

WHAT MAKES GREATER IMPACT ON THE SWIMMING RESULTS, GLIDING ELEMENTS OR SWIMMING ELEMENTS?

Goran Gabrilo, Ante Orlović and Matej Miličić

Faculty of Kinesiology, University of Split, Croatia

Original scientific paper

Abstract

The aim of this study was to determine the differences in swimming abilities between two different swimming programs. Both of the programs had the same goal, improvement in swimming technique. Program 1 (PR1) was comprised with learning the gliding elements of the swimming technique (start, gliding, turning), while program 2 (PR2) was consisted of the front crawl swimming technique elements (leg kick, arm stroke, breathing, body position). Both programs lasted 14 days/10 training sessions and were conducted simultaneously. The sample of subjects comprised 33 male students of the Faculty of Kinesiology (PR1 – 17; PR2 – 16). Pre and post testing was conducted on the two variables: 25 meters front crawl (25M) and 50 meters front crawl (50M). Apart from descriptive analysis, differences between the groups prior and after the program were established by independent samples t-test, while within group differences (pre- post-testing differences) were analyzed by dependent samples t-test. Results showed significant improvement in both programs, 5% in 25M (5% in PR1 and 5% in PR2) and 7-9% in 50M (9% in PR1 and 7% in PR2). There were no between-program differences, but there is a clear trend of better improvement in 50M in PR1. We can conclude that both programs are suitable for improvement in swimming results in novice swimmers.

Key words: novice swimmers, students, training program, swimming technique, crawl technique.

Introduction

Pushing the limits and breaking the records are the most exciting part of any sports, especially individual ones. In swimming, constant improvement raises a great interest of public and spectators. Pushing the limits of human performance is a cause making this sport one of the most popular individual sports. Improvement in results, regardless of the sports, is the mix of the capacities and the skills (Bompa & Buzzichelli, 2015). Getting better in swimming is a long-term process, starting firstly with learning the swimming technique and secondly with developing the swimming capacities. With advanced-level swimmers, swimming capacities mostly influence final swimming result (Maglischo, 2003). There are several types of training regimes, which could lead to improvement of different swimming capacities, such as swimming speed, swimming endurance, flexibility, strength, power, etc. Development of the swimming capacities leads to the improvement in swimming time, but to be able to affect development of the capacities, one needs to learn and adopt the higher level of the swimming technique. In youth swimmers and novices, swimming progress is merely a reflection of the technique improvement. Many authors emphasize the importance of adopting the adequate swimming technique as a main factor for developing the swimming performance and capacities (Counsilman, 1968; Maglischo, 2003; Riewald & Rodeo, 2015). Learning the basic swimming starts with learning the floating and the gliding techniques, after that the front crawl technique, and finally, turns and jumps. The swimming race is comprised of two groups of swimming elements: gliding elements (start, gliding, turning) and swimming elements – swimming techniques (front crawl, backstroke,

breaststroke, and butterfly). Both groups of swimming elements make a large impact on the swimming result. Body position and gliding surface can lead to the bigger drag in swimming, so it is very important to position the body and the head in a proper way throughout gliding (Cortesi & Gatta, 2015). Also, the researchers reported the importance of the turn drills for improvement of the gliding elements resulting with better performance in swimming (Wen, Peng, Zhao, & Zhen, 2016). The importance of the body position and the entrance angle during the swim start was also previously mentioned as being an important determinant of swimming achievement and result (Fischer & Kibele, 2016). Several factors can lead to better front crawl technique. Body position and head position during swimming or breathing is very important for efficient front crawl (Payton, Bartlett, Baltzopoulos, & Coombs, 1999). Also, the leg kick and the arm stroke quality are fundamental for effective front crawl swimming (Chollet, Chaliés, & Chatard, 2000). However, there is an evident lack of knowledge how different groups of swimming elements influence swimming achievement in novice swimmers. The aim of this study is to determine which group of swimming technique element can lead to better swimming result in novice swimmers – young adults.

Methods

Participants

The sample comprised 33 participants, all males, students at the University of Split, Faculty of Kinesiology. After the initial testing, participants were randomly grouped into two experimental groups: PROGRAM 1 (PR1) with 17 participants,

mean age 20.7 ± 3.1 and PROGRAM 2 (PR2) with 16 participants, mean age 20.9 ± 2.8 . Both groups of students had only basic knowledge in swimming, but they had no previous experience and/or participated in training sessions aimed at improving the swimming technique. More precisely, 15 months before the experiment, they had to pass qualifying swimming test at Faculty of Kinesiology. Students who were former swimmers were excluded from the experiment. Participants were all healthy prior, during and after the experiment.

