The European Proceedings of
Social & Behavioural Sciences
EpSBS

Future Academy ISSN: 2357-1330

http://dx.doi.org/10.15405/epsbs.2018.03.17

ICPESK 2017
International Congress of Physical Education, Sport and Kinetotherapy

MODERN COMMUNICATION MEANS TO IMPROVE PERFORMANCE FOR YOUNG SWIMMERS

Adrian Rădulescu (a)*, Gheorghe Marinescu (b), Laurențiu Ticală (c)
*Corresponding author

(a) National University of Physical Education and Sports, 140 Constantin Noica Street, Bucharest, Romania, adrian.radulescu90@yahoo.com
(b) National University of Physical Education and Sports, 140 Constantin Noica Street, Bucharest, Romania, georgemarinescu@yahoo.com
(c) National University of Physical Education and Sports, 140 Constantin Noica Street, Bucharest, Romania, ticala_laurentiu@yahoo.com

Abstract

Performance swimming requires good physical condition, balanced psychological attributes and great self-control. Swimmers are always faced with the challenge of distributing their biological resources in order to accomplish certain tasks in training and personal objectives in competition. Self-control is developed with patience and requires close guidance from the coach, who is responsible for creating a good learning environment with meaningful communication. Modern training equipment was created in order to enhance communication between the coach and the swimmer. One of the criteria for an efficient swimming technique, which is especially helpful to young swimmers, is the balance between stroke rate and stroke length. The H-902 Waterproof Bone Conduction System allows the coach to communicate directly with the swimmers during training. Real-time feedback is given verbally. Through this research, we intend to highlight the beneficial contribution of using the H-902 headset in bettering the efficiency of our swimmers (10-14 years old). We used the 8x50m Efficiency Test in order to evaluate both the control and experimental groups. The data was subsequently processed using statistical and mathematical methods. Comparing the results of the 8x50m Efficiency Test before and after using the H-902 headset, the experimental group of young swimmers managed to improve their efficiency by a higher margin than the control group.

© 2018 Published by Future Academy www.FutureAcademy.org.UK

Keywords: Stroke rate, stroke count, efficiency, young swimmers.

The Author(s) 2018 This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (https://creativecommons.org/licenses/by-nc-nd/4.0/).

http://dx.doi.org/10.15405/epsbs.2018.03.17
Corresponding Author: Adrian Rădulescu
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

1. Introduction

Many professionals in the swimming community view efficiency as greater distance per stroke, but such a statement is incomplete. An efficient swim implies a good ratio between the speed at which the athlete moves and the energy used to reach and maintain that speed. Speed is determined not only by good pacing, but also by the technique, fitness and mental qualities. All these factors create a complex image of what efficiency is in the sport of swimming.

Swimming faster depends on several very important biomechanical and physiological parameters, such as: acceleration, arm stroke rate in close relationship with the swimming technique and speed, distance covered per arm cycle (DAC) – as main determinants of propulsion, maximal aerobic power (MAP), (Marinescu, 2002, p. 31). The coach has a very important role in teaching the athlete how to reduce drag, how to optimise their arm pull, how to use stroke count and pacing and how to exploit their biological possibilities as much as possible.

Stroke rates are one of the best ways for swimmers to control their distribution of effort during races (Maglischo, 2003, p. 711). We developed a two-month training plan during which we used classical aquatic training methods that involved pacing and stroke count. The test group was equipped with H-902 headsets and was guided as much as possible from the pool side by the coach. The control group received feedback from the coach in the short breaks between sets or at the end of the workout.

To determine the effects of using real-time direct feedback, the subjects were tested at the beginning of the observation period and at the end of it. This helped us to determine the degree of improvement in their pacing ability.

