

The Effects of a Four Week ACL Prevention Program on the McCall Hamstring Test in High School Female Volleyball Athletes

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ABSTRACT

Five studies have created preventative exercise programs that focus on plyometrics, eccentric strengthening for hamstrings, and balance have been chosen to reduce ACL risk factors of young female athletes. However, women rely more on their quadriceps strength than their hamstring strength which causes anterior tibial stress which can be a predictor for ACL tears. Specifically, during jump landing the following risk factors were found decreased knee and hip flexion, increased quadriceps dominance vs. hamstring muscles being used, and valgus knee compared to men. **PURPOSE:** Investigate hamstring strength for ACL prevention and to investigate pre- and post-testing with the McCall Hamstring Test involving force plates. **METHODS:** The pre and post-test gathered data using force plates called KINVENT K-Deltas, where the participants will place their heel on top of the plate with the other leg laying flexed or flat on the ground. Using the two K-plates, the participants exerted as much force as they could through their left and right leg to measure maximum strength in their hamstrings. All the exercises listed were completed by the participants three times a week for three weeks. The participants performed a double leg lateral cone jump (plyometric exercise), leg curls with a towel and seated hamstring curls with a TheraBand (strengthening exercises), and a single leg balance on a foam block and a balancing disc (balance exercises). **RESULTS:** A paired sample t-test and an alpha level of <0.05 was set for significance. The left leg showed significant improvements for average force from pre to post-test ($p = 0.054$). While, on the right leg the average force revealed no significant improvements from pre to post-test ($p = .689$). When comparing the fatigue levels in both legs pre and post-test, we did not find a significant difference reported by the McCall Hamstring Test (Left leg Fatigue $p = .463$) (Right leg Fatigue $p = .114$). **CONCLUSIONS:** When looking at the significant difference, the analysis reported that there was a strong correlation from the program for the post-test. This ACL program found that plyometrics, strengthening, and balance are areas that will help improve strength. Though further studies need to be done to specify what exercises should be used. In addition, more research needs to be done regarding the McCall Hamstring Test to obtain normative data.