Gender differences and age-related changes in performance at the duathlon world champions

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Purpose. Analyze the differences in performance between genders, and changes in performance in age group category at Short distance during the ITU Duathlon World Championships held between 2005 and 2016.

Methods. During this period, a total of 9,772 duathletes were analysed (6,739 men and 3,033 women). Two-way analyses of variance (ANOVA) were used to examine the gender-related and age-related differences in performance (time, percentage of time and performance ratio) in the first running, cycling and second running legs, and total race for the top 10 male and female athletes in each age group at the Duathlon World Championships.
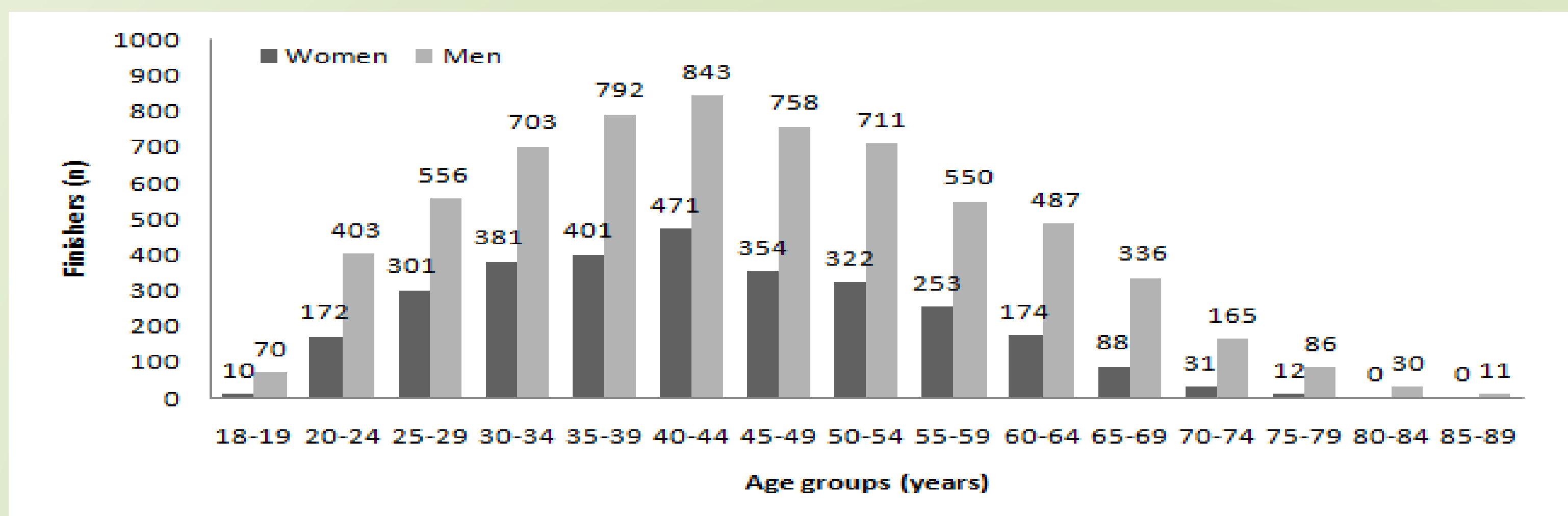

Figure. Number of finishers separately by sex and age groups at the Duathlon World Champions from 2005 to 2016

Results. The age group with the widest participation, in both male and female categories, was 40-44 years, and it was found that the mean age of female finisher participants across all age groups was 23.5±12.5%. With regards to performance, the best results for total race time and the cycling segment were achieved in the 30-34-year age group, for both male and female athletes. With regards to performance in the first and third segment (running legs), the best time was achieved in the 25-29 and 30-34 age group, in men and women respectively.

