Co-culturing of primary chondrocytes and mesenchymal stem cells to optimize cartilage formation

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Evaluate the optimal cellular ratio of human mesenchymal stem cells and primary chondrocytes for cartilage formation in an in vitro culture and in vivo nude mice model.

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Tendon, ligament and cartilage disorders
Study type	Observational invasive

Summary

ID

NL-OMON31506

Source
ToetsingOnline

Brief title
INSTRUCT Technology

Condition

- Tendon, ligament and cartilage disorders

Synonym
Cartilage damage, cartilage degeneration

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Utrecht
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: cartilage, chondrocyte, Culturing, Stem cell

Outcome measures

Primary outcome

Primary endpoint of this study will be after 6 weeks of in vitro culture or in vivo survival of the co-cultured chondrocytes and mesenchymal stem cells. At this time point we will analyze the ideal ratio of these cells for cartilage formation based on alcian blue staining, collagen propeptide I and II determination, safranin O staining and aggrecan ELISA.

Secondary outcome

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Study description

Background summary

Trauma and disease of knee joints frequently involve structural damage to articular cartilage.
Since 15 years autologous chondrocyte implantation (ACI) shows satisfactory results for the restoration of focal cartilage lesions. However, the necessary in vitro expansion of the harvested chondrocytes induces cellular dedifferentiation, resulting in diminished cellular quality. Hendriks et al combined primary bovine chondrocytes and human mesenchymal stem cells in an in vitro co-culture system. This combination led to an increase of cartilage specific matrix constituents at varying cell-cell ratios and, therefore, introduces the possibility to investigate the potential of a single surgery therapy for focal cartilage lesions.
This study will combine human mesenchymal stem cells and human primary chondrocytes from the same donor at different ratios to evaluate the effect on cartilage formation. We will obtain our cells from patients admitted to reconstructive anterior cruciate ligament (ACL) surgery.

Study objective

Evaluate the optimal cellular ratio of human mesenchymal stem cells and primary chondrocytes for cartilage formation in an in vitro culture and in vivo nude mice model.

Study design

Patients admitted to ACL reconstructive surgery will be informed about this study by the treating surgeon and asked for approval to obtain bone marrow during the operation and the use of their cells for laboratory cartilage research. After approval we will combine the primary chondrocytes and mesenchymal stem cells at different ratios and culture them in an in vitro and in vivo model for six weeks followed by immunohistochemical, histological and biochemical analysis on cartilage formation.

Study burden and risks

We expect, although cannot proof this because of lack of experience and available data, that the additional surgical procedure (aspiration of bone marrow before drilling the femoral hole) will not have any negative influence on surgical outcome or patient recovery.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

-Male and female patients over 18 years of age
-Patients with a ruptured ACL admitted to ACL reconstructive surgery

Exclusion criteria

-Patients over 40 years of age
-Patients with generalized cartilage degeneration

Study design

Design

Study type: Observational invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	09-02-2009
Enrollment:	48
Type:	Actual

Ethics review

Approved WMO

Date:	01-04-2008
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Utrecht (Utrecht)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL21170.041.08