Effectiveness of Strengthening or Stretching Interventions on Hamstring Strain Incidence in the Physically Active Population

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Focused Clinical Question: Is there an effect of strengthening or stretching programs on the prevention of hamstring strains among competitive adult athletes? Data Sources: The literature was searched through the PubMed database for studies of level 3 or higher that investigated the effect of stretching or strengthening programs on hamstring muscle injuries in competitive adult athletes. Key words included competitive athlete or professional athlete or college athlete, strengthening or stretching or prevention or prevention program, intervention, hamstring strain or tear or injury and incidence. Inclusion criteria included level 3 evidence or higher, publication in the past 10 years (2004-2014), English language with human subjects who were active in a competitive season of athletics at the time of study, and injury rates as a key outcome. Two investigators reviewed abstracts of articles retrieved independently to assess if all criteria had been met. These investigators came to consensus through discussion for any initial disagreements. Data Extraction: Studies were examined for the hamstring muscle injury rates among participants, as well as injury severity based on lost playing time. Summary Measures: Data of each study incorporated were organized into a table including study design, participants, intervention investigated, outcome measures, main findings, level of evidence, and conclusions in order to be compared and evaluated. Evidence Appraisal: All selected studies were appraised using the PEDro scale. Search Results: The literature search returned 72 possible studies of which 10 had a primary focus of hamstring muscle injury rates. Of these 3 studies were selected which met the inclusion criteria to be examined further. Data Synthesis: The first study examined the effects of the Nordic Hamstring exercise program on professional male rugby athletes, compared with traditional strengthening and stretching programs. The strengthening group experienced 1.1 hamstring muscle injuries per 1000 player hours (95% CI, 0.74-1.4). The strengthening and stretching group experienced 0.59 hamstring muscle injuries per 1000 player hours (95% CI, 0.34-0.84). The strengthening, stretching, and Nordic strengthening group experienced 0.39 hamstring muscle injuries per 1000 player hours (95% CI, 0.25-0.54). The second study looked at the effects of balance strengthening exercises on hamstring injury rate in female soccer players. Results showed a hamstring injury rate during the control period before the intervention program of 12.4/1000 hours of training and match exposure. After 6 months of the intervention program, hamstring strain occurrence was 11.9 injuries/1000 playing hours. After a full soccer season, hamstring injury rates were significantly reduced to 9.0 injuries/1000 hours (P=.009). The following season hamstring injury rates were further reduced to 4.8 injuries /1000 hours of exposure (P=.001). Overall mean injury rate of hamstring strains during all intervention periods was reduced by 43% when compared with the control (P=.048). The final study examined the effect of the Nordic Exercise Program and found overall acute hamstring injuries per 100 players for 1 season was 3.8 versus 13.1 in the control group (P<0.001) over the course of one season, with a number needed to treat to prevent 1 acute hamstring injury was 13. Evidence Quality: There is Grade B evidence that supervised preseason and in-season stretching and strengthening prevention programs are effective in reducing the rate of hamstring injuries in competitive athletes. Conclusions: There is strong evidence to support the use of a stretching or strengthening prevention program that focuses on the use of eccentric exercises and static stretching to build hamstring strength and control as well as increase flexibility, alongside balance exercises to work on proprioception. Word Count: 568