THE ANALYSES OF KNEE INTERNAL FORCE DURING PASSIVE REPETITIVE ISOKINETIC PLYOMETRIC TRAINING

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INTRODUCTION: Passive Repetitive Isokinetic (PRI) training was a novel method for improving sport performance (Chiang Liu et al, 2005). As you know it can comprehensively advance muscular power characteristic of an athlete (Hsiang-Hsin Wang et al, 2005). But did you ever think that PRP training program might cause sport injury. It is not clear how much training effect would cause injury. Especially knee joint would sustain the most internal force for lower extremity. Therefore, the purpose of this study is to investigate the effects of plymeric training on overuse injuries of the knee. The hypothesis is that the torque of knee joint variables will be greatly affected by injury.

METHOD: Thirty-four male college handball players are testing with PRI training and the work is still in progress. The kinematics data were collected by SONY digital camera (30Hz) situated beside the athletes. Furthermore, the kinetic data were collected by load cell (1000Hz), each subject performed the dynamic PRI testing (1.5Hz) for 20 seconds. This study will use SIMI motion analysis system scale variables extracted from the film of a calibration frame recorded before PRI testing. The optimal filtering method (to utilize band pass filter method) is chosen by the system. The knee joint force will be obtained from inverse dynamics theory. The body segment parameters will be derived from Wei-Hua Ho (2005) previous research data, who had already established a system of body segmental parameters for Taiwanese.

RESULTS: This work in progress wants to find the most important factor of knee joint injury during PRP training. As in previous studies (Buczec,1990), knee joint angular velocities and knee joint torque showed typical and reproducible patterns that could be used to enhance muscle function. So, in this study we want to use the suitability of inverse dynamics method for expression of joint kinetics. Therefore, the result of this study will be able to offer the measuring and determinates of the knee joint force and joint angular velocity especially for risk of injures analyses.

DISCUSSION & CONCLUSION: Previous study had found PRI training as a better training than traditional strength training. For sports biomechanics, the ultimate objective is to improve sports performance and preventing injury. On the other hand, would PRI training program cause injury? Therefore, we will use the torque of knee joint during the PRI training that investigates the changes in lower extremity. If it is, we must control the effect of this training. Ultimately, this study wants to understand the injury mechanism of training programs. The variables of PRI training are to be explained in future research.

REFERENCES:

Chiang Liu, Chuan-Show Chen, Ya-Ju Chang, Mu-Shan Chang and Tzyy-Yuang Shiang (2005)., Effect of Passive Repetitive Isokinetic Training on Jump Performance and Neuromuscular Function, Proceedings of APB Ⅱ, Taipei,Taiwan.

Hsiang-Hsin Wang, Jung-Sang Chang and Tzyy-Yuang Shiang (2005). Analysis the effects of passive repetitive plyometric training on specific continuous kicking performance of elite Olympic taekwondo athlete, Proceedings of APB Ⅱ, Taipei,Taiwan.

Wei-Hua Ho, Tzyy-Yuang Shiang and Chan-Chin Lee (2004). The study of segment of human body of Taiwanese young people, J. Medical and Biological Engineering (Taipei), 24, P. 1-6.

Buczec FL, Cavanagh PR(1990). Stance phase knee and ankle kinematics and kinetics during level and downhill running,Med Sci Sports exercise, 22, P. 669-677