patients were treated with ACI or MACI (4 Carticel, 13 Hyalograft, 2 Cares) and 25 patients were treated with MFX. The average age (±SD) at surgery was 32 ± 12 years and the average Body Mass Index (BMI) was 26.4 ± 4.2. The average follow up duration was 66 ± 38 months (11-168).
For clinical evaluation, the American Orthopedic Foot and Ankle Score (AOFAS), the OSG-Score and the modified Cincinnati Score were obtained.
Results: We depicted significant differences in the ACI/MACI group as well as in the MFX group in all scores when compared to preoperative scores. In the ACI/MACI group the AOFAS Score (52.16 vs. 86.16; $p<0.01$), the OSG-Score (45.79 vs. 82.11; $p<0.01$) and the modified Cincinnati Score (3.0 vs. 7.0; $p<0.01$) showed a significant increase. The MFX group demonstrated a significant increase in the AOFAS Score (41.92 vs. 80.92; $p<0.01$), the OSG-Score (51.80 vs. 82.40; $p<0.01$) and the modified Cincinnati Score (2.96 vs. 6.84; $p<0.01$).
Conclusions: According to our data, both ACI/MACI and MFX achieved a comparable outcome at mid -term. But there is still a need for long-term results to demonstrate the permanency of these results.

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OSTEOCHONDRAL AUTOGENOUS TRANSFER FOR SPONTANEOUS OSTEONECROSIS OF THE MEDIAL FEMORAL CONDYLE OF THE KNEE IN MIDDLE-AGED AND ELDERLY PATIENTS

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Purpose: Osteochondral autogenous transfer (OAT) became widespread for the treatment of spontaneous osteonecrosis of the knee (SONK). And, recently good results after OAT expand surgical indication to older patients as well as to young patients. The purpose of this study was to evaluate clinical outcome of OAT for SONK in middle-aged and elderly patients.
Methods: Ten patients were included who received only OAT for SONK between July 2005 and September 2010, and whose age was more than 35 years old. Five was left knee. The average age at the time of OAT was 63.1 years (range 36-72 years). Diagnosis of all cases was done by MRI of the knee. OAT was performed for those whose femorotibial angle (FTA) was under 180° or whose mechanical axis (Mikulics line) passed lateral side of the lesion in standing plain radiographs. Those who underwent re-alignment surgery such as HTO were excluded. Capsulotomy was performed by mini-open medial parapatellar approach. Osteochondral plugs were harvested and transferred from ipsilateral trochlear ridge to the lesion. Postoperative rehabilitaion included non-weight-bearing for three weeks, partial weight-bearing for 4 weeks thereafter, and full weight-bearing was allowed after 7 weeks post-surgery.
Result: Mean preoperative Lysholm score was 60.3 points (range 49-73 points). Mean postoperative Lysholm score at one year after operation was 92.5 points (range 85-100 points). All patients became to be able to sit straight in Japanese style. MR images at one year after operation showed that the transferred osteochondral plugs were same intensity as peripheral cancellous bone meaning that the plugs were well integrated. In one case, MRI showed T1 low and T2 high intensity in part of osteochondral plugs indicating poor integration. Lysholm score at one year after operation was 90 points in that case.
Conclusion: It is assumed that less ability of cartilage repair and degenerative change of the donor site could affect postoperative outcome of OAT in elderly patients. If chondral lesion is localized and there is no malalignment in the knee, OAT is an option for treatment of SONK even in middle-aged and elderly patients.

