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EDITORIAL

WHY THE MULTIDISCIPLINARY RESEARCH IS ESSENTIAL IN ORTHOPEDICS?

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BASIC SCIENCE

ELECTROMECHANICAL DELAY OF THE KNEE FLEXORS MUSCLES AFTERANTERIOR CRUCIATE LIGAMENTS RECONSTRUCTION USING SEMITENDINOSUS TENDON. PRELIMINARY STUDY.

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Increasing in electromechanical delay has been found in patients after ACL reconstruction using both semitendinosus and gracilis tendons. Using only one tendon may improve electromechanical delay results in patients after ACL reconstruction surgery. The purpose of the study is to evaluate electromechanical delay in ACL reconstruction patients after one tendon surgery technique. In particular, in this study, patients undergone the reconstruction surgery using the semitendinosus tendon will be evaluated. An isokinetic dynamometer will be used for the test. After warming up, patients will be ask to perform a maximally explosive isometric. Torques will be measured by the dynamometer while the electrical activity of the semitendinosus and gracilis muscles will be detected using surface EMG. Results of the study will evaluate if one tendons technique may increase electromechanical outcomes for ACL reconstruction patients.

Basic Science Study

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BASIC SCIENCE

ALTERNATIVE CELL SOURCES FOR TENDON/LIGAMENT ENGINEERING

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Tendons are connective tissues with low healing potential. In order to find new solutions for tendon regeneration, several models have been developed by combining different biomaterials with different cell populations. The choice of an opportune cell population is a fundamental step for engineering a tissue, since the cell source has to be competent for a specific phenotype and it has to be characterized by a minimally invasive approach on the patient for its isolation. According to these characteristics, different cell populations have been investigated for their tenogenic potential, in particular tenocytes, dermal fibroblast and mesenchymal stem cells from adipose tissue (ASCs). In the present study, these populations have been directly compared for their synthetic profile, both in monolayer culture and in combination to a collagen sponge, in order to evaluate if dermal fibroblasts and ASCs can be considered suitable alternative cell sources to native tenocytes for engineering tendons. The obtained data showed that these populations share the same synthetic profile of tenocytes, characterized by the expression of both collagen 1 and collagen 3; moreover, as well as the tenocytes, these cell populations were able to colonize and survive into a collagen sponge that is filled over time by the new matrix produced. In conclusion, dermal fibroblasts and ASCs can be considered suitable cell populations for tendon tissue engineering.

Basic Science

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BASIC SCIENCE

QUANTITATIVE BIOMECHANICAL MEASURES TO EVALUATE FUNCTION AND STRENGTH AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION IN DIFFERENT REHABILITATION STAGES.

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Anterior cruciate ligament (ACL) injury is common in knee joint accounting for 40% of sports injury. Returning to normal or high level athletic activity are the target of patients after reconstruction surgery. However, there are few standardized and objective protocols to evaluate patient's condition and safe return-to-activity after surgery. The purpose of this study is to present an assessment protocol in different rehabilitation stages after ACL reconstruction that includes neuromuscular control, strength, power, and functional symmetry evaluations. The proposed assessment methodology is based on quantitative measurement tools that provide the patient with objective feedback and targeted goal setting. KT-1000, stabilometry, gait analysis and isokinetic test were used in this assessment protocol to evaluate patient condition. These parameters may rationalize the work of clinician to provide the specific rehabilitation program based on the abilities of the specific patient. The proposed protocol may increase the outcome of the patient after rehabilitation and minimize injury risk.

