Strengthening of Hip and Knee Muscles Reduces Pain and Improves Activity after Knee Anterior Pain: Systematic Review

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Introduction. Strengthening of knee muscles has been recommended to reduce pain and improve activity in individuals with diagnosis of knee anterior pain. However, current evidence suggests that weakness of hip muscles significantly contribute to altered knee and patellofemoral joint kinematics. Therefore, the addition of hip strengthening has the potential to enhance gains in people with knee anterior pain. **Objective.** To examine if hip and knee strength training is more effective than knee strength training alone for increasing strength, reducing pain and improving activity in individuals with knee anterior pain. **Method.** Systematic review of randomized or controlled trials. Participants are individuals with diagnosis of knee anterior pain, and the experimental intervention had to be a resistance training program delivered to increase hip and knee muscle strength. The control intervention could be a single-joint resistance training applied to the knee muscles alone. Outcome measures of interest were: muscle strength, pain intensity and activity. Quality of trials was assessed using the PEDro scale. The post-intervention scores and/or change scores were used to obtain the pooled estimate of the effect of intervention, and analyses were performed using the Review Manager (RevMan) - Version 5.3 (Review Manager 2014). Review Registration: PROSPERO (CRD42015027762). **Results.** The electronic search strategy (Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, MEDLINE, PsycINFO and PEDro databases) identified 5044 papers. Nine trials compared hip and knee strength training with knee strength training alone and were included (mean PEDro score: 5.8). Mean age of participants ranged from 21 to 35 years old across trials. Hip and knee strength training did not significantly change strength compared with knee strength training alone (SMD 0.32; 95% CI -0.06 to 0.70; I2=0). However, hip and knee strength training significantly reduced pain by 1.9 points out of 10 (95% CI -2.6 to -1.2; random effects) and improved activity with an effect size of 0.85 (95% CI 0.07 to 1.63; random effects) compared with knee strength training alone. **Conclusion.** The addition of hip strength training to knee strength training is clinically recommended to enhance gains related to pain intensity and activity limitations in individuals with diagnosis of knee anterior pain. The effect size may be increased even more if strength training is of sufficient duration and/or intensity.

Key-words: Physiotherapy; Strength; Systematic Review.

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