Measurements and Procedures

Students were tested prior and after the programs with two swimming tests, making two variables, 25 meters front crawl (25M) and 50M front crawl (50M). Study was conducted at the 25 meters swimming pool. Firstly, all of the participants swam 25M, and then in the same order 50M. There were no significant differences between groups in both of the swimming tests, at the beginning of the experiment. So it was allowed to conclude that groups swimming skills and swimming capacities at the beginning of the programs were similar. The main goal of the PR1 was to improve turn and gliding swimming skills, while PR2 training sessions aimed towards development of the front crawl

technique. PR1 comprised training sessions implementing swimming drills for development of the swimming start/jump, gliding technique and front crawl open turn. PR2 worked on the improvement of the leg kick, stroke, breathing technique and body position in front crawl. During the whole experiment, neither program was implemented with elements of the other. Both programs lasted 14 days/10 training sessions and were conducted simultaneously.

Statistical analysis

Collected data were analyzed using program Statistica version 13, for Windows. Kolmogorov Smirnov test was used for normality of distribution. Differences between the groups prior and after the program were established by independent samples t-test, within group differences (pre- post-testing differences) were analyzed by dependent samples t-test.

Results and discussion

Both groups showed significant improvement in swimming tests, while there were no significant differences between the programs, prior or after the programs finished (see Table 1).

Table 1 T-test for independent samples, by group; t test for dependent samples; * - Represents significant differences between measurements.

	PROGRAM 1		PROGRAM 2		t test value (p)			
	Pre-Mean (SD)	Post-Mean (SD)	Pre-Mean (SD)	Post-Mean (SD)	Dependent PROG-1	Dependent PROG-2	Grouping-Program Pre-	Grouping-Program Post-
25M	16.92 (1.55)	16.11* (1.03)	16.96 (1.68)	16.14* (1.16)	3.45 (0.00)	3.97 (0.00)	-0.07 (0.95)	-0.06 (0.95)
50M	39.31 (3.73)	35.90* (2.71)	39.70 (4.59)	37.07* (3.91)	8.96 (0.00)	4.47 (0.00)	-0.26 (0.80)	-0.99 (0.33)

Students improved results in both swimming tests regardless of the program. It needs to be emphasized that students who participated in this study were novice swimmers. Improvements in swimming tests in novice swimmers have been already reported (Šitić, Gabrilo & Perić, 2015). Authors conducted a study analyzing two different training regimes with students as participants. Experimental group 1 (GR1) conducted the swimming program throughout 8 weeks and experimental group 2 (GR2) throughout 16 weeks. Briefly, improvement of 2-3% in 25M (2% in GT1 and 3% in GR2) and 4-5% in 50M (4% in GT1 and 5% in GR2) was reported. Similarly, we found improvement 5% in 25M (5% in PR1 and 5% in PR2) and 7-9% in 50M (9% in PR1 and 7% in PR2). Even though we hadn't been able to find studies supporting improvement in swimming results throughout such short period of time (10 training sessions). Therefore, we can conclude that both programs positively influenced swimming capacities in novice swimmers. When analyzing differences between groups at the end of the program, we have evidenced no between-program differences. Since none of the students had any swimming experience, it is logical that both programs resulted

in similar improvement. As previously mentioned, both gliding elements and swimming elements are very important in mastering the crawl technique (Chollet et al., 2000; Cortesi & Gatta, 2015; Fischer & Kibele, 2016; Payton et al., 1999; Wen et al., 2016), and consequently improvement in these elements logically influenced swimming results. In this study differential effects are not evident, but there is a clear trend of better improvement in PR1 (although not significant) in 50M, while there is no such trend in 25M (see Table 1 for more details). 50M is comprised of "more" gliding elements than 25M (turn and after-turn gliding). This could be a possible explanation of the trend of the PR1 in variable 50M since PR1 main goal was improvement of the gliding elements.