2. Problem Statement

2.1. Communication as a factor of learning

Communication is fundamental for learning in any context, stating that “the practical limitations of the pool environment mean that there are few opportunities for pupils to come onto the poolside for interaction with the coach” and that “mastery of communication is obviously the basis of effective teaching and includes many aspects that expand on the basics”. Lynn offers the following information: “Research on teaching behaviour in swimming shows that 43.1% of the time is spent on class instruction and 35.3% on group instruction. This leaves only 21.6% of time for individual instruction and feedback”. (Lynn, 2006, p. 23)

Direct communication using the H-902 System in training can increase the time spent for individual instruction with 21.6% and can bring feedback to a more meaningful quantity. This one-to-one communication with a focus on pragmatic aspects of interpersonal communication enhances active and conscious participation, this in itself being a great stimulus for the swimmers’ self-control ability.

States that “the learning that happens at training should be about developing that skill – the skill of self-correcting or self-coaching and of being the best that you can be on that day”. (Lynn, 2008, p. 10).

The coach can motivate and encourage athletes in the difficult moments of training. He can correct the technical flaws in real-time and with continuity. This higher level of communication allows young swimmers to be self-aware, understanding key elements of biomechanics and acceleration.

http://dx.doi.org/10.15405/epsbs.2018.03.17
Corresponding Author: Adrian Rădulescu
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

If a swimmer is permanently told what times he is achieving at certain training sets, he can correlate his speed with the number of strokes he is making.

Swimming more efficiently (less energy for higher speed) depends on several important biomechanical and physiological parameters, such as: stroke count, stroke length, acceleration or drag. They all influence and are influenced by the swimming speed and the capacity of the energy systems to sustain the effort.

2.2. Presentation of H-902 Waterproof Bone Conduction System

The H-902 System is an easy to use system that has two components:

- The transmitter (Figure 01) allows the coach to communicate on three-channels. It uses radio technology and can allow communication within a range of approximately 100 meters, both on the surface of the water or underwater at depths of 4 to 5 meters. There is not a limit for the number of receivers connected on the same channel.
- The waterproof receiver (Figure 01) can be used with or without a swimming cap. It can be placed underneath any swim cap and is built to remain in a proper position even through starts and turns.

The bone conduction technology works in a non-invasive manner, as the vibrations created by the receiver travel through the temporal bone into the cochlea and the inner ear (Figure 02). This allows the ear canal to remain free and other sounds (the start sound) can be perceived without difficulty.

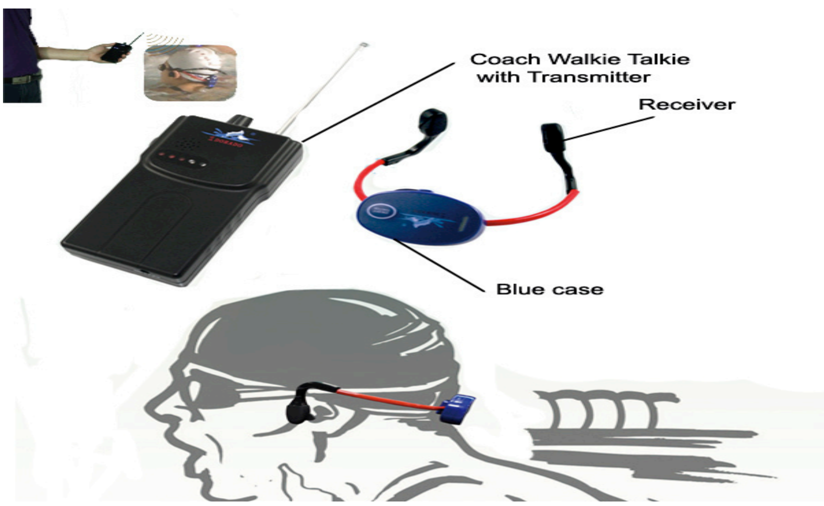

Figure 01. H-902 Waterproof Bone Conduction System (2015)

http://dx.doi.org/10.15405/epsbs.2018.03.17
Corresponding Author: Adrian Rădulescu
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

