Arthroscopic Reduction and Internal Fixation of Tibial Plateau Fractures (MIS Technique) (SS-43). *Sanjay Chaturvedi, MS, DNB, MNAMS*

Summary: Tibial plateau fractures, result of a high-energy trauma and commonly associated with significant soft-tissue and intra-articular injuries. Minimally invasive surgery offers less soft tissue damages, good reduction and stable fixation of the fracture. This study evaluates the combined arthroscopic and radioscopic assisted reduction and internal fixation of tibial plateau fractures 14 out of 16 patients had satisfactory result. Arthroscopic reduction and internal fixation can restore articular congruity with rigid fracture stabilization. 10 patients had associated intraarticular injury treated at the time of arthroscopy. Arthroscopy can provide definitive treatment, less stripping, better visualization, and early return to physical activities with less damage to intraarticular structures.

Tibial plateau fractures are complex lesions capable of causing severe consequences if not appropriately treated. They are often the result of a high-energy trauma and commonly associated with significant soft-tissue and intra-articular injuries. Different therapeutic options can be managed in the treatment of these lesions. Minimally invasive surgery offers several advantages compared to other surgical techniques and allows, with less additional soft tissue damages, good reduction and stable fixation of the fracture.

In this study we assessed the results of the combined arthroscopic and radioscopic assisted reduction and internal fixation of tibial plateau fractures in 16 patients affected by Schatzker type I, II, III, IV fractures. According to Hohl's and Rasmussen's grading system, 14 out of 16 patients scored a satisfactory result. We experienced no complications due to arthroscopy.

Arthroscopic reduction and internal fixation of tibial plateau fractures can facilitate restoration of articular congruity while permitting rigid fracture stabilization. Sixty-four percent of patients had associated intraarticular injury diagnosed and treated at the time of arthroscopy. Arthroscopic reduction and internal fixation provides an accurate assessment of, and allows definitive treatment for, intraarticular injuries associated with tibial plateau fractures. The technique allows less soft tissue stripping than with traditional arthrotomy, better visualization of the articular surface, early return to physical activities, and obviates the need for meniscal detachment and repair.

Arthroscopic Autologous Chondrocyte Implantation: Three New Unique Arthroscopic Techniques Utilizing New Instrumentation (SS-44). *Stephen P. Abelow, MD, Pedro Guillen, MD, Marta Guillen, MD, Isabel Guillen, MD*

Summary: Utilizing newly developed instrumentation autologous chondrocyte implantation can be performed arthroscopically. Arthroscopic MACI can be implanted in sites where suturing of a periosteal flap is difficult or even impossible. An arthroscopic MACI technique can be an effective treatment for large chondral defects with minimally invasive arthroscopic technique as an outpatient procedure.

Abstract: Three new arthroscopic techniques of Autologous Chondrocyte Implantation have been developed. Autologous chondrocyte implantation (ACI) has yielded good to excellent results in greater than 77% of the cases of deep chondral lesions. As a periostal flap must be harvested, sutured in place, and cultred chondrocytes injected underneath the flap, a wide arthrotomy incision is often necessary. Until recently arthroscopic ACI implantation has been difficult or impossible. Matrix/Membrane Autologous Chondrocyte Implantation (MACI) is a new biotechnology allowing the impregnation of autologous cultured chondrocytes onto a bilayer, bioabsorbable, purified porcine collagen I/III membrane. The MACI implant is fixed in place with fibrin glue and can be performed arthroscopically.

New arthroscopic techniques have been developed for MACI implantation. Utilizing specially designed cannulas, the defect is prepared with curettes, templated with a newly designed arthroscopic caliper, and glued in place. Articulated instruments have been developed to insure proper seating of the MACI graft. Another arthroscopic technique utilizing mini suture anchors and a modified arthroscopic cannula allow for the MACI implant to be guided into place by the sutures and then fixed inplace with fibrin glue. Histological sutdies show a hyaline-like cartilage with immature chondrocytes. MRI show progressive loss of subchondral edema. Patients report better than 70% good to excellent results (in spite of very large chondral lesions).

Conclusions: Arthroscopic MACI can be implanted in sites where suturing of a periosteal flap is difficult or even impossible. An arthroscopic MACI technique can be an effective treatment for large chondral defects with minimally invasive arthroscopic technique as an outpatient procedure.

