The use of a cell-free chondroinductive implant in a child with massive cartilage loss of the talus

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Disclosures

- No author involved with this presentation has any potential conflicts with what is presented
A 3-year-old girl was transferred into our Regional Trauma and Plastic Surgical Unit following a road traffic collision.

It was reported that the child had been dragged for several feet by a car.

This was a solitary injury with a very deep friction burn had been sustained over the left ankle, with an underlying open ankle fracture-dislocation.

Routine BOA/ BAPRAS protocols for treatment of open fractures was undertaken, including intravenous cephalosporin antibiotic infusion, removal of gross contamination in the emergency department and saline soaked gauze coverage of injury and splintage.
• Anterior ankle capsule was absent

• Extensor digitorum comminis - 100% divided.

• Extensor hallucis longus and tibialis anterior present.

• Distal sensation was present apart from a small patch distal to the wound.

• Capillary refill time of this limb was 2 seconds.
Initial Debridement

The talus is visible denuded of 80% of its chondral surface, with the underlying cancellous bone visible.

Following debridement, the resulting soft tissue defect measured 8 x 5cm.
Treatment

- Definitive surgery was undertaken 5 days post injury
- The osteochondral injury was treated with a single layer cell free chondroinductive implant (chondrotissue®, J.K. Orthomedic Ltd. 1755 St. Regis Blvd, Quebec, Canada)
- Hyaluronic acid as per product specifications was used
- The graft was anchored with 5.0 vicryl sutures and Tisseel® fibrin sealant (Baxter, Newbury, UK) around the margins.
- A single Kirschner wire was placed across the medial malleolus and under the graft to prevent shear stresses and improve stability.
- Post-operatively the Kirschner wire was removed at 2 weeks, when passive ranges of motion exercises were commenced. A removable splint was used for the first 4 weeks post-operative and the child was kept non-weight bearing throughout this time.
Soft Tissue Coverage

- The soft tissue defect was treated using a free anterolateral thigh flap anastomosed end to end to the anterior tibial vessels and limited split skin grafting.
MRI scan was performed 10 months post injury to evaluate the chondral surface of the talus. The cartilage appeared thick and intact with no underlying oedema of the talus.
At 3 years post injury, the ALT flap was revised to cosmetically improve the appearance of the ankle. We took this opportunity to treat the anterior impingement of the left ankle that had arisen, at the same time. On opening the joint it was noted the anterolateral impingement lesion was a consequence of overgrowth of the tibial plafond and this was excised. The talar surface, where the cell free chondral graft was used, looked and felt normal. Biopsies were taken for further analysis.
Histology and Result

- Histology of biopsies taken showed a homogenous cell distribution, no fibroblasts, matrix rich in cells, homogenous cartilage-bone-interface, good subchondral integration, no visible scaffold residues.

- We feel that an excellent outcome has been achieved in a patient who had devastating injuries at presentation.

- A consequence of the injury has been overgrowth of the tibial plafond, which caused impingement. This may recur prior to completion of growth in this patient.