A study on how age influences swimming speed in masters breaststroke mencompetitions

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Abstract

Introduction: Masters swimming competitions involve adults who practice swimming as a hobby, and it is focused on three main areas: fitness activity, recreational activity, and competitive activity. Masters swimming competitions are regulated at an international level by the FINA (Federation Internationale de Natation) and by the LEN (Ligue Europeenne de Natation). The Swimming Masters competitions are divided in age groups, starting at the age of 25, as follows: 25-29 years, 30-34 years, 35-39 years etc.

Aim: In this paper we wish to present a study on reduction of swimming speed in relation to age, in breaststroke men competitions (50 m, 100 m, and 200 m).

Methods: We analyzed the swimming speed for Masters Swimmers in a long swimming pool for the following events: 50 m, 100 m, 200 m – man breaststroke. The reference speed for each age group was calculated as the mean of the best 10 times obtained for that certain category.

Results: For competitors aged 60-69 the speed decreases reaching about 80-60% of the maximum speed, and it reaches 80% of the maximum value at ages that range from 70 to 84 years old. After 85 the speed decreases up to 30% to 58% of the maximum speed.

Conclusion: In breaststroke men events the speed at which master competitors swim decreases with age. Regarding the values of speed dependent on age and type of event we can state that it decreases more abruptly for older age in shorter distance events.

Key words: *swimming, masters, breaststroke, age, speed.*

Rezumat

Introducere: Înotul masters implică adulţi, care au ca pasiune înotul, practicarea acestuia fiind orientată în trei direcţii principale: activitatea de întreţinere, activitatea recreativă şi activitatea competiţională.

Activitatea competiţională este reglementată la nivel internaţional de FINA (Federation Internationale de Natation), respectiv LEN (Ligue Europeenne de Natation). La competiţiile de înot masters se concurează pe grupe de vârstă de câte 5 ani, începând de la vârsta de 25 de ani: 25-29 ani, 30-34 ani, 35-39 ani, ş.a.m.d.

Scop: În lucrarea de faţă dorim să realizăm un studiu asupra diminuării vitezei de înot odată cu înaintarea în vârstă, la probele de bras masculin (50 m, 100 m, 200 m).

Metode: Au fost analizaţi timpii obţinuţi de înotătorii masters în bazin lung, pentru următoarele probe: 50 m, 100 m, 200 m – bras masculin. Viteza de referinţă pentru fiecare categorie de vârstă, a fostcalculată ca media celor mai buni 10 timpi obţinuţi la fiecare categorie.

Rezultate: Viteza de înot ajunge la 80% din valoarea maximă, între 60 şi 69 de ani, scăzând între 80% şi 60% din viteza maximă, la vârste cuprinse între 70 şi 84 de ani. După 85 de ani viteza de înot ajunge la valori cuprinse între 58 şi 30% din viteza maximă.

Concluzii: În probele de bras masculin, viteza de înot a înotătorilor masters, scade odată cu creşterea vârstei. În ceea ce priveşte dinamica vitezei în funcţie de vârstă şi probă, putem spune că, viteza de înot scade odată cu creşterea în vârstă cu atât mai accentuat cu cât proba este mai scurtă.

Cuvinte cheie: *înot, masters, bras, vârsta, viteza.*

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Introduction

The Masters Swimming movement involves adults that have swimming as a hobby, this practice being focused on three main areas: fitness activity, recreational activity, and competitive activity.

The competitive activity is regulated at an international level by the FINA (Federation Internationale de Natation) and by the LEN (LigueEuropeenne de Natation). The Swimming Masters competitions are divided in age groups, starting at the age of 25, as follows: cat. I 25-29 years, cat. II 30-34 years, cat. III 35-39 years etc. the last age category being cat. XVI 100-104 years old [1].

Material and methods

Taking into account the wish for participating in Masters swimming competitions, in this paper we focused on the decrease in swimming speed for the breaststroke technique relative to the age of the contestants. In order to carry out this study we analyzed the swimming times for Masters Swimmers in a long swimming pool for the following events: 50 m, 100 m, 200 m – breaststroke.