Prospective Evaluation of Osteochondral Defects in the Knee Treated with Biodegradable Scaffolds (SS-45). *Philip A. Davidson, MD, Dennis W. Rivenburgh, PA-C, ATC*

Summary: Symptomatic full thickness chondral and osteochondral defects of the knee present a considerable treatment challenge. This study investigates the use of a biodegradable polymeric scaffold for articular cartilage repair. 26 cases were implanted over 1 year with an orthobiologic scaffold to replace tissue removed in the treatment of chondral and osteochondral defects. Mean area grafted was 1.7 cm^2 (range 0.6-5.7 cm^2). SF-36, IKDC and Lysholm scores improved significantly when compared to preoperative status. This technology shows significant promise in the clinical treatment of relatively small chondral and osteochondral defects.

Purpose: Symptomatic full thickness chondral and osteochondral defects of the knee present a considerable treatment challenge. This study investigates the use of a biodegradable polymeric scaffold, to fill a bone void, yielding bone and articular cartilage repair and resurfacing.

Methods: Sequential patients were enrolled prospectively, following IRB approval of the study. Once a full thickness chondral or osteochondral defect was identified arthroscopically, one or more polymeric orthobiologic scaffolds, cylindrical in shape, were implanted to restore a smooth surface contour. All patients underwent preoperative and postoperative clinical and radiographic evaluation and were examined at regular intervals, systematically collecting quantified clinical outcome scores. Postoperatively all patients were maintained touch down weight bearing with axillary crutches for 6 weeks with immediate full range of motion.

Results: 26 cases were implanted over 1 year with an orthobiologic scaffold to replace tissue removed in the treatment of chondral and osteochondral defects. Mean follow up was 22 months (range 16 to 32 months). Mean age was 41 years. Mean number of grafts was 1.8 (range 1-7). Mean area grafted was 1.7 cm^2 (range 0.6-5.7 cm^2). SF-36 Physical mean score improved from 35 pre-treatment to 47 post-surgery. On the SF-36 Mental, mean scores improved from 48 to 55. IKDC mean score improved from 29 to 62. The Lysholm mean score improved from 37 to 67. There was no radiographic evidence of bone lysis or evident complications. One patient was deemed a failure, and went on to arthroplasty for what was felt to be concurrent, unrelated pathologies. There were no other failures, and no complications related to the scaffolds identified.

Conclusions: All patients, except one, showed significant improvements post-treatment as measured by each of the scoring instruments. The use of this orthobiologic scaffold potentially eliminates the need for secondary procedures or interventions (such as autologous tissue harvesting or secondary chondrocyte implantation) resulting in decreased patient pain and donor site morbidity. This technology shows significant promise in the clinical treatment of relatively small chondral and osteochondral defects.

Clinical and Microscopic Evaluation of Implanted Refrigerated and Frozen Osteochondral Allografts (SS-46). *Albert W. Pearsall, MD, Sudhakar Madanagopal, MD, J. Tucker, MD*

Summary: The purpose of the current study was to evaluate patients who underwent refrigerated or frozen allograft transplantation No significant difference in chondrocyte viability was noted on histological or electron microscopy analysis between refrigerated and frozen allografts at the time of implantation. A trend towards greater improvement in WOMAC, KSS was noted in the frozen allograft group when compared to the refrigerated allograft group. Both refrigerated and frozen large osteochondral allografts appear to be function well clinically at 4 year follow-up.

Purpose: Treatment options for full thickness osteochondral lesions include microfracture, transplanting cultivated autologous chondrocytes, or osteochondral tissue. The use of fresh osteochondral allografts has been well documented, with "fresh" indicating graft harvest within 24 hours of the donor's death and time to implantation of < 7 days. Deep frozen allografts have also been used; however, diminished cell viability and matrix degeneration have been cited. The purpose of the current study was to clinically and radiographically evaluate patients who underwent refrigerated or frozen allograft transplantation and analyze the relationship between functional outcome and allograft histological and electron microscopic grading.

Methods: Between 1998 and 2002, 58 patients underwent transplantation for a cartilage defect of the femur and/or patella with a refrigerated or frozen allograft. Inclusion criteria were as follows: activity level of Tegner 3 or greater, a contained articular cartilage defect; damage limited to < 2 compartments, failure of conservative measures > 3 months. All patients underwent clinical evaluation including the Knee Society Score (KSS), WOMAC Score and a VAS for pain. Failure was defined as conversion to a unicondylar/total knee arthroplasty. All failures were included in the overall analysis and also analyzed separately. Three plugs were sterilely harvested and prepared for evaluation. The following scoring system was utilized for each slide: 0 = all cells lethally injured; 1+ = majority of cells with marked-lethal injury; 2+ = minority of cells with marked-lethal injury; 3+ all cells viable. For electron microscopy the