



THUASNE



A2S BIOMECHANICAL STUDY ABSTRACT – 01/2021

Objective:

Analysis of the kinematics of the mechanical articulation of 2 knee braces in comparison with natural knee kinematics.

Protocol – Materials and Methods:

3 conditions evaluated in 18 healthy volunteers (in random order):



- No knee brace – natural knee,
- **Rebel Standard Knee Brace (Thuasne) – TM5 hinge^a**
- Armor Knee Brace (DJO) – FourcePoint hinge^b

20 infrared markers were positioned on the legs and 8 on the knee braces.

The movements of these markers were recorded with 7 cameras and were transferred to a computer for processing.

The subjects were invited to walk on a treadmill at a speed they found comfortable, with and without a knee brace.

Limitations/study bias:

Accuracy of $\pm 1^\circ$ and 0.00198 m. Asymptomatic population, walking on a treadmill.

RESULTS

Spatiotemporal gait data:

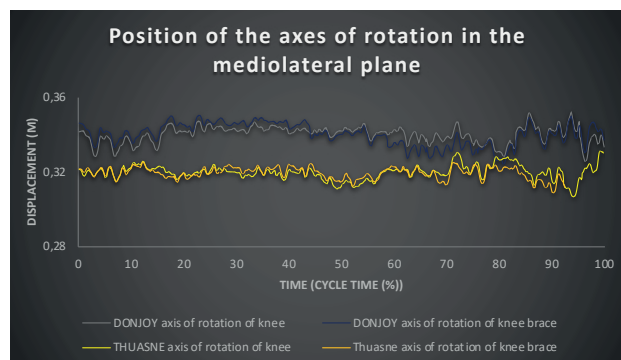
Significant decrease in double support time (when both feet touch the ground) with the **Thuasne** knee brace ($p < 0.05$) compared to the condition without a knee brace

→ **better dynamic stability***.

Flexion/extension amplitude:

Significantly reduced with both knee braces, but a smaller difference observed with the **Thuasne** knee brace

→ **closer to the natural range of motion of the knee.**



Displacements of the centers of rotation of the knees and of the knee brace hinges:

The difference between the **TM5** and the natural knee was smaller than the difference between the FourcePoint and the natural knee, especially for displacements on the mediolateral axis.

→ **better reproduction of the natural kinematics of the knee and better frontal stability with the TM5.**

Subjective comfort:

The **Thuasne** knee brace was rated as being significantly more comfortable (on average 7.29/10 for the **Thuasne** knee brace versus 5.25/10 for the DJO knee brace).

CONCLUSION

Walking with the **Thuasne** knee brace (**TM5** hinge) results in a greater decrease in double support time, which may thus characterize **better dynamic stability**. The **Thuasne** knee brace **optimally reproduces the natural movement of the knee**, in particular for mediolateral displacements. Finally, the feedback collected clearly shows that the **Thuasne** knee brace was **perceived as the most comfortable**.



^aMaki B. Gait changes in older adults: predictors of falls or indicators of fear. 1997 J Am Geriatr Soc. 45:313-20.
^bRebel indications: Anterior Cruciate Ligament instability, posterior cruciate ligament instability, medial collateral ligament injury, lateral collateral ligament injury. Low contact/impact activities. Contraindications: refer to the leaflet. Class I medical device. Read the product's instructions for use, indications and contraindications carefully. Availability of this product might vary from a given country or region to another, as a result of specific local regulatory approval or clearance requirements for sale in such country or region. Medical device mentioned on this document is CE marked according to the European council directive 93/42/EEC and its relatives. Creation or revision date of promotional item 2101032 - (02/2021).