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Effect of weight loss and strength training on pain, discomfort, stability, ROM and isokinetic moments in basketball player with experienced a knee injury

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Basketball requires abrupt stop and go and cutting maneuvers which can put the ligaments of the knee joint at risk. Basketball had a higher injury rate because player-player contact was the most common medically disqualifying injury mechanism. However, although it is also thought to be associated with body weight or myofunction around knee joint, there are so lacking evidences related to above the theory. All the subjects complaining of knee pain/discomfort for more than 3 months were not need to take a surgery. And they were collegiate students who did play basketball regularly for over 6 months. Additionally, they were also included if they had not taken any treatment for weight loss or any medication known to affect body composition, had not undergone any major surgery in past year. Of the 40 participants who completed the survey, seven subjects were disqualified. Five of them took part in a weight loss program during the study, another refused to participate, and the other had personal reasons. The remaining 33 participants were allocated to each group according to randomized criteria. Finally, twenty-five participants became the subjects for this study after 8 participants were disqualified due to a failure of receiving assessments or discontinuing the study. All subjects (mean age 21.95 ± 2.38 years) were randomly classified into control group (CON; n=8), weight loss group (WLG; n=8), and weight loss + strengthening group (WLSG; n=9) after a 4-week baseline period. One week later, the subjects returned to the laboratory to complete baseline measurements, including pain or discomfort degrees, instability balance test, ROM, and isokinetic strength test. The CON did not receive any intervention except for pre and post-measurements, whereas the WLG conducted a 500-calorie dietary restriction per day and walking for 200 calories per day. The inclination of the treadmill was set to 0% and the speed was set to 50% of the HRR. HRR was confirmed by Polar Watch by an expert. This weight loss program was prescribed by a dietitian and was designed to perform five days a week to consume 3,500 calories per a week. In other words, the goal of weight loss was to reduce 2 kg for 4 weeks. Meanwhile, WLSG's program was the same as that of WLG, but added a strength program. Strength program was performed only on Q-set and semi-squat. The Q-set exercise consisted of 10 seconds of muscle contraction and 10 seconds of rest. The semi-squat was performed in the same manner as the Q-set exercise by weight-bearing exercise. Results are as follows; First, although the muscle mass among groups was not significantly different in baseline, it was significantly ($P<0.01$) increased in WLSG compared with WLG and CON after 4 weeks. Fat masses of WLG and WLSG were decreased, whereas this of CON were increased after 4 weeks. Specifically, fat mass of WLSG was lower ($P<0.05$) than that of WLG. Second, although the pain and discomfort levels in baseline were not significantly different among groups, only the discomfort level was significantly ($P<0.01$) different after 4 weeks. The discomfort of WLSG was lower than those of both group after experiment. In detail, the discomfort level before the experiment was 5.25 ± 1.39, but it was significantly decreased by 2.75 ± 1.16 after 4 weeks. Third, although the stability and ROM levels were not significantly different among groups in baseline, only ROM level was significantly ($P<0.01$) different after 4 weeks. Other words, the ROM of WLSG was higher than those of both group after experiment. In detail, although the ROM level before the experiment was 112.00 ± 9.86°, it was significantly increased by 130.88 ± 3.48° after 4 weeks. Fourth, although all of the peak torques in baseline were not significantly different among groups, only the peak torque of quadriceps muscle in an involved leg of WLSG was significantly ($P<0.05$) increased after 4 weeks. Specifically, the deficit ratios of quadriceps and hamstrings in both legs of WLSG were significantly returned to normal ranges, respectively. As conclusion, this study confirmed that the weight loss and strength training program can improve body composition, reduce discomfort level, increase ROM and quadriceps muscle in basketball player with experienced a knee injury.

Biography

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