Basic Science Study

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REVIEW ARTICLE

TENDON LESIONS AROUND THE ANKLE

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Ankle tendons' injuries are very frequent diseases in athletic population, also due to the raise in number of people practicing sports activities at recreational or professional level. Some author suggests that, among lower limb soft tissue injuries, tendinous lesions represent the 24% for Achilles tendon, 7% for tibialis anterior, 2% for tibialis posterior, and 1% for peroneal tendons. Each tendon can be affected by different conditions, like peritendinitis, tendinitis, tendinosis, insertional tendinosis, rupture or luxation. The most frequently affected tendons are represented by Achilles tendon, tibialis posterior tendon and peroneal tendons. The treatment of these conditions can be conservative or surgical, depending on several factors like age, athletic level, funtional requests, functional residual abilities, anotomopathological findings and duration of symptoms. Both in case of surgical or conservative treatment, it is mandatory to find and correct the intrinsic and estrinsic predisposing factors, in order to avoid the recurrence of the disease. Aim of this contribution is to describe the most common tendon lesions interesting Achilles, tibialis posterior and peroneal tendons and to analyze the most effective conservative and surgical treatments intended to relieve pain and to improve the functional outcome.

Narrative Review: V Level of Evidence

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REVIEW ARTICLE

BIOLOGICAL SCAFFOLDS FOR TENDON AND LIGAMENT REPAIR: NEW TREND

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Tendon is not able to heal itself: this raises the need of implantable devices, synthetic or biological, to use for augmentation or as substitutes. Pre-clinical studies on bio-scaffolds show very optimistic results however clinical studies reported high incidence of adverse events and implant failures. This gives remarks about manufacturing process must be ameliorated, searching a compromise between safety and mechanical resistance. Today, because of their mechanical weakness, scaffolds should be used only for augmentation and not as substitutes of tendons or ligaments. New trend will be the combination of synthetic and biological devices to take advantages from both.

Systematic Review: I Level of Evidence

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REVIEW ARTICLE

CHONDROGENETIC PROPERTIES OF THE SYNOVIAL TISSUE AND A REVIEW OF THE LITERATURE ON SYNOVIAL MESENCHYMAL STROMAL CELLS

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The cartilage pathologies have been frequently seen in clinics. If they are not treated properly, they may cause significant functional disabilities and may even finally progress to osteoarthritis of the affected joint. There are various methods, which have been described for their treatment. The use of mesenchymal stromal cells has been intensively studied for their differentiation to chondrocytes. There are also a variety of enhancing factor involved in this process. This study demonstrated that the synovial tissue is a highly suitable in-vivo culture for the growth of native articular cartilage tissue, especially involving subchondral bone -osteochondral tissues-. This intimate relationship between the synovial and hyaline cartilage tissues –which we prefer to call "biological tropism"- may open new frontiers on the treatment of cartilage lesions as an alternative "biological treatment". Human can produce his own hyaline cartilage via synovial command and induction!

Basic Science: Randomized Experimental Study

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SURGICAL TECHNIQUE

ANATOMIC ALL-INSIDE ACL RECONSTRUCTION: SURGICAL TECHNIQUE AND RESULTS

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The reconstruction of the anterior cruciate ligament (ACL) has become a common procedure permitting to restore the normal anterior stability of the knee and its correct kinematics with many techniques described in literature. Recently technical improvements led to the development of minimally invasive techniques capable to obtain an anatomical ACL reconstruction. The aim of this study is to report the clinical results obtained with an anatomic single bundle All-inside technique using a triplicated or quadruplicated autologous semitendinosus (ST) tendon fixed with a second-generation cortical suspensory fixation device.

Case series: IV Level of evidence

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SURGICAL TECHNIQUE

ANATOMIC ACL RECONSTRUCTION USING DISTALLY INSERTED DOUBLED HAMSTRINGS TENDONS: SURGICAL TECHNIQUE AND RESULTS

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The anatomical anterior cruciate ligament (ACL) reconstruction using hamstring tendons is still a matter of debate in orthopedic surgery. Many techniques are currently available, but all of them require the detachment of the tibial insertion of the hamstrings, damaging the neurovascular supply of the tendons: it results in a lower residual proprioceptivity and worse ligamentization of the graft. To avoid these problems Marcacci described a non anatomical "over the top technique" able to spare the tibial insertion of the hamstring. The long term results presented by the Author are satisfactory. Recently we used a new surgical technique that allows to spare the tibial insertion of the hamstring and also allows anatomical recostruction. The femoral tunnel can be reamed using a antero-medial approach or an outside-in femoral drilling depending to the skill of the surgeon.

Case Series: IV Level of Evidence

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