A novel implantation technique for engineered osteo-chondral grafts

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Author(s) Candrian, C; Barbero, Andrea; Bonacina, E; Francioli, S; Hirschmann, M T; Milz, S; Valderrabano, V; Heberer, M; Martin, I; Jakob, M
Author(s) at UniBasel Valderrabano, Victor ; Jakob, Marcel ; Martin, Ivan ;
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We present a novel method to support precise insertion of engineered osteochondral grafts by pulling from the bone layer, thereby minimizing iatrogenic damage associated with direct manipulation of the cartilage layer. Grafts were generated by culturing human expanded chondrocytes on Hyaff-11 meshes, sutured to Tutobone spongiosa cylinders. Through the bone layer, shaped to imitate the surface-contours of the talar dome, two sutures were applied: the first for anterograde implantation, to pull the graft into the defect, and the second for retrograde correction, in case of a too deep insertion. All grafts could be correctly positioned into osteochondral lesions created in cadaveric ankle joints with good fit to the surrounding cartilage. Implants withstood short-term dynamic stability tests applied to the ankle joint, without delamination or macroscopic damage. The developed technique, by allowing precise and stable positioning of osteochondral grafts without iatrogenic cartilage damage, is essential for the implantation of engineered tissues, where the cartilage layer is not fully mechanically developed, and could be considered also for conventional autologous osteochondral transplantation.
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