The reference speed for each age group was calculated as the mean of the best 10 times obtained for that certain category [2].

For calculus simplification reasons we supposed that the speed is constant and uniform, and was calculated by dividing distance by time.

Results

a) 50 m breaststroke

By calculating the reference speed in the 50 m breaststroke event for each age group we obtained a set of 15 values; the maximum speed was 1.771 m/s (age group 25-29), while the minimum was 0.59 m/s (age group 95-99). The mean value for the reference speed in the 50 m men breaststroke event was 1.391 m/s (Fig 1).

The reference speed decreases constantly, with differences between consequent categories of maximum 2% until the 40-44 age category. In this age category the reference speed represents approximately 94% of the maximum reference speed.
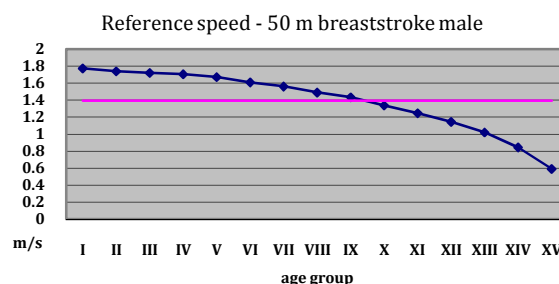
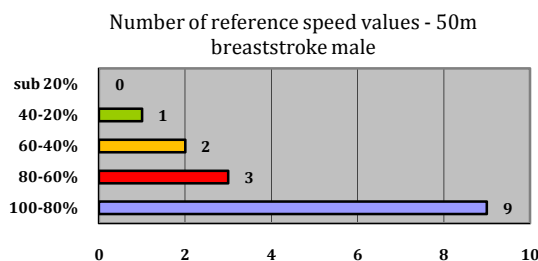**Figure 1.** Reference speed values in the 50m breaststroke men competitions, depending on age

The decrease in reference speed accentuates for the age categories that follow, with differences ranging from 2% to 4% up until the 65-69 age group, in this case the reference speed being approximately 81% of the maximum reference speed.

For the next age groups the reference speed continues to decrease with differences that range from 5% to 7% in consecutive groups, up until the 85-89 age group. In this case the reference speed was about 57% of the maximum reference speed.

The rate of decrease accentuates even more for the last two age groups, where the differences between the categories range from 9% to 14%. The reference speed reaches a minimum for the 95-99 age group, representing approximately 33% of the maximum reference speed.

By grouping the reference speed values depending on the age groups and the maximum reference speed we obtain the graph presented in Figure 2.

In the 100-80% interval there are nine values for the reference speed, and the difference between the age groups included in this range is not over 4%.

**Figure 2.** Number of reference speed values in percentages for the 50m breaststroke men events

The 80-60% interval includes three reference speed values, and the difference between the consecutive

age groups included in this category ranges between 5% and 6%.

The 60-40% and 40-20% intervals include two, respectively one reference speed values, and the difference between the consecutive age groups included in these categories ranges between 7% and 15%.

b) 100 m breaststroke

After calculating the reference speed for the 100 m men breaststroke events for each age group we obtained 15 values; the maximum speed was 1.594 m/s (age group 25-29), and the minimum speed was 0.476 m/s (age group 95-99). The mean value for the reference speed in the 100 m breaststroke was 1.227 m/s (Fig. 3).

Reference speed- 100 m male breaststroke
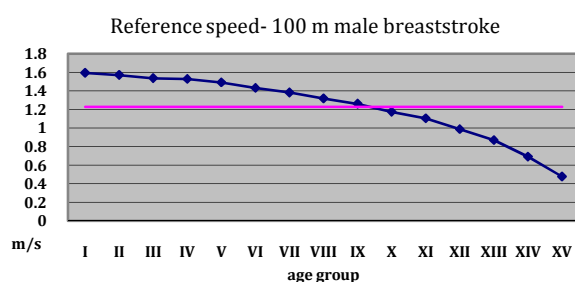
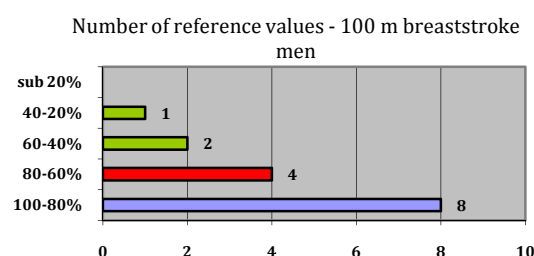**Figure 3.** Reference speed in the 100 m men breaststroke competitions, depending on age

