

P32**Interspecies comparison of meniscus properties in human, sheep and rabbit and development of animal models for meniscus repair**

S. Methot¹, A. Chevrier², J. Sun¹, M.B. Hurtig³, C.D. Hoemann², M.S. Shive⁴, M.D. Buschmann⁵;

¹Research And Development, Bio Syntech Canada Inc., Laval, Canada, ²Chemical Engineering, Ecole Polytechnique de Montreal, Montreal, Canada, ³Clinical Studies, University of Guelph, Guelph, Canada, ⁴Product Development, Bio Syntech Canada Inc., Laval, Canada, ⁵Chemical Engineering And Biomedical Engineering, Ecole Polytechnique de Montreal, Montreal, Canada

Purpose: Menisci play a central load-bearing role in knee biomechanics and menisci pathologies are associated with cartilage damage and osteoarthritis. Development of treatments for meniscal tears requires appropriate animal models. The purpose of this study was to establish an animal model for meniscus repair and to assess the comparability of human menisci to those in animals.

Methods and Materials: Menisci from skeletally mature rabbit, sheep and human were characterized with histology and immunohistochemistry for cell and tissue morphology, vascularization, GAG by Saf-O staining, and collagen types I, II and VI by immunostaining. Punch hole defects and trephination models in the red-white zone of the anterior portion of the rabbit medial meniscus were used to assess meniscus repair in the presence of a chitosan-glycerol phosphate/blood (BST-CarGel™) implant.

Results: Cell morphology in all species was round in central regions and more fusiform at the surface. Rabbit and sheep menisci were more cellular and contained more GAG than human. In rabbit and sheep, blood vessels were mainly confined to the adipose-rich tissue peripheral to the menisci while human menisci also contained blood vessels in the outer meniscus proper. In rabbit and sheep, collagen type I appeared throughout, type II in the inner body and type VI was pericellular. The chitosan-glycerol phosphate/blood implant in the punch hole showed greater volume and residency than blood only and cell migration into the defect was subsequently observed.

Conclusions: Use of animal models to assess meniscus repair techniques for human applications requires detailed comparison of interspecies characteristics and the development of specific surgical approaches.

P33**Is there an association between articular cartilage changes and type of meniscal tear ?**

C.J. Dynybil, J. Snel, M. Käb, C. Perka;
Orthopaedic Surgery, Center for Musculoskeletal Surgery, Berlin, Germany

Purpose: To evaluate whether horizontal cleavage and complex meniscus tears, which supposed to be degenerative tears, are associated with an increase of selected Matrix Metalloproteinases and an increased incidence of cartilage damage, in comparison with patients having other patterns of meniscal injury.

Methods and Materials: Data were collected prospectively from 30 knee arthroscopies, patients were randomized by intra-operative findings due to their meniscal tear in "degenerative meniscal lesions" (horizontal cleavage and complex tears; n=18) and "traumatic tears" (longitudinal and radial tears; n=12). Patient data (age, duration of symptoms, mechanism of injury), intra-articular and radiographic findings were recorded. Samples of knee joint fluid were analyzed for MMP-1, -3 and pro-MMP-13. The Knee Injury and Osteoarthritis Outcome Score (KOOS) was used to quantify knee-related symptoms pre- and 1.5 years post-operatively.

Results: A comparison of patients with horizontal cleavage and complex meniscal tears ("degenerative tears") to patients with longitudinal and radial ("traumatic") tears showed for the former increased severity of chondral lesions (Outerbridge: 2.9±1.4 vs 1.1±0.9; P<.001) and radiographic osteoarthritis (Kellgren-Lawrence: 1.9±1.5 vs 0.4±0.5; P<.05). The KOOS improved after arthroscopic treatment in both groups significantly (P<.05). Pro-MMP-13 correlated significantly with an increase of chondral lesions and radiographic osteoarthritis (P=.003; P=.02).

