Autologous Osteochondral Graft For Focal Articular Cartilage Defect Of The Knee

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Summary:
Autologous osteochondral graft appears suitable for the treatment of moderate size full thickness contained articular cartilage defect of the knee with an overall 85% satisfactory results.

Abstract:
Introduction:
Full thickness cartilage defects of the knee frequently result in fibrous tissue formation, and larger lesions often lead to degenerative arthritis of the knee. Currently available methods of treatment included periosteal and perichondral grafts, chondrogenesis stimulating factors, gene therapy, chondrocyte transplantation, microfracture and osteochondral graft. Each has achieved some success, but none shows universal results. There is no consensus of opinions on the best method to repair full thickness cartilage defect. Autologous osteochondral graft has gained in clinical popularity because of its technical feasibility and cost effectiveness. In pig model, osteochondral graft achieves bony union between host bone and osteochondral plug in 4 weeks, and bonding of the articular cartilage in 12 weeks.

Purpose: This retrospective study reviewed the medium-term results of autologous osteochondral graft for focal contained articular cartilage defects of the knee in 25 patients with 26 knees with 2- to 7-year follow-up.

Patients and Methods: There were 17 men and 8 women with an average age of 31.3±11.8 (range 20 to 65) years. One patient had bilateral knees. The diagnosis included 9 osteonecrosis, 10 osteochondritis dessicans, and 7 traumatic defects. A 1.0 mm oversized 10 mm long osteochondral plug was harvested from either the sulcus terminalis or the intercondylar notch, and implanted into the recipient site until the articular surface flush with the surrounding cartilage. The numbers of osteochondral plug were determined by the size of the lesion, and ranged from 1 to 3. In larger lesions, osteochondral grafts were implanted in the weight bearing area, and microfracture in non-weight bearing area. Postoperative management included crutch walking with non-weight bearing on the operated leg for 6 weeks, then partial weight bearing for another 6 weeks before full weight bearing. Range of knee motion, quadriceps and hamstring strengthening exercises were encouraged. The evaluations included functional assessment, radiograph of the knee and second look arthroscopy.

Results: At follow-up of 52.9±20.3 (range 25 to 84) months, the results were 50% excellent, 35% good, 11% fair and 4% poor. Overall satisfactory results were noted in 85%. Significant improvements in functional scores were observed postoperatively (p < 0.05). The time of pain relief ranged from 8 to 16 weeks after surgery. There was no correlation of the clinical results with the diagnosis of osteonecrosis, osteochondritis dessicans and traumatic cartilage defect. However, the size of the lesion greater than 500 mm² is associated with failure. Radiographic degenerative changes of the knee was noticed in 6 (23%) and 7 (27%) in medial compartment, 5 (19%) and 5 (19%) in lateral compartment, and 1 (4%) and 2 (8%) in the patellofemoral compartment pre- and postoperatively (P > 0.05). In second look arthroscopy, 8 asymptomatic knees with the size of the defect smaller than 500 mm² showed complete bonding of the graft to the adjacent host cartilage. Three cases showed minimal fissuring and scanty fibrous tissues between graft and host tissue. One symptomatic knee with a lesion of 900 mm² showed extensive fibrous tissue between graft and host cartilage despite of the viable graft. It appears that a cartilage lesion larger than 500 mm² is prone to complication and poor outcome. Fresh frozen osteochondral allograft may be a better choice for massive chondral and osteochondral defect.

Conclusion: Autologous osteochondral graft provides good or excellent results in 85% of patients with focal contained chondral and osteochondral defects of the knee. There was no correlation of the clinical results with the
nature of the disease and the size of the lesion smaller than 500 mm². Any lesion larger than 500 mm² is prone to poor clinical outcome. Autologous osteochondral graft is suitable for treatment of knee with moderate size full thickness contained articular cartilage defect of the knee.