ISAKOS

International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine

10th Biennial ISAKOS Congress • June 7-11, 2015 • Lyon, France

Paper #39

The Effect of a Valgus Opening Wedge High Tibial Osteotomy and Release of the Medial Collateral Ligament on the Articular Cartilage Pressure, Tension over the Medial Collateral Ligament and Valgus Stability of the Knee

Nienke Van Egmond, MD, NETHERLANDS
Dennis Janssen, PhD, NETHERLANDS
Anne Vrancken, PhD, NETHERLANDS
Nico Verdonschot, NETHERLANDS
Albert Van Kampen, MD, NETHERLANDS

Radboud UMC
Nijmegen, NETHERLANDS

Summary:
A release of the medial collateral ligament is needed to switch the cartilage pressure from the medial tibiofemoral compartment to the lateral tibiofemoral compartment after an open wedge high tibial osteotomy

Abstract:
PURPOSE
The objective of this study was to investigate the effect of a valgus opening wedge high tibial osteotomy and the release of the medial collateral ligament (MCL) on the tibiofemoral cartilage pressure, the tension over the medial collateral ligament and the valgus stability of the knee.

METHODS
Seven fresh frozen human cadaveric knees were tested in a specially designed device. Peak contact pressure (peak CP), contact pressure (CP) and contact area (CA) were measured using a pressure-sensitive film, which was inserted in the medial and lateral tibiofemoral joint . The tension over the MCL was measured using our specially designed device. The valgus stability was measured using a handheld Newtonmeter. The measurements were continuously recorded for 5 minutes after a valgus opening wedge high tibial osteotomy of 5, 10 and 15 degrees. After each sequence of measurements, a complete release of the superficial MCL was performed and the measurements were repeated.

RESULTS
There was an increase of the mean peak CP, CP and CA in the medial tibiofemoral compartment and a decrease in the lateral tibiofemoral compartment after an high tibial osteotomy of 5, 10 and 15 degrees . Only after a complete release of the superficial MCL the mean peak CP, CP and CA decreased in the medial tibiofemoral compartment and increased in the lateral tibiofemoral compartment. After each osteotomy the tension over the MCL decreased with a mean of 12% over a period of 5 minutes. We found after the release of the MCL and an osteotomy of 10 degrees a mean increase of 7.4 degrees of the valgus instability compared to the baseline measurement.

CONCLUSION
A release of the medial collateral ligament is needed to switch the cartilage pressure from the medial tibiofemoral compartment to the lateral tibiofemoral compartment after an valgus opening wedge high tibial osteotomy. The release of the MCL caused a valgus instability. The MCL has a quality to adapt to its new situation (the tension over the MCL decreased over time), but after each osteotomy the tension over the MCL remains very high.