

CHOSEN ORGANIZATIONAL QUESTIONS ABOUT CORRECTIVE SWIMMING AND IN-WATER CORRECTIVE EXERCISES IN CASE OF SCOLIOSIS

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^A Study Design; ^B Data Collection; ^C Statistical Analysis; ^D Manuscript Preparation; ^E Funds Collection

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Abstract. In-water corrective exercises and corrective swimming are a very important element of prevention and correction of body posture defects. These occupancies are more frequently being used in modern treatment of these conditions. Advantageous influence of corrective exercises in water is predefined with specificity of water environment. The organization of corrective process is highly significant for successful final effects.

The main aim of this review was to collect all organizational questions that may become useful for future instructors who want to carry the correction process effectively. The authors, based on literature review, personal knowledge and their experiences assembled most important organizational questions about swimming and in-water corrective exercises in case of multiply-curves scoliosis.

Key words: organizational problems, corrective swimming, in-water corrective exercises, scoliosis

Introduction

In-water corrective exercises and corrective swimming are very important elements of prevention and correction of body posture defects (Kołodziej 1986; Oprychał et al. 1993; Olszewska 2001; Zając et al. 2003; Becker 2009) and extremely significant in case of scoliosis (Iwanowski 1997; Barczyk et al. 2005). These occupancies are more frequently used in modern treatment of these health conditions (Róžański 2004; Pasek et al. 2009; Karpiński and Karpińska 2011; Tasiemski and Osińska 2013).

Water environment gives big capability of body posture correction. Many authors (Kołodziej 1986; Oprychał et al. 1993; Iwanowski 1997; Owczarek 1999; Olszewska 2001; Andersen 2002; Róžański 2004; Barczyk et al. 2005; Gedl-Pieprzycza and Kisielewska 2008; Becker 2009; Pasek et al. 2009; Karpiński and Karpińska 2011) cite advantageous influence of corrective exercises in water, that is predefined with specificity of water environment, which are: power of gravitation and lift, pressure and flow of water, evoked contumacy, viscosity and surface tension.

The organization of corrective process is highly significant for successful final effect (Dytz-Świstek 1976; Różański 2004; Cieślicka et al. 2011).

The main aim of this review was to collect all organizational questions, that may become useful for future instructors who want to carry the correction process effectively.

The authors, based on literature review, personal knowledge, observation, and their experiences gathered during work with children with different body posture defects, have presented and discussed most important organizational questions in range of corrective swimming and in-water corrective exercises in case of scoliosis. Additionally, complex program of corrective exercises was presented.

Review was prepared based on good ethical practice, ethical codes and guidelines (Kruk 2013).

Corrective exercises program

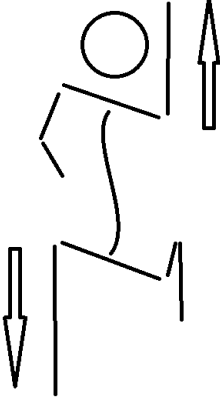
Yearly in-water corrective exercises program was divided into 2 semesters. There were 32 hours of exercises in each. Classes proceeded twice a week, 45 minutes each. In addition, children attended classes in athletic hall – 45 minutes, once a week, and they did exercises at home. In order to evoke desirable effects, minimal participation once a week in swimming pool classes was required (Owczarek 1999; Zając et al. 2003; Gedl-Pieprzyca and Kisielewska 2008). Pasek et al. (2009) recommends even a more frequent participation of 3 times a week – fitted for age, capabilities and limitations.

Preliminary examination

Andersen (2002) underlines that the base of conduction in occupancies is the acquaintance of a patient in various respects: physical, mental and social. All participants were examined by a physician before starting the corrective exercise program (Kołodziej 1986; Iwanowski 1997; Karpiński and Karpińska 2011). It evaluated triple-surface changes of backbone, general structure, body posture and power of muscles with Kraus-Weber Test. Physician referral was based on taking up the farthest decision (Witkowski 1994; Zając et al. 2003; Barczyk et al. 2005; Karpiński and Karpińska 2011). It also defined changes in the current X-Ray photos, confronting them with real posture research. Based on collected data, authors prepared examination cards of A4 format for all of the participants (Table 1). Based on Rubcowa's patterns, authors chose specificity of individual, future corrective actions. Iwanowski (1997), Andersen (2002), Cieślicka et al. (2011), Andrews and Glass (2013) propose this type of forms, facilitating the work of the therapist, to early detect any kind of contraindications and allow for constant monitoring of the patient's condition.

During the first meeting, an interview with a child's parents was also conducted. During the interview researchers obtained the necessary data, passed the relevant information of faults and made the parents aware of the seriousness of the problem (Iwanowski 1997; Andersen 2002; Karpiński and Karpińska 2011).