The reference speed decreases constantly, with differences between consequent categories of maximum 3% until the 45-49 years of age category. In this age category the reference speed represents approximately 93% of the maximum reference speed.

The decrease in reference speed accentuates for the following 6 age groups, up until the 75-79 age group, with differences ranging from 3% to 6%. In the 75-70 years of age group the reference speed was approximately 69% of the maximum reference speed.

The reference speed for the last 4 age groups decreases even more, with differences between consequent categories ranging from 7% to 14%. For the 95-99 age group the reference speed reached only 30% of the maximum reference speed.

By grouping the reference speed values depending on the age groups and the maximum reference speed we obtain the graph presented in Figure 4.

In the 100-80% interval there are 8 values for the reference speed, and the difference between the consequent age groups included in this range reaches a maximum of 4%.

Number of reference values - 100 m breaststroke men

Figure 4. Number of reference speed values in percentages for the 100 m breaststroke men events

The 80-60% interval includes 4 reference speed values, and the difference between the consecutive age groups included in this category ranges between 3% and 8%.

On the other hand, the 60-40% interval includes 2 reference speed values, and the difference between the consecutive age groups included in this category ranges between 7% and 12%.

Between 40% and 20% there was a single value for the reference speed the difference between the consecutive age groups included in this category was over 13%.

c) 200m breaststroke

By calculating the reference speed for the 200 m breaststroke events we obtained 15 values, the maximum speed was 1.446 m/s (age group 25-29), and the minimum speed was 0.432 m/s (age group 95-99). The mean value for the reference speed in the 200 m breaststroke was 1.101 m/s (Fig. 5).

The reference speed decreases constantly, with differences between consequent categories of maximum 3% until the 45-49 years of age category. In this age category the reference speed represents approximately 92% of the maximum reference speed.

This is followed by a group of 5 age categories for which the difference in reference speed is between 3% and 5%; for the 70-74 age group the reference speed reaches approximately 73% of the maximum value.

Reference speed in 200 m breaststroke
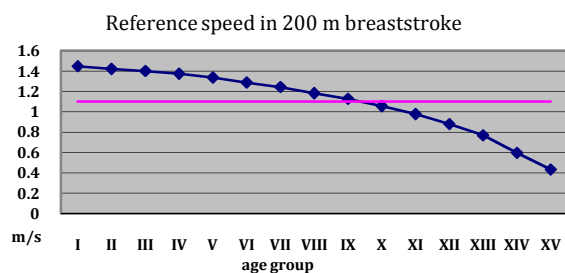
Figure 5. Reference speed in the 200 m men breaststroke competitions, depending on age

For the last age group from the 5 aforementioned categories the differences between consecutive categories range from 5% to 12%, the last age category having a reference speed that represented 29% of the maximum registered speed.

Reference speed values in 200m breaststroke
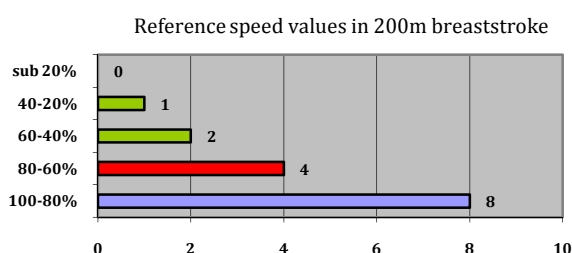
Figure 6. Number of reference speed values in percentages for the 200 m breaststroke men events

The chart presented in Fig. 6 was obtained after grouping the reference speed values depending on their percentage counterparts in comparison to the maximum reference speed.

The 100-80% interval includes 8 reference speed values, and the maximum difference between the consecutive age groups included in this category was 5%.

