

## THE APPLIED OF KINITECH ISOKINETIC REHABILITATION AND TESTING UNIT IN THE STRENGTH TRAINING OF ELITE ATHLETES AFTER KNEE JOINT INJURY

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**KEY WORDS:** knee joint injury, isokinetic training, muscle strength

**INTRODUCTION:** Knee joint injury is one of common injuries in sports, it affects the improvement of sports performance, reduce the number of years for sports, even ends athlete's sports career. This study, which aims to apply the isokinetic training in the most excellent Chinese female athletes of softball after knee joint injury, verifies that isokinetic training not only improves muscle strength of athletes but also is a very effective way in the rehabilitation after knee joint injury.

**METHODS:** Two of the most excellent Chinese female softball athletes volunteered to participate in this investigation. One of them was operated on the cruciate ligament, while the other operated on meniscus of the knee joint in 2001. Rehabilitation program: On a computer-controlled dynamometer (Kinitech Multi-Joint Computerised Isokinetic Rehabilitation and Testing Unit., Keylink Corp., Australia), the subjects participated in the isokinetic training every two days. In the first 4 weeks, the subjects did the exercise including 5 sets of dynamic knee extension-flexion movements, which velocity are 30°/s, 60°/s, 90°/s, 120°/s, 180°/s respectively. The subjects perform the first two sets of 6 repetitions, and 8 repetitions about next two sets, and 10 repetitions about 180°/s. There was 1 min interval between the sets. The subjects did the exercise 4 circulations a day with 3 min recovery between two circulations. In the rest 4 weeks, there is an adding set which velocity is 240°/s. The subjects perform the first two sets of 6 repetitions, and 10 repetitions about the next two sets, and 15 repetitions about 180°/s, and 20 repetitions about 240°/s. Before doing exercise, both the subjects had 10 min to warm up. Testing scheme: The subjects participate in two test of pre- and pro-training at the same condition on a computer-controlled dynamometer (MERAC, Universal Corp., USA). The tests adopt two modes of 60°/s × 6 and 240°/s × 20 with 3 min interval. Then the computer records the data of the indexes.

**RESULTS:** 1) The comparison of recovering knee joint strength between pre- and pro-training. After training, one subject's recovering knee flexor muscle torque increased 38.8%, and her knee extensor muscle torque increased 11.6%, while the other increased 77.5% and 88.6% at 60°/s. At 240°/s, one increasing 29.8% and 11.1%, while the other increased 10.1% and 26.4% respectively. The values of two subject's maximal power at 240°/s increased significantly, so did the values of their total power and average power at 60°/s. And the subjects' stamina index at 60°/s increased too. 2) The comparison of recovering knee H/Q between pre- and pro-training. Before and after training, one subject's recovering knee values of H/Q were 71% and 88% respectively at 60°/s, and were 65% and 76% at 240°/s. While the other were 43% and 41% at 60°/s, and were 65% and 57% at 240°/s. The difference may be related to the feature of their knee joint injury. 3) The comparison of extensor and flexor muscles strength between recovering knee and contralateral knee. After training, one subject's ratio of bilateral knee extensor and flexor muscles increased from 60.5% and 59.7% to 78.5% and 62.1%, while the other increased from 76.7% and 73.7% to 84.4% and 86%. 4) The comparison of maximal rank of motion (ROM) between pre- and pro-training. This study showed: after the training, Wei Qiang and Zhang Yanqing's ROM added 7° and 8° respectively.

**CONCLUSION:** 1) Isokinetic training can improve knee extensor and flexor muscles strength of athlete. 2) It is uncertain how Isokinetic training affects the subjects' knee H/Q with different knee joint injury feature. 3) Isokinetic training can increase the subject's ratio of bilateral knee extensor and flexor muscles.