

4. SWACSM Abstract

Acute Effects of Swimming and Running on Serum Cartilage Oligomeric Matrix Concentration

STEPHANIE BANGERTER, MARTHA GILL, MADISON J. RHOADES, ALEXANDRA M. HAY, SETH A. FERGUSON, HYUNWOOK LEE, RONALD L. HAGER, GARY J. MEASOM, MATTHEW K. SEELEY.

Biomechanics Laboratory; Department of Exercise Sciences; Brigham Young University; Provo, UT

Category: Undergraduate

Advisor / Mentor: Seeley, Matthew K. (matt_seeley@byu.edu)

ABSTRACT

Most older adults are thought to have some level of knee joint articular cartilage degradation or knee osteoarthritis, a debilitating and incurable disease. Physical exercise is known to benefit joint health for older adults, yet it is unclear how different modes of exercise affect knee joint articular cartilage. Serum cartilage oligomeric matrix protein (COMP) is a biomarker that is thought to reflect articular cartilage metabolism. **PURPOSE:** To compare effects of running and swimming on serum COMP concentration in older adults. **METHODS:** Serum COMP concentration was measured before and after physical exercise for two groups of older adults: runners and swimmers. The runners ($n = 20$; Age = 56 ± 4 yrs; BMI = 24.5 ± 3.2) completed a 5000-m run. The swimmers ($n = 19$; Age = 60 ± 6 yrs; BMI = 24.0 ± 2.7) completed a 1500-m swim. Blood samples were collected before and after the exercise and serum COMP concentration was quantified using an ELISA assay. A repeated measures ANOVA was used to compare the effects of running and swimming on serum COMP concentration. **RESULTS:** A significant group \times time interaction existed for serum COMP concentration ($p < 0.01$). Running significantly increased serum COMP concentration (29%, from 171.4 ± 41.1 to 220.7 ± 63.2 ng/ μ L; $p < 0.01$), but swimming did not (5%, from 179.5 ± 60.7 to 187.9 ± 59.0 ng/ μ L; $p = 0.99$). **CONCLUSION:** Assuming that serum COMP concentration increase after physical exercise represents knee articular cartilage metabolism due to physical exercise, the present data show that running results in more articular cartilage metabolism than swimming. This supports the idea that, when tolerated, land-based exercise involving ground reaction forces and corresponding joint loads contributes to knee joint health in older adults. We suspect that this is due to increased joint loads associated with running, relative to swimming.