The 80-60% interval includes 4 reference speed values, and the maximum difference between the consecutive age groups included in this category ranged from 3% to 7%.

The 60-40% interval includes 2 reference speed values, and the difference between the consecutive age groups included in this category ranges between 7% and 12%.

Between 40% and 20% there was a single value for the reference speed the difference between the consecutive age groups included in this category was over 11%.

Discussion

In masters swimming, the performance decreases with age, in short events, and also in long events (3) The slowing with age is not affected by the length of the race (4).The rate of the declines in swimming performance with age are grater in long duration then in short duration events (5).

In order to compare the decreasing trend for speed depending on age and on the length of each swimming event we designed fig.7 which represents the speed curve for each of the three analyzed sporting events (50m, 100m, and 200m breaststroke men).

Reference speed curves in breaststroke men events
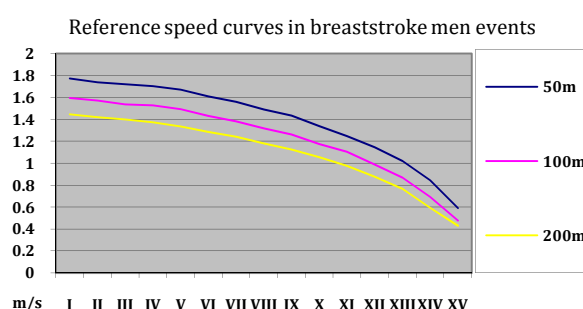
Figure 7. Reference speed curves in breaststroke men events relative to each age category

We can observe that the concavity of each curve accentuates if the event is of a shorter length. On the other hand, speed values are more similar for higher age groups.

In order to observe the decrease level for reference speed depending on the swimming distance, we can analyze the amplitude of these values for each event (Fig. 8).

Amplitude of reference speed value - breaststroke men
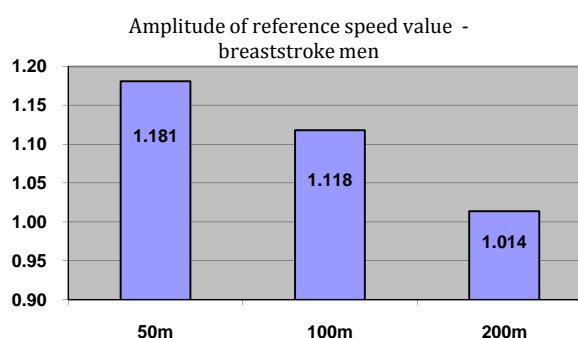
Figure 8. Amplitude of percent values for reference speed in breaststroke men events

We observed that for the 50 m event the amplitude for reference speed values was 1,181 m/s, for the 100m was 1,118 m/s, and for the 200m breaststroke the amplitude was 1,014 m/s.

Conclusion

According with the results obtained in this study, in breaststroke men events the speed at which master competitors swim decreases with age. For competitors aged 60-69 the speed decreases reaching about 80-60% of the maximum speed, andit reaches 80% of the maximum value at ages that range from 70 to 84 years old. After 85 the speed decreases up to 30% to 58% of the maximum speed.

Table I. Percentage values for swimming speed – breaststroke men

	Breaststroke events		
Age group	50m	100m	200m
25-29	100%	100%	100%
30-34	98%	99%	98%
35-39	97%	96%	97%
40-44	96%	96%	95%
45-49	94%	94%	92%
50-54	91%	90%	89%
55-59	88%	87%	86%
60-64	84%	83%	82%
65-69	81%	79%	78%
70-74	75%	74%	73%
75-79	70%	69%	68%
80-84	65%	62%	61%
85-89	58%	54%	53%
90-94	48%	43%	41%
95-99	33%	30%	30%

Regarding the values of speed dependent on age and type of event we can state that it decreases more abruptly for older age in shorter distance events.

Following this study we wish to propose a set of approximate values for swimming speed depending on age and type of event in order to better anticipate results in breaststroke men events for masters age categories, (Table I), to set the performance goals and to improve the planification in training process.

References

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