P20

Scaffold-free tissue engineered cartilage for tracheal repair

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Purpose: The purpose of this study is to develop and test a method to fabricate sheets of cartilage that can be used to produce replacement cartilage in a rabbit trachea model.
Methods and Materials: Auricular cartilage was harvested from white New Zealand Rabbits sequentially digested with trypsin, testicular hyaluronidase and collagenase type II, passed through a 70 µm nitex filter, centrifuged, plated on 100 mm diameter cell culture plates, and expanded in DMEM containing 10% FBS. Confluent plates were trypsinized stored in liquid nitrogen until needed. To form scaffold-free cartilage sheets, 50-100 million chondrocytes were injected into a 6 x 7 cm bioreactor (composed of two polystyrene gas-permeable membranes) and cultured in serum-free medium containing ITS,1 mM sodium pyruvate, 50 µM ascorbate-2-phosphate, 10^{-7} M dexamethasone and non-essential amino acids, and cultured for 3 weeks.
Results: The results showed that the implanted cartilage survived intact, integrated well with the surrounding fascia, which was well vascularized, and had a well-formed lumen of 4-5 mm in diameter, and there was no sign of an immune reaction even in tracheas formed from allo-cartilage sheets. The cartilage stained positively for collagens II and X, much like the native auricular cartilage, but showed no signs of mineralization.
Conclusions: These results show that chondrocytes sheets can be used to fabricate vascularized neo-trachea that retains a lumen and may be used as a model to repair segmental defects in rabbits.

P21

Clinical assessment of long term results of autogenous bone grafting of large volume osteochondral defects of the knee

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Purpose: The purpose of this study was to examine the long term results of autogenous bone grafting of large volume osteochondral defects of the knee by clinical assessment and MRI.
Methods and Materials: This was a prospective study of 38 patients with large volume osteochondral defects of the knee joint due to osteochondritis dissecans or osteonecrosis. The volume of the lesion was six to seventy-five cubic centimeters. The medial femoral condyle was the common site. There was arthroscopic debridement in all knees. The underwent autogenous bone grafting. The donor site was the proximal tibial metaphyses. Fifteen patients had an accompanying osteotomy. Post-operative regimen included eight weeks of non weight bearing ambulation with active range of motion. There was opportunistic second look and biopsy between two months and seven years.
Results: The clinical outcome was known in 32 patients average 15.4 years. Those with osteochondritis dissecans is were asymptomatic. Those with the largest lesions lost minimal range of motion. Radiological evaluation showed maintenance of joint space in those with osteochondritis and iatrogenic osteonecrosis. The MRI showed complete bone graft integration and reformation of the subchondral bone in all cases. There was maintenance of joint congruity with articular surface continuity of soft tissue covering of the grafted area.
Conclusions: The long term results in selected cases supports the concept that autogenous bone grafting of large volume osteochondral lesions is beneficial by clinical assessment. The MRIs up to 18 years revealed repair of the bony defect and restoration of soft tissue continuity of the articular surface.

P22

Cartilage regeneration. Chondrogenic induction by the effect of sodium hyaluronate and chondroitin sulfate

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Purpose: The purpose of this trial is demonstrate that we have an effective treatment for the Osteoarthritis.
Methods and Materials: We have 560 knees and 64 hips with 93% of excellent results.
Results: Since 1997 we have excellent results in the 93 % of the patients, with the implantation of an artificial matrix, such as the mixture of Sodium Hyaluronate (SH9 and Chondroitin Sulfate (CS9, provokes chondrogenic induction, both in vivo and in situ, because the chondrocytes that are duplicated in the site of the injury as an autonomous mechanism of regeneration, may be assimilated by this artificial matrix that acts as a wet nurse, permitting their maturation and, ubsequently, the secretion of its own definitive hyaline matrix, regenerating the articular surface. The treatment of G-I and G-II OA and chondromalasia by implantation of an artificial matrix (SH 40 mg/CS 30 mg), with its effect of chondrogenic induction, chondroprotection, and inhibition of the enzymatic synthesis of Stromelysin, causes regeneration of the articular cartilage in vivo and in situ, proven by microscopic changes after 4 months of starting the treatment, with normal structural, as well as functional characteristics. Throughout these almost 9 years, we have had evidence of chondral regeneration from the standpoint of clinical evolution, X-rays, arthroscopy, pre- and post-treatment microscopy, and immunohistochemical tests. •
Conclusions: The treatment of G-I and G-II OA by implantation of an artificial matrix,with its effect of chondrogenic induction, chondroprotection, and inhibition of the enzymatic synthesis of Stromelysin, causes regeneration of the articular cartilage in vivo and in situ.

P23

Treatment of grade IV chondral lesion with grow factor: a case presentation

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Purpose: The aim of this presentation is to demonstrate the regeneration of hyaline cartilage lesion grade IV treated by mechanical shaving and ice pick procedure plus intrachondral allograft insertion of growth factor delivered by plasma rich in pallets.
Methods and Materials: Forty-eight mL of the whole blood were collected 15 minutes before the chirurgical procedure in tube containing citrate as anticoagulant. Plasma rich in growth factors (PRGF) was isolated by density gradient after a centrifugation at 1800 rpm for 8 minutes. At the moment of insertion, the plasma rich in pallets was activated by calcium chlorite 10% (50µL of calcium chlorite for each mL of plasma rich in pallets) to the delivery of growth factor. During the videoarthroscopy, the mechanical shaving is performed until the bone layer; after this, the ice pick procedure is done in multiple sites of the lesion; the activated PRGF was placed into the chondral environment after the isotonic solution was removed. A second look was performed for histological evaluation of chondral tissue four months later.
Results: After four months of the procedure, a recuperation of hyaline cartilage was macroscopely observed. The histological analyses of the hyaline cartilage demonstrated a homogeneous stroma colored by eosin and the presence of chondrocytes in multiple points of biopsy with more than one nucleus suggesting the regeneration of the cartilage.
Conclusions: This is a simple method that presents promising results. In the present case, the patient returned to the practice of physical activity (soccer practice) in four months after the first chirurgical procedure, presenting good evolution.