

Autologous cartilage chip implantation improves cartilage repair tissue quality in osteochondral defects

135.

Bjørn Borsøe Christensen, Casper Bindzus Foldager, Morten Lykke Olesen, Hede Kris Chadwick, Martin Lind

Department of orthopedic surgery, Orthopedic research laboratory, Aarhus University hospital; Orthopedic research laboratory, Aarhus University hospital; Department of orthopedic surgery, Aarhus University hospital

Background: Osteochondral injuries in the knee have a poor endogenous healing potential and no gold standard treatment has been established. Recently, the use of cartilage chips has been emerging in the literature with promising short-term clinical results.

Purpose / Aim of Study: The aim of this study was to investigate the repair response of cartilage chips in a Göttingen minipig (GMP) osteochondral defect model. The hypothesis was that the presence of cartilage chips would improve the quality of the cartilage repair tissue in osteochondral defects.

Materials and Methods: Twelve GMP's received two 6 mm deep osteochondral defects in each knee. The defects were randomized to autologous bone graft combined with autologous cartilage chips (Autologous dual-tissue transplantation, ADTT) or autologous bone graft alone (ABG). Six GMP's were euthanized at six months and six GMP's at 12 months. Evaluation of repair was performed by histomorphometry.

Findings / Results: The presence of cartilage chips in the defects resulted in significantly more hyaline cartilage in the ADTT group compared with the ABG group at both six months (25.8% vs. 12.8%) and at 12 months (20.1% vs. 4.8%). There was significantly more fibrocartilage in the ADTT group compared with ABG alone at both time-points (44% vs. 27.5% and 60.8% vs. 41%, respectively) and there was significantly less fibrous tissue in the ADTT group compared with the ABG group at both time-points (27.6% vs. 57.7% and 16% vs. 48.3% respectively).

Conclusions: The presence of cartilage chips in an osteochondral defect facilitated the formation of fibrocartilage as opposed to fibrous tissue at both six- and 12- months follow-up. This study confirms the chondrogenic effect of cartilage chips on cartilage repair tissue in osteochondral defects.