

# Load-bearing capacity of the cruciate ligament replacement precisely evaluated

March 3 2015

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In case of a cruciate ligament rupture, the load-bearing capacity of the cruciate ligament replacement can be precisely evaluated using a new imaging process

A footballer is able to play football again or to recommence training six months after an operation on a cruciate ligament rupture in case of a normal healing process. This interruption is common in professional football, but it is merely an empirical value, as Siegfried Trattng from the University Clinic for Radiology and Nuclear Medicine at the MedUni Wien (Medical University of Vienna) has emphasised. In future, however, it will be possible to evaluate precisely both the load-bearing capacity of the "new" cruciate ligament and the risk of a renewed rupture using a new imaging process methodologically

developed for clinical use at the MedUni Wien, with which the biomechanical properties of the knee and the cruciate ligament can be measured.

In this process, the so-called gagCEST technique is used, the basic principle of which originates from New York University. The methodological further development for application in clinics was then conducted at the Centre of Excellence for High Field MR at the University Clinic for Radiology and Nuclear Medicine at the MedUni Wien, and has now been used for the first time on patients with an operative replacement of the anterior cruciate ligament. It is possible to measure important components of the cartilage, menisci and knee joint ligaments; the glycosaminoglycans (GAG). They represent a general biomarker for the biomechanical properties of knee joint structures.

In case of a cruciate ligament operation following a rupture of the [anterior cruciate ligament](#), a tendon from the patient themselves – usually a tendon from the thigh – is used as a replacement cruciate ligament to replace the damaged one. "The human body reacts to this by converting this tendon into a ligament again in a process lasting several months", the MedUni Wien expert explains on the occasion of the European radiologist congress, ECR, which takes place from the 4th to 8th March in the Austria Center Vienna.

The stability of the ligament could not up to now be determined using the current standard magnetic resonance, but this can be achieved using the new gagCEST technology. Trattnig: "The more glycosaminoglycans we can measure in the new ligament, the better its stability and load-bearing capacity. As a result, we can measure precisely when, depending on the measured values during the healing process, a higher load can be placed on the knee and also whether the so-called ligamentization, i.e. the conversion of the tendon to a ligament, is still in progress and there is therefore still a risk of a renewed rupture of the cruciate ligament."

This new technology has now been used for the first time using a 7-Tesla ultra-high field magnetic resonance tomography at the MedUni Wien, but it can also be applied during methodological further development using the 3-Tesla devices normally in operation.

Provided by Medical University of Vienna

Citation: Load-bearing capacity of the cruciate ligament replacement precisely evaluated (2015, March 3) retrieved 26 April 2024 from <https://medicalxpress.com/news/2015-03-load-bearing-capacity-cruciate-ligament-precisely.html>

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