Standardized and reproducible knee acquisitions

Innovation, tested and proved by
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Vienna, Austria

Introduction

JAMES is a patented device that supports an optimal position of a patient's knee during standing knee acquisitions. It applies not only for joint space analyses but also for visual assessments.

The reproducibility is essential for follow-up studies. If the correct and consistent acquisition perspective isn't granted for two or more images, the likelihood for wrong analysis results or misinterpretations is drastically increased. Therefore the joint space analysis isn't such a reproducible tool in the medical world these days as it could be with JAMES.

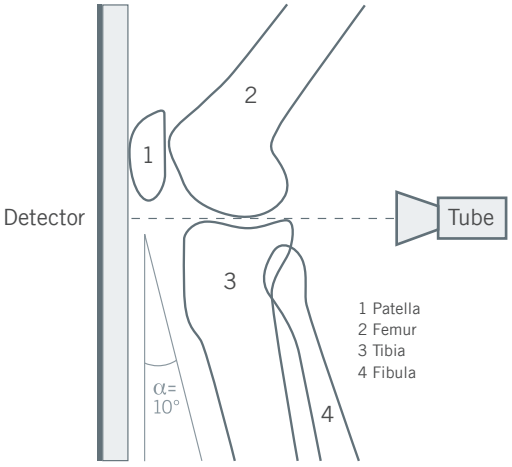
James mono / duo

The foundation of the device is the ground plate. The foot element can be docked-in to be able to perform single knee captures. The foot elements can be easily adjusted:

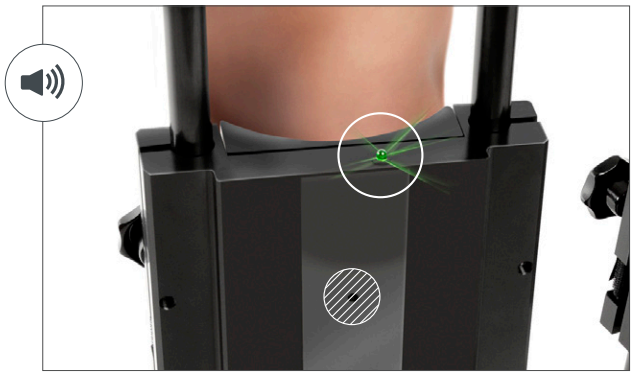
foot element adjustments

foot rotation angle	-15° to 15° in 5° steps
tibia inclination angle	0°, 10° and 15°
sensor module height	27 to 42 cm to upper edge

The foot rotation angle ensures an individually natural standing position for the patient. Most people have an outward rotation of 5° while standing.



The sensor module height can be adjusted, relative to the patient's body height. It features two tactile sensors which only activate the module when the patient is in the correct position.



If activated, acoustical (pulsed beep sound) and visual (colored LED light) feedback is perceptible. The two foot elements have a different pitch level and LED color. The different signals allow the differentiation of which leg is correctly positioned.

The correct tibia inclination angle is essential for an image acquisition that is parallel to the tibia plateau. The human tibia plateau has a standard slope of 10°.

proved reproducibility

To collect data for an improved reproducibility, clinical investigations were performed in the orthopedic office of the CORPUS clinic, Vienna. 10 different sets of test subjects were included. Each knee was examined two times with JAMES and two times without JAMES. Between the acquisitions, short pauses were included. The test subjects had to walk a few steps after each examination. The measurement setup was rearranged every time, to ensure realistic daily routine.

The basis parameter for the evaluation was the JSA (joint space area), which was determined using the i3A-JSX software. The JSA is very sensitive against perspective changes and therefore best suited for a comparison of capturing methods.

The results clearly endorse the use of JAMES:

examination errors	
without JAMES	**with JAMES**
28,18 % (maximum)	2,73 % (maximum)
6,19 % (average)	**0,83 % (average)**

As mentioned, JAMES ensures a position that is best for an objective visual and computed JSA analysis. The optimal position is concluded from international studies [1, 2, 3]. The investigation also shows that free standing knee acquisitions can lead to results that vary approximately 30% to the results from the correct position.

JAMES therefore grants a reproducibility rate accuracy of **99,17 %** on average. The progression of Osteo-arthrosis is so rapid in most cases, that the 0,83 % of uncertainty hardly interferes with follow-up studies. The 6,29 % without JAMES however does potentially falsify the assessment.

References
[1] B.C. Didia, B.N.R. Jaja; "Posterior Slope of Tibial Plateau in Adult Nigerian Subjects" (2009)
[2] U.Malzer P.Schuler; "Die Komponentenausrichtung beim Oberflächenersatz des Kniegelenkes" (1998)
[3] S. Şenışık, C. Özgürbüz; „POSTERIOR TIBIAL SLOPE AS A RISK FACTOR FOR ANTERIOR CRUCIATE LIGAMENT RUPTURE IN SOCCER PLAYERS" (Dec 2011)

james
by i3a

mono

Weight: appr. 6 kg (13,2 lb)
Dimensions (WxHxD): 240 x 440 x 500 mm
Side plate (WxD): 200 x 400 mm

duo

Weight: appr. 9,8 kg (21,6 lb)
Dimensions (WxHxD) 440 x 440 x 500 mm

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