

Contact Area and Pressure Changes in the Medial Compartment of the Knee in Horizontal Cleavage Tears of the Medial Meniscus (SS-36) *Kian-Chun Chong, M.B.B.S., F.R.C.S., Roland Chong, M.B.B.S., Jee Lim Tan, M.B.B.S., F.R.C.S., Barry Periera, Ph.D., M.Eng, B.Eng.(Sing)*

Introduction: Horizontal meniscus tears are challenging and the surgeon has to decide whether to repair, resect either of the upper or lower leaf of the tear, or do a segmental meniscectomy. There is currently no biomechanical data to support either method of treatment. We present a human cadaveric biomechanical study to investigate the changes in the contact area and pressure distribution at the medial tibial plateau of the knee, following the management of a simulated horizontal cleavage tear.

Methods: 7 fresh frozen human cadaveric knees are used. A medial parapatellar arthrotomy is made to expose the medial compartment of the knee. A contoured template of a pressure-sensitive film is placed between the meniscus and the surface of the medial tibial plateau, to capture changes in contact area and pressure. A compression load of 740N and 1100N is applied and maintained for 5 seconds, before unloading. The medial compartment is divided into 13 Regions of Interest; 7 beneath the medial meniscus (M1 to M7), 3 in a transition zone (T1 to T3), and 3 in the exposed surface not covered by the meniscus (E1 to E3). A densitometer is used to record the intensity of the color change, indicative of the mean applied pressure. Each template is also digitized and the average contact area calculated. A horizontal cleavage tear of the medial meniscus is created. The specimens are loaded and imprints taken under the following groups: 1) horizontal cleavage tear alone, 2) repair with two vertical mattress sutures, 3) meniscectomy of the upper leaf, 4) meniscectomy of the lower leaf, and 5) segmental meniscectomy of the cut region.

Results: The mean total contact area measured in the medial compartment after each experiment showed no significant change ($p=0.68$) when compared to the intact condition. In the presence of a horizontal cleavage tear, there is no significant change in the location of the contact area and mean contact pressure, even after repair with sutures. Following upper leaf meniscectomy, there is an increase in the mean pressure by 57% in the ROI of M4 and M5 (Scheffe, $p=0.19$). Between upper and lower leaf meniscectomies, upper leaf meniscectomy leads to a significant increase in pressure in ROI M4 by about 100% (Scheffe, $p<0.001$), and in ROI M5 by about 130% (Scheffe, $p<0.001$). Lower leaf meniscectomy leads to a 2 times increase in pressure in ROI M6 at the

posterior horn of the medial meniscus (Scheffe, $p=0.003$). Segmental meniscectomy leads to a shift in the contact area, and increases the mean contact pressure by 3.5 times in ROI E2 and T2

Conclusion: This study indicates that segmental meniscectomy results in more direct unprotected cartilage-to-cartilage contact. The best treatment for a horizontal cleavage tear of the meniscus will be to repair it. If repair is not possible, a meniscectomy of the lower leaf of the tear will be the next best alternative.

Clinical Results of Arthroscopic Salvage Repair including Popliteus Tendon as a Temporary Post for Complex Lateral Meniscus Tear (SS-37) *Sang Eun Park, M.D., Ph.D.*

Introduction: This study was undertaken to document the clinical results and technical aspects of arthroscopic repair including popliteus tendon as a post for the treatment of complex lateral meniscus in young people indicated as total meniscectomy.

Methods: From June 2004 to May 2006, we prospectively studied arthroscopic repairs on 35 young people knees with symptomatic complex lateral meniscus that was treated by all inside repair technique. Mean age at operation was 28.7 years (range, 17 to 42 years), and the mean follow-up period was 42.9 months (range, 36 to 60 months). Clinical results were evaluated using Lysholm knee scores preoperatively and at final follow-up. 2nd look arthroscopy or MRI was taken at final follow-up.

Results: All patients were able to return to their previous life activities with little or no limitation, and no reoperation was required after an average follow-up of 43 months. Mean Lysholm knee scores improved from 65 (range, 55 to 74) preoperatively to 93.9 (range, 79 to 100) at the final follow-up ($P < .0001$). 80% meniscus healing was found on arthroscopic or MRI follow up.

Conclusion: Arthroscopic repair using Popliteus tendon as a post is effective for treating young people with complex lateral meniscus tear as a salvage procedure.

Patients Undergoing Lateral Unicompartmental Knee Arthroplasty: Can we Guarantee Success and Return to Sport? (SS-38) *Kevin D. Plancher, M.D., Shariff K. Bishai, D.O., Tarik Ibrahim, B.S.*

Introduction: Unicompartmental arthroplasty in athletic individuals with osteoarthritis in the past have had limited success returning patients to sports. Patients who are arthritic and symptomatic in one compartment of the knee may provide better physiological function and quicker recovery compared with knee arthroplasty. The