

# Tendon and fascial structure contributions to knee muscle excursions and knee joint displacement

O. Snoeck<sup>1,\*</sup>, B. Beyer<sup>1</sup>, V. Feipel<sup>1,2</sup>, P. Salvia<sup>1,2</sup>, J-L Sterckx<sup>2</sup>, M. Rooze<sup>1,2,3</sup>, S. Van Sint Jan<sup>1</sup>  
1: Laboratory of Anatomy, Biomechanics and Organogenesis, Université Libre de Bruxelles (ULB), Bruxelles, Belgium.

2: Laboratory of Functional Anatomy, Université Libre de Bruxelles, Bruxelles, Belgium.

3: Department of Orthopedic Surgery, Erasme Hospital, Université Libre de Bruxelles, Bruxelles, Belgium

\*: Corresponding author: Snoeck Olivier (osnoeck@ulb.ac.be)

**BACKGROUND.** Semitendinosus and gracilis muscles whose tendons are used in surgical reconstruction of the anterior cruciate ligament maintain their contractile ability, and a limited decrease of hamstring muscles force is observed postoperatively despite important changes [1-4]. The goal was to quantify the influence of the myofascial structures on excursions and moment arms of knee muscles to attempt explaining the above-mentioned post-surgical observations.

**METHODS.** Hamstring harvesting procedures were performed by a senior orthopaedic surgeon on seven lower limbs from fresh-frozen specimens.

Femoro-tibial kinematics and tendons excursion were simultaneously recorded at each steps of the surgery.

**RESULTS.** No significant difference was demonstrated for excursions and moment arms after tenotomies and gracilis tendon harvesting ( $p \geq 0.05$ ). The first significant semitendinosus excursion ( $p < 1.17 \times 10^{-4}$ ) and moment arm ( $p < 6.88 \times 10^{-5}$ ) decrease was observed after semitendinosus tendon harvesting (46% of the initial excursion) [5].

**CONCLUSION.** Gracilis and semitendinosus myofascial pathway is crucial for force transmission towards the knee joint.

## REFERENCES

1. Maeda A, Shino K, Horibe S, et al. (1996) Anterior cruciate ligament reconstruction with multistranded autogenous semitendinosus tendon. *American Journal of Sports Medicine* 24:504–509.
2. Nakamura N, Horibe S, Sasaki S, et al. (2002) Evaluation of active knee flexion and hamstring strength after anterior cruciate ligament reconstruction using hamstring tendons. *Arthroscopy* 18:598–602.
3. Ohkoshi Y, Inoue C, Yamane S, et al. (1998) Changes in muscle strength properties caused by harvesting of autogenous semitendinosus tendon for reconstruction of contralateral anterior cruciate ligament. *Arthroscopy* 14:580–584.
4. Yasuda K, Tsujino J, Ohkoshi Y, et al. (1995) Graft site morbidity with autogenous semitendinosus and gracilis tendons. *American Journal of Sports Medicine* 23:706–714.
5. Snoeck O, Beyer B, Feipel V, et al. (2014) Tendon and fascial structure contributions to knee muscle excursions and knee joint displacement. *Clinical Biomechanics*. doi: 10.1016/j.clinbiomech.2014.08.003