Conclusion

The results of the study reveal that both groups of the students improved in results regardless of the program. Both programs can be used in novice swimmers and improvement in result can be expected. Differential effects remain unknown, even though there are some trends indicating that gliding elements are making better improvements

in results in novice swimmers. Future studies should consider, prolonging the program. Namely, there is a certain possibility that 10 sessions are not enough to clearly distinguish differences

between training programs. Also, in future studies control group should be implemented just to be sure there is no an extrinsic factor for such an improvement.

References

- Bompa, T., & Buzzichelli, C. (2015). *Periodization Training for Sports*. New York: Human kinetics.
- Chollet, D., Challes, S., & Chatard, J. (2000). A new index of coordination for the crawl: description and usefulness. *International Journal of Sports Medicine*, 21(01), 54-59.
- Cortesi, M., & Gatta, G. (2015). Effect of The Swimmer's Head Position on Passive Drag. *Journal of Human Kinetics*, 49(1), 37-45.
- Counsilman, J. E. (1968). *The science of swimming*: Prentice Hall.
- Fischer, S., & Kibele, A. (2016). The biomechanical structure of swim start performance. *Sports Biomechanics*, 15(4), 397-408.
- Maglischo, E. W. (2003). *Swimming fastest*. New York: Human Kinetics.
- Payton, C. J., Bartlett, R. M., Baltzopoulos, V., & Coombs, R. (1999). Upper extremity kinematics and body roll during preferred-side breathing and breath-holding front crawl swimming. *Journal of Sports Sciences*, 17(9), 689-696.
- Riewald, S., & Rodeo, S. (2015). *Science of swimming faster*. New York: Human Kinetics.
- Šitić, K., Gabrilo, G., & Perić, M. (2015). Postoje li razlike u plivačkoj izvedbi između dviju grupa studenata kod provođenja identičnog plivačkog programa kroz dva različita vremenska perioda? [Are there any differences in swim performance between two groups of students in the same swim program during two different time periods? In Croatian.]. *Contemporary Kinesiology, 5th International Scientific Conference*, 627-635.
- Wen, Y., Peng, Y., Zhao, F., & Zhen, K. (2016). The effects of specific drills on the flip turns of freestyle swimmers based on a kinesiology analysis. *Journal of Human Kinetics*, 52(1), 165-173.

ŠTO IMA VEĆI UTJECAJ NA REZULTATE PLIVANJA, ELEMENTI KLIZANJA ILI ELEMENTI PLIVANJA?

Sažetak

Cilj ovog rada je utvrditi postoje li razlike u napretku u plivačkim sposobnostima kod kraul tehnike, nakon provođenja dva različita plivačka programa. Oba programa su imala isti zadatak, unaprjeđenje plivačke tehnike. Program 1 (PR1) je za cilj imao unaprjeđenje plivačke tehnike kroz usavršavanje elemenata klizanja (start, klizanje, okret), dok se kroz Program 2 (PR2) napredak pokušao postići kroz usavršavanje elemenata kraul tehnike (rad nogama, rad rukama, disanje, položaj tijela). Oba programa su trajala 14 dana/10 treninga i odrađena su paralelno, to jest u isto vrijeme. Uzorak ispitanika sačinjavali su 33 studenta Kineziološkog fakulteta (PR1 - 17; PR2 - 16). Varijable koje su promatrane prije i poslije provođenja programa su: 25 metara kraul (25M) i 50 metara kraul (50M). Osim deskriptivnih statističkih pokazatelja, razlike među grupama prije i poslije provedenih programa izračunate su t-testom za nezavisne varijable, dok su razlike među mjerenjima analizirane t-testom za zavisne varijable. Rezultati ukazuju na statistički značajni napredak obaju programa, 5% kod varijable 25M (5% - PR1 i 5% - PR2) te 7-9% u varijabli 50M (9% - PR1 i 7% - PR2). Nema statistički značajnih razlika među programima, ali postoji jasan trend koji ukazuje kako postoji bolji napredak kod PR1. Može se zaključiti kako su oba programa pogodna za postizanje napretka u plivačkim sposobnostima kod plivača početnika.

Ključne riječi: plivači početnici, studenti, tehnika plivanja, kraul, program treninga.

Received: August 3, 2017
Accepted: August 16, 2017
Goran Gabrilo, PhD
University of Split
Faculty of Kinesiology
Teslina 6, 21000 Split, Croatia
E-mail: gorangabrilo@yahoo.com