



# Breathing peculiarities during the performance of the technical routine of the artistic swimming national teams of Russia and Egypt at the XXXII summer olympic games

UDC 796.012



**Ola Amin Elsayed Mahmoud Amin Elsherif** <sup>1,2</sup>

Dr. Hab., Professor **V.R. Solomatin**<sup>2</sup>

<sup>1</sup>Helwan University, Cairo, Egypt

<sup>2</sup>Russian University Sport (SCOLIPE), Moscow

Corresponding author: [ola.elsherif@pef.helwan.edu.eg](mailto:ola.elsherif@pef.helwan.edu.eg)

## Abstract

**Objective of the study** was to identify the characteristic features of breathing in the national teams of Russia and Egypt in artistic swimming at the Olympic Games 2020 (2021).

**Methods and structure of the study.** The experiment was carried out on 16 athletes participating in the 2020 (2021) Olympic Games of the national teams of Russia and Egypt in artistic swimming.

**Results and conclusions.** As a result of the experiment, it was revealed that the Egyptian team spent 61.9% of the total time (3 minutes) underwater, while the Russian team spent 49.8%. Accordingly, in every minute of the technical routine, the Egyptian team spent 26%, 17%, and 35% more time underwater than the Russian team. The Russian team performed fewer hybrids and a three-peak load (1 peak per minute), with adequate control of retention and voluntary breathing between combinations throughout the program, demonstrating a balanced breathing pattern strategy.

**Keywords:** *artistic swimming, breathing patterns, technical routine hybrids.*

**Introduction.** Artistic swimming is a water competitive sport, which is a combination of swimming, dance, ballet and gymnastics [5], involving the synchronous execution of complex technical movements accompanied by music for a certain period of time. In one program, choreographic exercises are performed both above the water surface and under water [1].

Based on this, to create a breathing plan throughout the program, it is necessary to take into account the following parameters: how long each combination will last, how many combinations the performance includes. This information is needed for adequate management and implementation of the performance program [2, 3]. In addition, it is important to choose breathing patterns suitable for a particular team, corresponding to individual development and functional readiness [7]. Thus, by analyzing breathing patterns, it is necessary to determine the relationship between training methods, loads, and testing with these patterns [6].

Considering the results of the last Olympic Games held in Tokyo in 2021, the Russian artistic swimming team, which has been the champion since 2006, remains an example worthy of study. Meanwhile, the Egyptian team is the only team, both Arab and African, to compete at the Olympics in artistic swimming. This comparison makes it possible to identify the breathing characteristics of the Russian and Egyptian teams.

**Objective of the study** was to identify the characteristic features of breathing in the national teams of Russia and Egypt in artistic swimming at the Olympic Games 2020 (2021).

**Methods and structure of the study.** The performances of the two national Artistic Swimming teams were taken directly from the Olympic technical routine for the Tokyo 2020 (2021) Olympics. The breathing patterns of the technical routine were analyzed from the video recording using the manual tracking mode of the software "Tracker 6.0.1" to determine the coordinates of the markers. Time above and below the wa-

*Temporal categories for describing the hybrid*

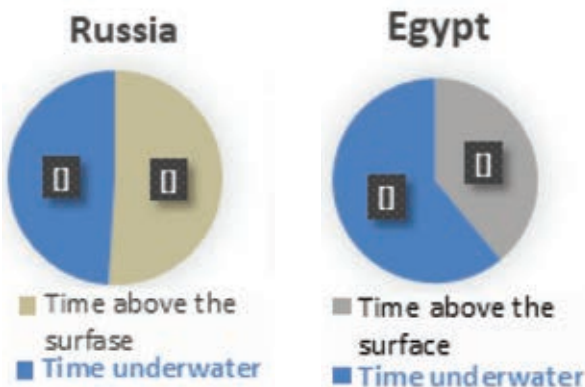
<b>Underwater time during combination (TU/ seconds)</b>	<b>TU1 &lt;7</b>	<b>TU2 (8-15)</b>	<b>TU3 (16+)</b>
---	------------------	-------------------	------------------

\* combination time = time spent underwater; \*(acrobatics and beginning not included)

ter surface is treated as a variable in this study. In this analysis model, according to the new scoring system [3], the classification of the time limit for each combination into three categories is used (see table).

**The results of the study and their discussion.**

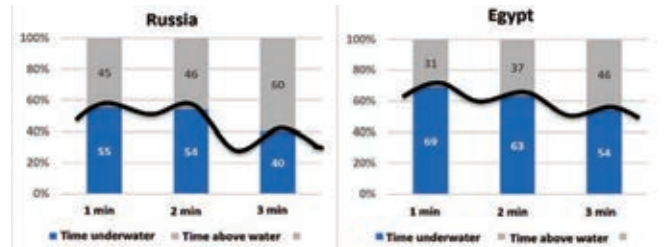
The following two diagrams show the breathing patterns of the Russian and Egyptian national teams, taking into account the time spent above and below the water surface during the technical program. The results show that the Egyptian national team spent more time underwater holding their breath than under the surface with free breathing, while the Russian team performed in a more efficient mode. As can be seen from the above diagrams (Fig. 1), the Egyptian team spent 111.43 seconds underwater, which is 61.91% of the total time, while the Russian team – 89.63 seconds – 49.8% of the total time.