Table 1. Corrective swimming participant's exemplary test card

Name: Jan Kowalski	
Age: 12 years	Sex: M Swimming skills: very good
Size and position of curvature	L P
TH 4–8 left 21°	
L 1–5 right 18°	
Notes:	weakened postural muscles, rotation of the spine in section L 2–3, willing to work, quick to learn new exercises

The division into groups

The basis for the proper and effective conduction of the corrective activities was the creation of small groups - up to 6 participants, even if it is permitted to conduct classes in teams of 8–10 people (Róžański 2004). Reducing the number of participants in groups increased the level of safety and performance of exercises. The division criterions were comparable swimming skills and possibly close parameters of spinal curvatures. Minimum swimming skills, allowing participation in the correction program, included swimming on back 25 m without any gear and 25 m swimming with gear, on the chest, using leg movement (Zająć et al. 2003; Gedl-Pieprzyca and Kisieleska 2008; Karpiński and Karpińska 2011).

For organizational reasons, the respondents with deformations below 10 degrees were sent to normal swimming classes to learn and improve swimming, giving each coaches individual recommendation that they should look for when conducting exercise. Patients with 10 degrees scoliosis and more were qualified for correction swimming classes and corrective exercises in the water. Authors established groups for functional scoliosis - from 10 to 20 degrees and the structural scoliosis – 20 degrees and above. In this way of division there were fully organized groups and increased conducting comfort (Iwanowski 1997; Bielec 2007; Karpiński and Karpińska 2011).

Program leaders

Two instructors, specialists in corrective exercise, took part in the implementation of the program (Zająć et al. 2003; Andrews and Glass 2013). Water activities were conducted by one instructor, while the second person was the supervisor and controller of the whole process. This allowed to avoid any discrepancies and ensured the continuity of the correction process.

Shower

According to the hygiene rules and the rules of the swimming pool, before entering the water, all participants took a shower. Washing whole body allowed to avoid thermal shock and adjust to the water temperature (Witkowski 1994; Owczarek 1999; Pasek et al. 2009). In order not to lead to freezing, shivering, lack of thermal comfort, muscle contraction, malaise or unwillingness to exercise, participants had been recommended to the exit from the showers, wiped to dryness and covered with bathrobes.

Start of the classes

Start of classes preceded the conversation about self-handling, organizational issues and verifying the correctness of implementation (covered in the earlier classes) of "home exercises" on Pilates mats. The participants responded how they worked at home, and showed how they performed the exercise.

Basic exercises were already performed in the water, mainly due to practitioners safety, which should always have priority over the rest of the rules (Owczarek 1999; Rózański 2004; Bielec 2007).

Gear

During the program, available gear was used, i.e.: boards, noodles, neoprene gloves, fins, buoyancy belts, cuffs, foams, hard rubber balls and rings, plastic sticks, ping pong balls and rubber elements sinking to dive. This hardware supported increasing buoyancy, intensifying resistance and enhancing activities (Radomski 2003; Rózański 2004; Karpiński and Karpińska 2011). Note that with increasing the volume of the object and the air content in it, also the resistance is increased (Andersen 2002).

An additional element which seems to facilitate a warned participation and better instruction were colored rubber bands, placed on the correct wrist and ankle, determining in this way the direction and location of the curvature.

During exercise in the water, in addition to verbal instruction and demonstration, a plastic pole was used to indicate the selected areas of the body. After prior signals consultation with the relevant, trainer used the utensil to focus their attention on a particular muscle group, reminding given movement or increasing range of motion in a given direction. If there was such a need, instructor was also in the water and immediately corrected the position of the utensil, the setting of the whole body or individual limbs (Andersen 2002; Rózański 2004).

Usage of the wall and shore

The pool wall was also used to stabilize certain sections of the spine and to isolate selected parts of the body during exercise (Oprychał et al. 1993; Iwanowski 1997; Owczarek 1999).

During each classes, for a greater participants awareness, their understanding of the purpose and essence of the exercise also to facilitate the transmission of instructions, leaders used static exercises on the shore. When introducing new exercises or to correct the erroneous ideas of movement, participants came out of the pool, they laid on rubber mats and performed exercise on a stable surface in a facilitated environment.

Pool parameters

Selecting the swimming pool as well as pool track for the program was extremely important. Group led by authors participated in the activities conducted at the pool of the General Education School Group No. 3 located at Orawska 1 Street in Szczecin. Pool dimensions was 25 m length, 12 m width. Each of the 5 designated track was 2.4 m wide. Particular attention was paid to such parameters as water temperature, depth and height of the water surface relative to the edge.

Water temperature

It is difficult to determine the optimum temperature at which corrective exercises should be performed in water. Bernthal (2013) recommends 26–29.5°C for recreational swimming.