Conclusions: Complex and horizontal cleavage meniscal tears are not as benign as was previously thought and are highly associated with an increased severity of cartilage degeneration and radiographic osteoarthritis. Arthroscopic treatment improved knee-related symptoms at least on medium-term.

P34**Light and shade of syntetic hydrogel implants in knee cartilage defects treatment**

E. Di Cave¹, F.V. Sciarretta², A. Basile³, P. Versari⁴;
¹Orthopedics, Jewish Hospital, Rome, Italy, ²Orthopaedy, Jewish Hospital, Rome, Italy, ³Orthopaedy, Jewish Hospital, Rome, Italy, ⁴Orthopaedics, Jewish Hospital, Rome, Italy

Purpose: Since November 2002 we started using syntetic cartilage implants in degree 3 and 4 knee cartilage defects in 63 patients. The implants, made in poli vinyl alcohol -hydrogel (Salucartilage - SaluMedicag have been implanted in the knees in absence of severe axial deformities, in order to evaluate the follow up results in cases where no secondary procedures, as valgus or varus osteotomies, were made.

Methods and Materials: 4 cases have undergone a second look arthroscopy: with the visualization of the real integration and bone ingrowth enabling us to show the lights and shades of this implant and to understand the mechanical reasons of eventual failures. Serial clinical, radiographic, CT and MRI follow -up have been conducted

Results: 1th case: ACL reconstruction and Salucartilage with implant dislocation, knee locking that required arthroscopy implant removal. 2th case: acute post- op pain associated to articular impairment, showed on MRI with extensive bone edema surrounding the implant but stable anchorage on second arthroscopic look 3th case: inflammatory reaction at the 4th month post -op that disappeared with physiotherapy 4th case: pain during the hyperextension phase of stance, knee arthroscopy that has shown perfect implant integration and a 4 degree cartilage damage of the patello -femoral joint, that will be treated by resurfacing

Conclusions: in this work we present all problems encountered, on wich basis, we have been able to develop a biomechanical model of the failure mechanism, wich has brought us to associate hydrogel correct implantation to growth factors application

P35**Articular cartilage lesions: a review of 25,124 knee arthroscopies**

W. Widuchowski¹, J. Widuchowski¹, T. Trzaska², R. Faltus¹, P. Łukasik³, G. Kwiatkowski¹;

¹Department Of The Knee Surgery, Arthroscopy And Sports Traumatology, District Hospital of Traumatology, Piekary Śląskie, Poland, ²Regional Centre Of The Knee Surgery And Arthroscopy, Puszczkowo Hospital, Puszczkowo / Poznań, Poland

Purpose: This study was aimed to provide data on the prevalence, epidemiology and etiology of the knee articular cartilage lesions and to describe and estimate the number of patients who might benefit from cartilage repair surgery.

Methods and Materials: The analysis of 25,124 knee arthroscopies performed from 1989 to 2004 was conducted. Information concerning cartilage lesion, associated articular lesions and performed procedure were collected. Cartilage lesions were classified in accordance with the Outerbridge classification.

Results: Chondral lesions were found in 60% of the patients. Documented cartilage lesions were classified as localized focal osteochondral or chondral lesion in 67%, osteoarthritis in 29%, osteochondritis dissecans in 2% and other types in 1%. Non-isolated cartilage lesions accounted for 70% and isolated for 30%. The patellar articular surface (36%) and the medial femoral condyle (34%) were the most frequent localization of the lesions. The most common associated articular lesions were the medial meniscus tear (37%) and the injury of the ACL (36%). The Outerbridge grade II lesions were the most frequent (42%). The potential candidates for cartilage repair surgery, patients with one to three localized grade III and IV cartilage lesion, under the age of 40 or 50 were found in 7% and in 9% of all analysed patients, respectively.

Conclusions: The knee cartilage lesions are common. Patients suffering from chondropathy are a heterogeneous group and the natural history of cartilage lesions remains so far unknown, that is why also the total number of patients in our study, who might benefit from cartilage repair, remains not clearly known.