoarthritic change in standing AP radiogram, and no severe angular deformity were selected for microfracture surgery. The clinical outcomes were assessed with Baumgaertners nine-point scale and the amounts of joint space change were measured using the preoperative and postoperative AP and lateral films. Once the full-thickness articular cartilage lesion is identified, the exposed bone was debrided of all remaining carilage tags. Arthroscopic awls with different angles(Linvatec Corp, Largo, FL) were used to make multiple holes in the full-thicknes chondral defects. 47 knees in 44 patients had second look arthroscopies and biopsies. 18 knees had immunohistochemical study and 12 knees had Western blotting test to identifiy type II collagen qualitatively and quantitatively.

Significant improvement was noted for parameters of activities of daily living and pain($P<0.05$).The joint spaces were widened in the amounts of average 1.06mm(range, from -0.5 to 3.2 mm) on standing AP and average 1.37mm(range, from -1mm to 4mm)on standing lateral films with statistical significance($P<0.05$). Histologically the repaired tissue appeared to be a hybrid of hyaline and fibrocartilage. The results of immunohistochemical staining and Western blotting test showed similar results in the regeneration of cartilage. Type II collagen formations were identified qualitatively and quantitatively by immunohistochemical staining and Western blotting test. There were no complications related to the microfracture surgery. In conclusion microfracrure surgery is effective for the treatment of moderate degree of osteoarthritic knee joint.