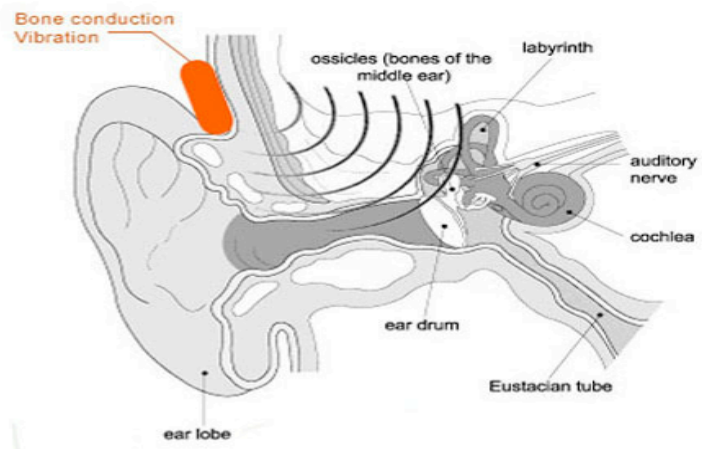

Figure 02. Visual description of the bone conduction system (H-902 Waterproof Bone Conduction System, 2015)

3. Research Questions

For this research study, we have formulated the following hypothesis: young swimmers can improve their swimming performance by using bone conduction communicating tools.

4. Purpose of the Study

The main objective of this research paper is to gain conclusive data on how direct communication between the coach and the swimmer, by using waterproof radio equipment, can enhance a young swimmer's self-control, swimming speed, swimming pace and stroke rate.

5. Research Methods

In developing this paper, we used the ascertaining pedagogical experiment with two variables (experiment group and control group), the controlled observation, the testing method (8x50**m** Efficiency Test), the graphical method and the statistical-mathematical method**.**

5.1. Subjects

The research was conducted at Aqua Team Sports Club of Bucharest and lasted 77 days, starting on 9 January 2017 and ending on 27 March 2017.

We selected two groups of young swimmers (boys and girls) with ages between 10 and 14, irrespective of their performance level.

All subjects had the same amount of training hours and swam similar volumes during the observation period. They carried out the same assignments regarding the technique and stroke count control during training.

http://dx.doi.org/10.15405/epsbs.2018.03.17
Corresponding Author: Adrian Rădulescu
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

5.2. The 8x50m Efficiency Test

This test was designed by in order to verify "the swimmer's efficiency" (Sweetenham & Atkinson, 2003, p. 30).

The swimmer has to complete 8 repeats of 50m freestyle within a 2-minute and 30-second cycle. Each repetition has to be faster than the previous one by approximately 2 seconds, in a descending manner. The final repetition should be within a second of the swimmer's personal best time in the 50m freestyle. "The final swim of the 8x50m repeats is maximum effort" (Sweetenham & Atkinson, 2003, p. 30).

All the swims in the 8x50m Efficiency Test are performed from a push start with no streamline kicks.

The swimming times and stroke counts are recorded by the coach on a special sheet.

The swimmers were given 1 point if they accomplished their target time on 1 repeat and 0 points if they did not. The points were then summed up for total rating.

5.3. Statistical and mathematical methods

For this research, we chose to use the following statistical-mathematical indices:

- the mean - parameter of central tendency;
- the standard deviation - statistical parameter of dispersion;
- the coefficient of variance.

6. Findings

Each swimmer was tested separately on an empty pool lane, so the amount of waves from other athletes was as small as possible. All starts were done from a push-off.

The following tables show the results of the 8x50m Efficiency Test for some of the subjects.

Table 01. Results of testing for M.I. (12 years old)

Initial Testing							Final Testing					
Swim	Target	Target time	Time recorded	Stroke count	Rating		Swim	Target	Target time	Time recorded	Stroke count	Rating
1	PB+15	45	44.68	18	0		1	PB+15	45	45.33	17	1
2	PB+13	43	43.13	21	1		2	PB+13	43	43.65	20	1
3	PB+11	41	41.23	23	1		3	PB+11	41	41.41	23	1
4	PB+9	39	40.09	26	0		4	PB+9	39	39.05	26	1
5	PB+7	37	37.19	31	1		5	PB+7	37	36.99	30	0
6	PB+5	35	36.12	35	0		6	PB+5	35	35.41	35	1
7	PB+3	33	32.89	37	0		7	PB+3	33	33.03	38	1
8	PB+1	31	32.12	41	0		8	PB+1	31	31.11	40	1
					3							7

http://dx.doi.org/10.15405/epsbs.2018.03.17
Corresponding Author: Adrian Rădulescu
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