Table. Performance times (minutes) of the first running, cycling, second running, and total race for the top 10 male and female athletes in each age group at the Duathlon World Champions

Age		Men					Women			
	n	Running	Cycling	Running	Race	n	Running	Cycling	Running	Race
20-24	118	34.9 (2.7)	64.7 (6.3)	19.1 (1.6)	120.7 (8.8)	105	42.5 (4.0)	77.7 (8.5)	23.4 (2.8)	146.2 (12.6)
25-29	120	34.2 (2.1)	64.0 (6.0)	18.5 (1.3)	118.7 (7.8)	119	41.2 (3.3)	74.9 (7.8)	22.4 (2.1)	141.1 (11.3)
30-34	119	34.3 (2.3)	63.3 (6.3)	18.6 (1.3)	118.2 (8.1)	117	39.8 (2.8)	72.2 (6.8)	21.4 (1.7)	135.9 (9.3)
35-39	120	34.7 (2.2)	63.7 (6.5)	18.7 (1.5)	119.1 (8.1)	119	40.5 (2.7)	73.1 (7.3)	21.7 (1.8)	137.8 (9.3)
40-44	120	34.9 (2.2)	64.0 (6.5)	18.7 (1.4)	119.6 (8.2)	119	41.2 (2.8)	73.8 (7.8)	22.1 (1.6)	139.7 (9.7)
45-49	120	36.0 (2.4)	64.8 (6.5)	19.3 (1.5)	122.4 (7.8)	120	41.9 (3.2)	74.9 (8.0)	22.5 (1.9)	141.9 (10.0)
50-54	120	37.5 (2.1)	67.1 (6.9)	20.3 (1.3)	127.2 (8.3)	119	44.2 (3.7)	77.4 (9.1)	23.9 (2.5)	148.4 (12.5)
55-59	119	39.3 (2.4)	68.4 (7.2)	21.1 (1.4)	131.5 (9.3)	111	48.4 (4.4)	81.5 (12.0)	26.4 (3.1)	159.6 (17.6)
60-64	120	41.6 (2.9)	71.4 (8.7)	22.7 (1.9)	138.5 (11.0)	96	55.2 (6.9)	90.7 (16.9)	30.5 (4.4)	180.8 (23.9)
65-69	103	45.4 (3.9)	76.6 (8.8)	24.8 (2.3)	150.3 (11.6)	64	60.1 (8.2)	92.4 (14.3)	33.8 (6.3)	190.9 (23.6)
Total	1,179	37.2 (4.3)	66.7 (8.0)	20.1 (2.5)	126.3 (13.2)	1,089	44.6 (7.2)	77.9 (11.7)	24.2 (4.5)	149.7 (21.4)

Note. Values are reported as mean (standard deviation).

Discussion. Gender differences in performance at different legs: In the Olympic distance on the Zurich triathlon between 2000 and 2010, for elite top five overall triathletes, mean gender differences in swimming, cycling, second running legs and total race were 15.2%, 13.4%, 17.1%, and 14.8%, respectively (Etter et al., 2013). Our gender-based differences in performance in running (leg 1 and 3 of the duathlon) are similar to those obtained in the previous study. In the cycling leg, we found a slight difference that is greater in the duathlon than in the triathlon, possibly linked to the difference in the first leg that precedes cycling in both events, swimming in the triathlon, and running in the duathlon. The total race time could also be affected for this reason, as we have found differences somewhat higher than those established in the previous study.

Gender differences in peak age performance: In our study the peak performance of the top ten competitors in short duathlon from 2005 to 2016 was in the age group 30-34 in both gender. In contrast with Etter et al. (2013), where the mean age of the top five competitors in short triathlon from 2000 to 2010 was established at 26.8 years in men and 28.4 years in women.

Age and gender interaction in performance: According to the results of our study, gender-related performance differences, for both men and women, the mean age-related performance ratio in the first running, cycling, second running and total race decreased in a curvilinear manner with advancing age. Results confirmed in other studies completed on Olympic distance triathlons (Bernard et al., 2009).

Conclusions. According to the results obtained in our study, we could deduce that the best results in the professional career of a duathlete should be planned to be achieved between 30 and 35 years. Furthermore, based on the results, and in our opinion, results in performance or sporting success in our discipline should not be forced before age 25, after which improvements begin to be consolidated until achieving peak performance in the 30-34 age bracket.