Lees et al. (2013) proposes the following guidelines:

- for children in preschool – over 32°C
- for learning swimming – above 29°C
- training junior lifeguards – above 29°C
- low intensity workout rescuers, carers – 29–32°C
- intensive training of rescuers, carers – 26–28°C.

The authors recommend higher water temperatures, especially for therapeutic activities – 26–30°C (Róžański 2004) or 33–36°C (Oprychał et al. 1993; Owczarek 1999; Andersen 2002). This temperature ensures dilation of blood vessels, increases blood pressure, releases endorphins and leads to general relaxation of the body (Andersen 2002).

Too low temperature (below 24°C), especially during the static tasks at the wall, could cause freezing, numbness and stiffness of the body, increasing the risk of injury and the emergence of a reluctance to exercise (Oprychał et al. 1993; Róžański 2004; Lees et al. 2013).

However, when more intensive work is involved, authors propose a value of 24–26°C (Kołodziej 1986; Oprychał et al. 1993; Olszewska 2001).

Depth

The depth of the pool was variable, but on a longitudinal section it progressed gradually and gently from 1.2 m to 1.8 m. The possibility of contact with the bottom of the pool while changing body position or loss of the security sense is an important element, especially for participants moving unsteadily in an aqueous environment (Witkowski 1994; Róžański 2004).

Surface of water in the pool is equal to the edge (overflow system). Lowering the water level in the basin in relation to the shore level would result in a decrease instruction comfort, practitioner anxiety and cervical spine strain during exercise, instruction and demonstration.

Track

To optimize and intensify contact between exercise performer and instructor, authors selected an external track, just near the pool wall. Not only to use the wall to exercise, but also because of the better visibility, facilitated communication, the possibility of early intervention, error correction, and continuous monitoring (Owczarek 1999; Andersen 2002; Róžański 2004; Bielec 2007). To intensify the effects, classes were carried out to half length of the track (if there were conditions for that).

The attractiveness of classes

The authors started new forms, diversifying and modifying the well-known exercise, introduced new settings or start positions, used new hardware and unconventional accessories (Róžański 2004; Bielec 2007). All these treatments were used in order to maintain the highest possible mobilization, efficiency classes and to maintain good atmosphere.

Feedback

After each session the instructor gathered feedback (Iwanowski 1997) from practitioners regarding well-being, symptoms, exercise attractiveness, general classes reception and the occurrence of subjective and objective effects. Comprehensive knowledge of the charges allows for impact improvement (Andersen 2002).

Homework

In addition, it was required to execute the exercise at home, which the participant had to repeatedly perform on the mat, under the supervision of the instructor. The authors (Grabara et al. 2003; Zając et al. 2003; Gedl-Pieprzyca and Kisielewska 2008) recommend home exercises, because correction of posture during activities at the swimming pool, even in an increased amount, i.e. 2 × 45 minutes per week, is not enough.

Current Control

During the semester, the participants were asked to provide the latest X-Ray photos and medical check certificates (if there were any) that the instructors were able to control and modify the process of correction (Iwanowski 1997).

Below is a diagram of the correction procedure in the water with regard to the examination of body posture and corrective exercises in the gym, parallel to activities in the water (Table 2).

After completion of the whole program, there was re-examination and confrontation of the earlier effects with the recent ones (Iwanowski 1997; Barczyk et al. 2005).

Table 2. In-water corrective exercises complex program

Medical examination: – orthopedist referral – Kraus-Weber test – X-ray photos – posture examination – preparing an examination card	
Meeting with parents/guardians	
Qualification to groups: – curvature parameters – swimming skills	
Stages of the corrective activities in water	Corrective exercises in the gym
Phase I – adaptation classes, to familiarize with water, breathing exercises, buoyancy, – basic locomotion movements in water, static corrective exercises	– basic, global exercises – sense of posture control exercises – stretching exercises – strengthening selected parts of the muscle exercises
Phase II – learning correct legs movement, to crawl on the chest and on the back – learning correct arms movement and symmetrical arms work – corrective swimming exercises – general, global basic exercises – asymmetric exercises	Additional operations – meetings with parents to continuously corrective impact – medical inspection every 6 months – conscious and active participation in the process of correct posture
Phase III – appropriate corrective exercises in water (derotation, exercises to kyphosis thoracic, anti-lordosis, selectively strengthening muscle groups) – use of swimming styles for the correction purpose – swimming exercises with accessories and resistance	

Conclusions

All the above, organizational issues in the field of corrective swimming and corrective exercises in the water, in case of multicurves scoliosis, should become guidelines for future instructors who want to effectively carry out the correction process with their clients.

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Cite this article as: Wiażewicz A., Zawadzki M. Chosen organizational questions about corrective swimming and in-water corrective exercises in case of scoliosis. *Centr Eur J Sport Sci Med.* 2014; 7 (3): 91–98.