Table 02. Results of testing for P.D. (13 years old)

Initial Testing						Final Testing					
Swim	Target	Target time	Time recorded	Stroke count	Rating	Swim	Target	Target time	Time recorded	Stroke count	Rating
1	PB+ 15	42	42.16	16	1	1	PB+ 15	42	42.15	14	1
2	PB+ 13	40	41.4	18	0	2	PB+ 13	40	40	16	1
3	PB+ 11	38	40.2	21	0	3	PB+ 11	38	38.01	19	1
4	PB+ 9	36	36.71	28	1	4	PB+ 9	36	36.35	26	1
5	PB+ 7	34	34.99	31	1	5	PB+ 7	34	34.12	29	1
6	PB+ 5	32	31.87	35	0	6	PB+ 5	32	32.04	31	1
7	PB+ 3	30	30.45	38	1	7	PB+ 3	30	30.31	34	1
8	PB+ 1	28	29.31	39	0	8	PB+ 1	28	28.02	37	1
					4						8

Table 03. Results of testing for I.A. (11 years old)

Initial Testing						Final Testing					
Swim	Target	Target time	Time recorded	Stroke count	Rating	Swim	Target	Target time	Time recorded	Stroke count	Rating
1	PB+ 15	45	45.53	21	1	1	PB+ 15	45	45.01	21	1
2	PB+ 13	43	44.65	22	0	2	PB+ 13	43	43.88	22	1
3	PB+ 11	41	42.11	25	0	3	PB+ 11	41	40.4	26	0
4	PB+ 9	39	40.33	28	0	4	PB+ 9	39	39.32	29	1
5	PB+ 7	37	40.56	32	0	5	PB+ 7	37	37.6	32	1
6	PB+ 5	35	36.1	36	0	6	PB+ 5	35	34.79	37	0
7	PB+ 3	33	35.12	39	0	7	PB+ 3	33	33	39	1
8	PB+ 1	31	33.09	40	0	8	PB+ 1	31	32.21	40	0
					1						5

Table 04. Results of testing for P.A. (14 years old)

Initial Testing						Final Testing					
Swim	Target	Target time	Time recorded	Stroke count	Rating	Swim	Target	Target time	Time recorded	Stroke count	Rating
1	PB+ 15	43	43.16	21	1	1	PB+ 15	43	43.23	19	1
2	PB+ 13	41	40.51	23	0	2	PB+ 13	41	41.07	21	1
3	PB+ 11	39	39.8	25	1	3	PB+ 11	39	39.1	25	1
4	PB+ 9	37	37.22	28	1	4	PB+ 9	37	38.9	28	0
5	PB+ 7	35	36.9	32	0	5	PB+ 7	35	36.02	31	0
6	PB+ 5	33	32.7	35	0	6	PB+ 5	33	33.67	33	1
7	PB+ 3	31	30.3	38	0	7	PB+ 3	31	31.22	36	1
8	PB+ 1	29	29.31	38	1	8	PB+ 1	29	29.86	38	1
					4						6

Looking at Table 05, we can observe that the control group has improved from the initial testing to the final testing. The experiment group did the same thing, as shown in Table 06.

