

repair with biodegradable implants showed higher peak pressure than suture repair, particularly at the most medial location. Implants in the more posterior meniscus demonstrated smaller increases in peak pressure, and may have less potential for articular cartilage injury. These results suggest that avoidance of deep knee flexion angles postoperatively may limit increases in articular contact pressures and potential chondral injury.

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Meniscal Fixation Implants Sufficiently Reduce Gapping of Longitudinal Meniscal Tears (SS-24)

Many meniscal fixation implants provide only low pull out forces between 15 and 50 N. However, it is unknown if these forces are sufficient to withstand the loads, which occur in vivo. The aim of this laboratory study was to explore the gapping behavior of longitudinal meniscal tears. It was also investigated to what extent a fixation implant of low pull out force is able to reduce the gaps that occur in meniscal tears under different loading conditions. Methods: Longitudinal tears of 2 cm in length were set in the posterior horn of the medial menisci of 8 porcine knee joints. To observe the tears an opaque placeholder of the same shape as the original articular surface replaced the medial tibial plateau. Thus the menisci could be visualized in situ. The knees were exposed to flexion-extension cycles in a loading and motion simulator under 30 N and 200 N axial joint load, under tibial rotation moments, varus or valgus moments, and combined moments. For each load condition the maximum gap width of the tear occurring during a motion cycle was recorded. All tests were repeated after lengthening the initial tear to 2.5 cm, and subsequently to 3 cm. Finally the tears were repaired using three Meniscal Screws in each knee and the test repeated. Results: Maximum gapping of 1.6 mm (Standard deviation (SD) 0.5 mm) occurred for the 3 cm tear under 200 N axial joint load under a valgus-external tibial rotation moment. Significantly less gapping was observed under pure internal tibial rotation for all tear lengths and axial loads (between 0.1 mm (SD 0.28 mm) and 0.9 mm (SD 0.3 mm); $P < .05$). Longer tears always produced broader tear gaps ($P < .05$). Repair with three Meniscal Screws reduced the maximum width of the tear gaps significantly ($P < .05$). The gaps were very small especially at the locations of the implants with gap widths of 0.28 mm (SD 0.45 mm) under a varus moment and 200 N axial joint load. The gapping between the implants was also reduced with a maximum gap of 0.62 mm (SD 0.52 mm) under external tibial rotation and 30 N axial joint load.

Discussion: From the gap widths measured in this study and the stiffness of the implant-meniscus interface determined in previous studies maximum forces of the implant-meniscus interface of 10 N can be estimated. This coincides with the findings of Kirsch et al. (J Biomech 1999;Suppl 1:104), who measured low forces in meniscal sutures. Therefore the implant pull out force seems not to be a critical parameter. In conclusion, it can be assumed that all available meniscal fixation implants provide sufficient primary stability avoiding excessive gapping even under critical joint loads like valgus and external tibial rotation. Early rehabilitation under weight bearing can therefore be recommended. Nevertheless, to avoid peak gapping of repaired meniscal tears a brace limiting external rotation can be worn.

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Complex and Horizontal Cleavage Meniscal Tears: Association With Significant Cartilage Damage (SS-25)

Experimental studies demonstrated that meniscal tears could lead to chondropathy and osteoarthritis. Clinical studies are controversial. Some authors describe the association of meniscal and articular cartilage lesions as coincidental, whereas others believe that causal link may exist. Some studies suggest that stable tears have good potential for healing and are less likely to produce osteoarthritis. Even though there are not a lot of studies to support this fact, complex tears and horizontal cleavage tears have been considered degenerative tears associated with cartilage degeneration. The objective of the present study was to evaluate whether horizontal cleavage and complex meniscal tears are associated with more significant cartilage damage, in comparison with patients having other pattern of meniscal injury. Data were collected prospectively from 1,000 consecutive knee arthroscopies. Of the 1,000 patients who had knee arthroscopy, 507 (50.7%) patients had meniscal tears and mainly these patients were included in this study. There were 359 men and 148 women with age 13 to 85 years (mean age 40.8 ± 15.2 years). Of these patients, 333 (65.6%) had medial meniscal tears and 184 (34.4%) had lateral meniscal tears. Patients details (age, sex, duration of symptoms, injuries, and possible mechanism of injury), operative details (types and number of portals, equipment used), intra-articular findings (articular, meniscal and synovial lesions, and stability characteristics) and procedures performed were recorded. Pathologic findings were recorded diagrammatically, with articular lesions being represented on accurate anatomic maps of the articular