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OSTEOCHONDRAL DEFECT REPAIR USING A NOVEL NATURALLY DERIVED BIOMATERIAL SCAFFOLD

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Purpose: This study was intended to determine the biocompatibility and efficacy of osteochondral repair using a novel naturally derived biomaterial scaffold.
Methods: Scaffolds were derived from porcine cancellous bone (vertebral bodies) obtained from a local abattoir. Bone cylinders (7mm diameter, 10mm length) were machined, and marrow spaces were cleaned and defatted. Scaffolds were created by regional demineralization, resulting in a porous cylindrical scaffold with an 8mm mineralized end and a 2mm demineralized end.
Six healthy mature ewes, free of lameness and radiographic evidence of stifle (knee) pathology were included in the study. Sheep were premedicated with diazepam, induced with pentothal, and maintained on isoflurane and oxygen using endotracheal intubation and a ventilator. The stifle joint was entered using a medial and lateral parapatellar approach. Three 6 mm diameter and 10 mm deep holes were created using commercially available surgical equipment. Defects were created on the distal trochlea (non-weightbearing) and the condyles (weightbearing). Defects were randomly assigned as scaffold-treated or untreated (control). Scaffolds were press-fit into the defects. The procedure was repeated on the contralateral limb at 8 weeks before euthanasia.
Ewes were euthanized 6 months after the first surgery. First the stifles and then each defect and its surroundings were isolated. The proximal half of the specimen was used for mechanical testing; the distal half was used for histological evaluation. Histological specimens were decalcified and embedded in paraffin; sections were cut at 5μm and stained (with hematoxylin & eosin, safranin-o/fast green, type I collagen or type II collagen). H&E and SOFG slides were analyzed and scored according to the ICRS II scoring system. A semi-quantitative analysis of collagen type within the repair tissue was performed using digital image analysis. From each specimen, 3mm-diameter cylinders were obtained from normal and repair cartilage for mechanical testing. Confined compression testing was performed to measure aggregate modulus (HA).
Results: Histological analysis - All scaffold-treated defects were covered with hyaline-like cartilage with very little fibrous connective tissue. In two of the scaffold treated defects, the calcified region of the scaffold was surrounded by an inflammatory response with fibrous connective tissue. ICRS II scores trended higher for scaffold-treated defects in most parameters, including the Overall Assessment (Control: 49.6% ± 28.9%, Scaffold-Treated: 73.2% ± 10.1%). Both scaffold treated defects and control defects had strong Type II collagen staining. Scaffold treated defects demonstrated significantly lower Type I collagen content, indicating a lower fibrous tissue character.
Mechanical Properties - The average aggregate modulus of normal cartilage tissue was measured at 1300 ± 400 kPa. The aggregate modulus in the control group was 732 ± 134 kPa, nearly significantly different from the normal cartilage ($p = 0.062$). The aggregate modulus of the scaffold repaired group was 988 ± 133 kPa ($p = 0.536$).
Conclusions: A novel natural biomaterial scaffold was developed from cancellous bone with a continuous interface connecting soft and hard tissue regions, replicating the normal graded interface between cartilage and bone. Implantation into osteochondral defects in sheep stifle joints produced repair tissue with biochemical and biomechanical properties approaching those of normal cartilage. This scaffold may have applications in cartilage repair for backfill of OATS autograft or primary repair of osteochondral defects.

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AETIOLOGY OF EXPERIMENTALLY INDUCED OSTEOARTHRITIS OF THE KNEE; BIOMECHANICAL OR BIOCHEMICAL FACTORS?

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Purpose: Disturbance of joint homeostasis, due to several risk factors, can result in osteoarthritis (OA). In the present study we investigated the role of biomechanical loading and biochemical joint homeostasis in the development of osteoarthritis, in an experimental caprine model of joint damage.
Methods: In nine skeletally mature female milk goats, cartilage damage was introduced in the right stifle joint according to the Groove model. Grooves were made with a K-wire with a bend tip, only on the medial femoral condyle and maximally 0.5mm deep.The left stifle joint served as a control. After 20 weeks the goats were euthanized and the cartilage and synovial tissue was analyzed on macroscopical, histological (both OARSI goat score) and biochemical (proteoglycan (PG) turnover) OA characteristics.
Results: Macroscopic analysis showed a significant increase in the OARSI goat cartilage score for both the femoral and tibial experimental medial