**Figure 1.** The percentage of time spent above the water surface and underwater during the technical routine for both teams

At the same time (Figure 2), the Russian team performed in the last minute 60% of the time above the water with voluntary breathing, sufficient for the subsequent effective completion of the program while holding the breath. While the Egyptian team spent 69% and 63% underwater in the first and second minutes. This is 26% and 17% more than the Russian team. In the last 3rd minute, the Egyptian team had 54% against 40% of the Russian team. As a result of the increased time spent underwater by the Egyptian team throughout the technical program, their performance was lower. This also affected the quality of performance and therefore the overall score. In addition, in the second minute, the Egyptian team failed to

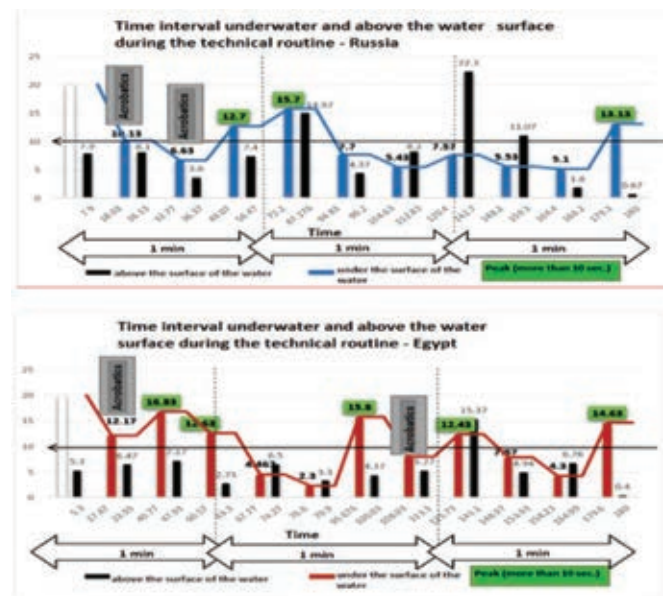
perform any technical elements required underwater. During the last minute, they completed (three of the five elements of) the required elements.



**Figure 2.** Time spent above and below the water surface during the technical routine for both teams (%)

Accordingly, the data presented clearly reflect the general breathing strategies, as well as holding or voluntary breathing during the competition, its positive or negative effect on technique, the quality of the elements and the overall score.

The program of the Russian team was less subject to fluctuations compared to the Egyptian team. The Russian team had only three load peaks (TU2 level), while the Egyptian team had four peaks of the TU2 level + 1 peak of the TU3 level, which shows the well-thought-out strategy of the Russian team breathing in the allotted time period for the combination. At the same time, the Egyptian team spent more time holding their breath, not having enough time to prepare before each peak. This affected the performance of both teams.



**Figure 3.** Time parameters of each combination in the technical routine for both teams



Thus, the Russian team performed 1 peak per minute with an average duration of no more than 13 seconds and short peaks with an average of 6 seconds. The Egyptian team completed two peaks in the first minute. In addition, she passed two peaks in the last minute in an average of 13 s and one peak in the second minute in an average of 16 seconds. Thus, the Egyptian team experienced a greater load during the implementation of the technical routine than the Russian team.

**Conclusions.** For each team, you should choose the time of holding and voluntary breathing based on the duration and intensity of the combination, as well as the functionality of the athletes. For a positive effect on the technique, the quality of the elements and the overall score, holding the breath should not exceed 55% of the total time per minute under water. At the last minute of the technical routine, the proportion of voluntary breathing can be about 60%.

#### References

1. Maksimova M.N. Sinkhronnoye plavaniye. Primernaya programma sportivnoy podgotovki dlya detsko-yunosheskikh sportivnykh shkol, spetsializirovannykh detsko-yunosheskikh shkol olimpiyskogo rezerva [Synchronized swimming. Approximate program of sports training for children's and youth sports schools, specialized children's and youth schools of the Olympic re-
- serve]. Moscow: Sovetskiy sport publ., 2007. 192 p.
2. Gökçe, Akgün. «Comen cup competition points analysis of Ariana figure in artistic swimming» Turkey, European Journal of Physical Education and Sport Science, vol 7, (2021) pp. 90-92.
3. Dimitrova, B. «Comparative analysis for the hypoxic sustainability of the synchronized swimmers from Bulgaria, Greece and Turkey». Research in Kinesiology, (2015). 43(2), pp.180-184.
4. FINA artistic swimming manual for judges, coaches & referees 2017 – 2021.
5. Homma M. et al. Physiological responses during the practice of synchronized swimming: A systematic review, Clinical Physiology and Functional Imaging (2017); p. 1.
6. Ponciano, K., Miranda, M. L. D. J., Homma, M., Miranda, J. M. Q., Figueira Junior, A. J., Meira Junior, C. D. M. & Bocalini, D. S. (2018). Physiological responses during the practice of synchronized swimming: a systematic review. Clinical Physiology and Functional Imaging, 38(2), pp. 163-175.
7. Viana, E.; Bentley, D.J.; Logan-Sprenger, H.M. A (2019). Physiological Overview of the Demands, Characteristics, and Adaptations of Highly Trained Artistic Swimmers: A Literature Review. Sports Med. 1, 9.