Table 05. The control group results in the 8x50m Efficiency Test

No.	Name	Age	Gender	Initial Testing	Final Testing
1	P.A.	14	M	4	6
2	A.A.	11	M	2	2
3	C.S.	12	M	1	3
4	R.C.	11	F	2	4
5	C.A.	12	F	4	6
6	S.T.	11	M	4	6
7	S.D.	10	M	3	3
8	R.M.	13	M	1	3
Arithmetic mean				**2.63**	**4.13**
Standard deviation				±1.21	±1.53
Coefficient of variance				1.696428571	2.696428571

Table 06. The experiment group results in the 8x50m Efficiency Test

No.	Name	Age	Gender	Initial Testing	Final Testing
1	P.D.	13	M	4	8
2	M.I.	12	F	3	7
3	A.A.	11	F	4	7
4	B.R.	10	M	3	5
5	N.A.	12	M	2	6
6	B.A.	11	F	3	6
7	I.A.	11	M	1	5
8	G.A.	12	F	5	7
Arithmetic mean				**3.13**	**6.38**
Standard deviation				±1.165	±0.99
Coefficient of variance				1.553571429	1.125

The experiment group had better rating in swimming, their target time during the final 8x50m Efficiency Test recorded an average of 6.38 successful repeats compared to the control group average of only 4.13 successful repeats (Table 07 and Table 08). This implies a 57% improvement in accuracy for the experiment group.

In Figure 03, we graphically represented the results of both groups in the initial testing and the final testing. The progress recorded between the initial and final testing is much higher for the experiment group than for the control group.

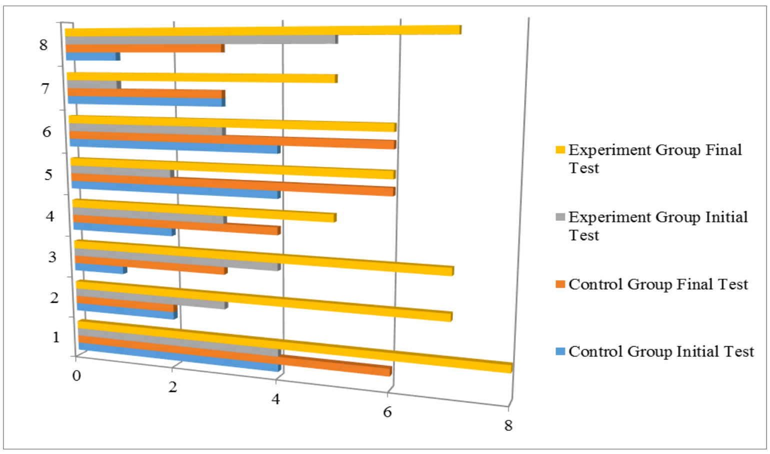

Figure 03. Graphical representation of the results from 8x50m Efficiency Test

http://dx.doi.org/10.15405/epsbs.2018.03.17
Corresponding Author: Adrian Rădulescu
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

7. Conclusion

From the findings of our research, we can establish the following conclusions:

- The experiment group athletes had better ratings than the control group in both tests, and their rate of improvement was far superior;
- This progress can be explained by the real-time training guidance and the positive transfer occurring in the athletes' cognitive ability, which has been facilitated by the use of H-902 System in stimulating the experimental group athletes;
- Young swimmers can improve their swimming performance by using bone conduction communicating tools – the research hypothesis is confirmed;
- Swimming coaches can use the H-902 Bone Conduction System to create new learning opportunities for swimmers with any skill level and to provide immediate feedback.

References

H-902 Waterproof Bone Conduction System. (2015). Retrieved from http://www.alibaba.com/product-detail/Most-Popular-H-902-Bone Conduction_60267039353.html?spm=a2700.7724838.0.0.TGc7zb;

Lynn, A. (2008). *High performance swimming*. Ramsbury, Wiltshire: The Crowood Press, p. 10;

Lynn, A. (2006). *Swimming - technique, training, competition strategy*. Ramsbury, Wiltshire: The Crowood Press, p. 23;

Maglischo, E. W., (2003). *Swimming fastest*. USA: Human Kinetics, p. 711;

Marinescu, Gh., (2002). *Natație – Tempo și Ritm*, Ed. Dareco, Bucureşti, p. 31;

Sweetenham, B., & Atkinson, J. (2003). *Championship swim training*. Champaign, Illinois: Human Kinetics, p. 30.