

INFLUENCE OF ANGULAR VELOCITY OF A DYNAMOMETER IN JOINT POSITION SENSE OF KNEE IN NORMAL SUBJECTS

Fabio Navarro Cyrillo¹; Cristina M. N. Cabral¹

¹UNICID – Universidade Cidade de São Paulo - Brasil
Email: ftfabiocyrillo@uol.com.br

INTRODUCTION:

The integrity of knee proprioception is essential for a good musculoskeletal control, and for this reason, knowing some physiological mechanisms involved in this process is essential for clearing the complex injury mechanism, favoring the elaboration of more specific and adequate interventions. Among the resources to assess the joint position sense, it's prominent the manual goniometry, continuing passive manipulation, shooting system, isokinetic dynamometry and electrogoniometry, but the isokinetic dynamometry and electrogoniometry are the most reproducible.

OBJECTIVE:

Verify which angular velocity of the dynamometer is the most reproducible for assessing the knee joint position sense in healthy subjects.

METHODS:

It was selected 10 female volunteers, sedentary (without regular physical activity), age between 18 and 21 years old, and without any kind of musculoskeletal injury in lower limbs (hip, knee and ankle joints). It was utilized a Cybex Norm dynamometer and a MIOTEC model miotool 400 of 4 channels with 14 resolution bits, acquisition per channel of 2000 samples per second, 100x, RUÍDO < 2LSB, filter Butterworth high pass 1 polo 0,1Hz and buterworth low pass 2 polo 500 Hz, spacing between electrodes

fixed in 30mm. Surface electrodes of Ag/ClAg, round, pre gelded and auto adhesive from MEDITRACE Kendall 200. The subjects were placed on the dynamometer chair, sitting, back sustained, and fastened by belts according to fabricant regulation. The dynamometer arm passively conducted the dominant limb in a regular velocity of 1°/s, until the proposed angle of 45° of knee flexion for 3 times, standing on this angle during 5 seconds for the perception of the position. After this time, the limb returns to initial position and will be passively conducted by the dynamometer for 25° to 90° knee flexion amplitude, and the subject, with a locking button of the dynamometer, was oriented to stop the movement when realizing to be at 45°. The same procedures were practiced for velocities of 2°/s and 20°/s. During the collection, surface electrodes were placed according to SENIAM on rectus femoris muscles to certify they were relaxed. It was used significance level of 5% and wilcoxon test also (Basmajian & De Luca 1985; Lephart, FU 2000)

RESULTS:

It was observed that there wasn't statistically significant difference, but for angular velocity of 1°/s, the absolute error was 2°, and 1° for angular velocity of 2°/s ($p < 0,07$). Nevertheless, for angular velocity of 20°/s, the higher absolute error was 12° ($p < 0,001$).

	Angular Velocity 1°/s	Angular Velocity 2°/s	Angular Velocity 20°/s
Absolute error with 45° knee flexion	2° (p<0,07)	1° (p<0,07)	12° (p<0,001)

Table 1. Absolute error of joint position sense of knee at 1°/s, 2°/s and 20°/s.

CONCLUSION:

This study suggests for this sample that the lowest errors for the answer of joint position sense of knee was at angular velocity of 2°/s. This is important to define the one of the parameters of knee proprioception evaluation.

REFERENCES:

- Basmajian Jv, De Luca Cj. *Muscles alive, their functions revealed by eletromyography*. 5ª edição, Baltimore: Williams & Wilkins, 1985, pp. 409-428.
- Cram Jr, Kasman SG. *Introduction to surface electromyography*. Maryland: Aspen, 1998, p. 334.
- Lephart, FU. *Proprioception and Neuromuscular Control in Joint Stabiity* Human Kinetic. 2000.