

S234 Osteoarthritis and Cartilage Vol. 16 Supplement 4

the allogenic cartilage cells were not observed. Histological analysis of the biopsy specimens rated the repair tissue as hyaline-like in 15.3%, as mixed tissue in 46.2%, as fibrocartilage in 30.8% and as fibrous in 7.7%. **Conclusions:** The results of this pilot study show that the alginate-based scaffold containing mature human allogenic chondrocytes provides clinical and histological outcomes equal to those of other cartilage repair techniques.

552 MUSCLE STRENGTH AND FUNCTIONAL PERFORMANCE IN PATIENTS WITH ANTERIOR CRUCIATE LIGAMENT INJURY TREATED WITH TRAINING AND SURGICAL RECONSTRUCTION OR TRAINING ONLY: A 2 TO 5-YEAR FOLLOW-UP

E. Ageberg¹, R. Thomeé², C. Neeter², K. Grävare-Silbernagel², E.M. Roos³, ¹Dept of Orthopedics, Lund University, Lund, SWEDEN, ²Lundberg Laboratory of Orthopaedic Research, Göteborg University, Göteborg, SWEDEN, ³Sports Science and Clinical Biomechanics, Odense M, DENMARK

Purpose: To study muscle strength and functional performance in patients with anterior cruciate ligament (ACL) injury with or without surgical reconstruction 2 to 5 years after injury. Good muscle function is important in preventing early-onset osteoarthritis (OA), but the role of reconstructive surgery in restoring muscle function is unclear.

Methods: 54 patients (mean age at follow up 30 years, range 20–39, 28% women), out of 121 patients with ACL injury included in a randomized controlled trial on training and surgical reconstruction vs. training only (the KANON study, ISRCTN84752559), were assessed 3 years (SD 0.9) after injury with reliable, valid and responsive test batteries for strength (knee extension, knee flexion, leg press) and hop performance (vertical jump, one-leg hop, side hop). The Limb Symmetry Index (LSI, injured leg divided by uninjured and multiplied by 100) value, and absolute values were used for comparisons between groups (analysis of variance). An LSI \geq 90% was considered normal.

Results: There were no differences between the surgical and the non-surgical treatment groups in muscle strength or functional performance. Between 44% and 89% of the subjects had normal muscle function in the single tests, and between 44% and 56% had normal function in the test batteries.

Conclusions: The lack of differences between patients treated with training and surgical reconstruction or training only, indicates that reconstructive surgery is not a prerequisite for restoring muscle function. Abnormal muscle function, found in about one third or more of the patients, may be a predictor of future knee OA.

553 BIOCOMPATIBLE PHOSPHOLIPID POLYMER GRAFTING ON LINER SURFACE OF ARTIFICIAL HIP JOINTS ENHANCES THE WEAR RESISTANCE INDEPENDENTLY OF LINER CROSS-LINKING OR FEMORAL HEAD MATERIAL

T. Moro, Y. Takatori, M. Kyomoto, K. Ishihara, K. Nakamura, H. Kawaguchi. *The University of Tokyo, Tokyo, JAPAN*

Purpose: Artificial joint replacement is approved by OARSI guidelines as the treatment of hip and knee osteoarthritis (OA) with the highest recommended strength and cost-effectiveness (OA&C 2007, 2008). However, the aseptic loosening induced by wear particles from the polyethylene (PE) liner remains as the fatal problem limiting their longevity and clinical success, despite contraptions such as cross-linking of the liner and changes of the femoral head material. We have developed a novel PE liner with the surface graft of a biocompatible phospholipids polymer, 2-methacryloyloxyethyl phosphorylcholine (MPC), and reported that this dramatically decreased the wear production in a hip joint simulator (Nature Mat 2004). This study compared the MPC effect with those of the liner cross-linking and the femoral head material.

Methods: We prepared PE liners with or without cross-linking (PE & CLPE) and photoinduced grafting of MPC onto the surfaces (MPC-PE & MPC-CLPE). The hydrophilicity of the surface was determined by the contact angle of a water drop, and the friction torque was measured against cobalt-chromium alloy (Co-Cr) or alumina ceramic femoral head. The wear amount was measured as the loss of the liner weight during 5×10^6 cycles of loading (comparable to 5 to 10 years of physical walking) in the hip joint simulator. The surfaces of the liners and femoral heads, as well as the wear particles in the lubricant were analyzed by confocal scanning laser and electron microscopies, three-dimensional morphometry, and XPS spectroscopy.

