

## **Progression of Performance Over Four Decades in Masters' Athletics**

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### ABSTRACT

Athletic performance at the highest level of competition has improved in a variety of sports over the last 40 years, most notably in swimming and track. Although improvements in performance have also been observed among masters' athletes (ages 35 and older), data concerning masters' athletic performance have only been certain since the 1970's. Whether the magnitude of improvement in athletic performance from 1970 onward is different between elite and masters' athletes, as well as between different age groups of masters' athletes, has yet to be determined. **PURPOSE:** The purpose of this study was to investigate differences in progression of athletic performance between different age groups of masters' athletes and elite athletes. **METHODS:** Track (100m and 400m running) and swimming (100m freestyle) times were collected from the World Masters Track and Field and the USA Swimming database. The time span ranged from 1975 to 2013. Age groups were separated into eight 5-year segments spanning from age 40 to 79 years. The top three times of each age group for each year were selected. Moreover, the top 3 track and field and swimming times of any age were collected for the same years to represent a reference standard from which to compare age-group records. A multiple linear regression analysis was used to evaluate the effect of the age  $\times$  year  $\times$  sex interaction with SPSS software. When a significant interaction was present, a comparison of slope between age groups and sexes was performed. **RESULTS:** There were significant age  $\times$  year  $\times$  sex interactions in all athletic events examined. Improvements in race times were significant ( $p < 0.05$ ) in both sexes and for age groups 45 and older. Relative improvements in the 45+ age groups were significantly different from the fastest running times. The general trends were similar for 400m middle-distance running. The progressions of 100m swimming times were significant ( $p < 0.05$ ) for all age groups and for both sexes. Analysis of differences in the slope showed that older athletes and women had a greater slope of improvement in performance during that time. **CONCLUSION:** We demonstrated that there have been significant improvements in athletic performance in masters' athletes aged 45 and older in the track and field events, and those aged 40 and older in the swimming events in the past thirty nine years.