

Comparability of isokinetic dynamometers

B. Joss*¹, P. Hamer¹, P. Sacco² & G. Strauss³

¹Dept of Human Movement & Exercise Science, The University of Western Australia

²Dept of Biomedical and Sports Science, Edith Cowan University

³School of Physiotherapy, Curtin University of Technology

The use of isokinetic dynamometers for muscle testing has become a popular and arguably reliable and valid measurement of maximal muscle performance. With different dynamometers on the market, the question of comparability remains partly unanswered. Subjects (n=12) were tested on the Biodex System 2, Kinetic Communicator 500H (KinCom), and Cybex 6000 dynamometers for maximal concentric knee extension torque at velocities of 60, 120, 180 and 240°.sec⁻¹. Results showed that the KinCom dynamometer consistently reported significantly greater peak torque values than the Biodex and Cybex dynamometers (p<0.05). Differences were also found between dynamometers for angle at peak torque (p<0.05), as well as torque at 60° of knee flexion (p<0.05). The most probable reason for these results was the effect of preload. Although set to a minimum, the KinCom dynamometer requires a 20N force to be produced by the subject before isokinetic movement will commence. The resultant effect may be that a greater peak torque is recorded by the dynamometer. Overall, the three dynamometers lack true comparability, and further research is required to determine whether the variability between dynamometers is due to the human interaction with the dynamometer, or the design and mechanical differences between dynamometers.

Comparability of isokinetic dynamometers

B. Joss^{*1}, P. Hamer¹, P. Sacco² & G. Strauss³

¹Dept of Human Movement & Exercise Science, The University of Western Australia

²Dept of Biomedical and Sports Science, Edith Cowan University

³School of Physiotherapy, Curtin University of Technology

The use of isokinetic dynamometers for muscle testing has become a popular and arguably reliable and valid measurement of maximal muscle performance. With different dynamometers on the market, the question of comparability remains partly unanswered. Subjects (n=12) were tested on the Biodex System 2, Kinetic Communicator 500H (KinCom), and Cybex 6000 dynamometers for maximal concentric knee extension torque at velocities of 60, 120, 180 and 240°.sec⁻¹. Results showed that the KinCom dynamometer consistently reported significantly greater peak torque values than the Biodex and Cybex dynamometers (p<0.05). Differences were also found between dynamometers for angle at peak torque (p<0.05), as well as torque at 60° of knee flexion (p<0.05). The most probable reason for these results was the effect of preload. Although set to a minimum, the KinCom dynamometer requires a 20N force to be produced by the subject before isokinetic movement will commence. The resultant effect may be that a greater peak torque is recorded by the dynamometer. Overall, the three dynamometers lack true comparability, and further research is required to determine whether the variability between dynamometers is due to the human interaction with the dynamometer, or the design and mechanical differences between dynamometers.