Results: The MPC grafting increased hydrophilicity to 5–6 fold and decreased friction torque to 1/5–1/10, independently of the liner cross-linking or the femoral head material. Cross-linking by itself altered neither of them. The loss of liner weight (mg) after 5×10^6 cycles of loading in the hip simulator was PE/Co-Cr = 99.6, CLPE/Co-Cr = 18.9, CLPE/alumina = 14.8, MPC-PE/Co-Cr = -5.9, MPC-CLPE/Co-Cr = -6.9, and MPC-CLPE/alumina = -6.4, indicating that cross-linking caused a significant decrease of wear amount while the femoral head material little affected it. The MPC grafting abrogated the wear amount, independently of the liner cross-linking or the femoral head material. The gain of weight in the MPC-grafted liners was confirmed to be due to water absorption, since it was similarly seen in all liners with and without MPC grafting during soak without motion in the lubricant. The suppressions of the wear on the liner surface and the particle amount in the lubricant by the MPC grafting were much stronger than those by the cross-linking, independently of the femoral head material. Interestingly, the particle size from the CLPE liner was around 0.1 μ m, while that from PE or MPC-grafted liners was around 10 μ m.

Conclusions: The MPC grafting increased the surface lubricity and diminished the wear production, independently of the liner cross-linking or the femoral head material. In addition, we previously reported that MPC-grafted wear particles, even if produced, are biologically inert with respect to phagocytosis by macrophages and subsequent bone resorption. Although cross-linking also suppressed the wear, it did not alter the surface lubricity but produced submicrometer-sized particles which are known to induce more catabolic responses above than larger particles. Taken together, we believe that the MPC grafting surpasses the cross-linking of the liner and the change of the femoral head materials in extending longevity of artificial hip joints. A large-scale clinical trial is now underway.

554 VARIABILITY IN DISEASE SEVERITY AT THE TIME OF PRIMARY HIP REPLACEMENT FOR OSTEOARTHRITIS

P.A. Dieppe¹, A. Judge², S. Williams², K-P. Guenther³, W. Puhl⁴, K. Dreinhofer⁴. ¹Nuffield Department of Orthopaedic Surgery, University of Oxford, UNITED KINGDOM, ²Department of Social medicine, University of Bristol, UNITED KINGDOM, ³Universitätsklinikum Carl Gustav Carus, Dresden, GERMANY, ⁴Department of Orthopaedics, Ulm University, GERMANY

Purpose: Total hip joint replacement (THR) is a high volume, effective but expensive and irreversible intervention, used to treat people with advanced hip osteoarthritis (OA). In spite of over 40 years of experience with THR, it is still unclear who should be referred for surgery, when in the course of arthritis hip replacement should be carried out, or what the determinants of relatively good or bad patient outcomes are. The 'EUROHIP consortium', a multidisciplinary group of health care professionals from 20 centres in 12 European countries, is addressing these questions. As part of its work, the consortium has developed a prospective cohort of patients undergoing THR for primary OA. The purpose of this paper is to describe the variations in disease severity in this cohort, explore the relationships between clinical and radiographic measures of severity, and explore some of the determinants of the variation.

Methods: A minimum of 50 consecutive, consenting patients coming to THR in each participating orthopaedic centre within the EUROHIP consortium were entered into the study. Baseline data collected included demographics, employment and educational attainment (surrogates for socio-economic status), current drug utilisation (a surrogate for comorbidities), involvement of other joints, and handedness. In addition, each subject completed the WOMAC (Likert version 3.1) and the EQ5D (EUROQoL) questionnaires. Data collected at the time of surgery included the prosthesis used and ASA status. We attempted to obtain pre-operative radiographs from all subjects. These were read by the same two readers (PD and SW) using both Kellgren and Lawrence grading and the OARSI atlas.

Results: Data from a total of 1327 subjects has been analysed. The mean age of the group was 65.7 years, with a wide variation, and there were more women (53.4%) than men. Most (79%) were ASA status 1 or 2, but there was widespread use of medications, particularly for cardiovascular disease and diabetes. Reported disease duration was relatively short, being 5 years or less in 69.2%. Disease in other joint sites was common. In 1051 of the 1327 subjects (79%) good quality radiographs were available for reading and nearly all showed severe OA: the Kellgren and Lawrence grade was 3 or 4 in 95.8%. However, there was much more variation in severity assessed by the WOMAC, with many people having relatively low scores. The mean total WOMAC score was 59.2 (SD 16.1).