Fizjoterapia Polska

Annex nr 1
to the Rules and Regulations
of the Ethics Committee for Scientific Research of Physiotherapists
at the Polish Physiotherapy Association
of 14 April 2023

RESOLUTION No. 1/03/2026 of 30 March 2026 of the Ethics Committee for Scientific Research of Physiotherapists at the Polish Physiotherapy AssociationEthics Committee for Scientific Research of Physiotherapists Polish Physiotherapy Association

Concerning the research project: **"The Impact of Respiratory Training on Reaction Time and Other Components of Performance in Young Football Players"**

Submitted by: Dr hab. Anna Polak

The Ethics Committee for Scientific Research of Physiotherapists of the Polish Physiotherapy Association issues a **POSITIVE OPINION** regarding the research project entitled:

"The Impact of Respiratory Training on Reaction Time and Other Components of Performance in Young Football Players."

Justification of the opinion
/in the case of a negative opinion/:

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Signature
Dr hab. Tomasz Halski

Chair of the Ethics Committee for Scientific Research of Physiotherapists at the Polish Physiotherapy Association

*-niepotrzebne skreślić

Physiotherapy Poland

STUDY INFORMATION

Study title: "The impact of respiratory training on reaction time and other components of perfomance in young football players"

The information about the study should include the following data (description of a maximum length of 2 pages)

Place of research:

- MTS Rybnik Football Academy, ul. Kilinskiego 33b, 44-200 Rybnik
- Department of Clinical Physiotherapy, Faculty of Physiotherapy, J.Kukuczka Academy of Physical Education in Katowice, Mikolowska 72A Street, 40-065 Katowice, Poland

Number of participants: 50 people

Criteria for inclusion in the study:

- healthy boys aged 13-15 (born in 2011-2013),
- have been training in football for at least 2 years;
- valid medical certificates confirming the ability to practice a given sport,
- members of the MTS Rybnik Football Academy,
- consent of the parent/guardian for the player (child) to participate in the study,
- the player's consent to participate in the study,
- no participation in breathing training in the last year,
- attendance at training sessions during the 6 months preceding participation in the study at a minimum of 80% of the hours.

Criteria for exclusion from the study:

- lack of valid medical certificates confirming the ability to practice a given sport,
- current acute diseases (including respiratory tract infections) or chronic diseases that may affect exercise capacity or training safety;

- musculoskeletal injuries requiring treatment or limiting participation in football training, experienced within the 6 months preceding participation in the study;
- diseases requiring hospitalization within the 6 months preceding participation in the study;
- diseases of the nervous system or musculoskeletal system requiring physiotherapy within the 6 months preceding participation in the study;
- diagnosed respiratory diseases (e.g., pharmacologically uncontrolled asthma), cardiovascular diseases, or other conditions that are a contraindication to physical exercise;
- contraindications to performing breathing exercises, such as: a tendency to hyperventilate, dizziness during breathing exercises, recent chest injuries.

Research objectives

The general objective of the research is to gain knowledge about the impact of physical training supplemented with breathing exercises on the effectiveness of training for young football players.

The specific objectives of the research are to answer the questions of whether physical training expanded with breathing exercises increases reaction time, agility, speed and exercise capacity u of young football players.

The applied objective of the research is to gain knowledge about the possibilities and purposefulness of using breathing exercises in the training of young football players.

Methods

Study participants. The study will include 50 healthy football players aged 13 to 15 (born in 2011-2013), who have been training in football for a minimum of two years and are members of the MTS Rybnik Football Academy.

Qualification for the study and randomization. The qualification of players to participate in the study will be conducted by the head physiotherapist, in accordance with his professional competencies. The qualification process will include an interview with the player in the presence of a parent or legal guardian, an analysis of training records and, if available, medical records. On this basis, the current health status of the players will be assessed in order to exclude possible contraindications to

participation in the study and other exclusion factors, in accordance with the adopted criteria.

In the event of doubts regarding the player's health or the safety of his participation in the study, there is a possibility of a medical consultation with a physician, independent of the research team, before making a final decision on eligibility for the study.

After meeting the inclusion criteria, the player and his parent or legal guardian will be informed about the objectives, course and nature of the study, as well as about the possibility of withdrawing from participation in the study at any stage, without the need to provide a reason. Withdrawal from participation in the study will not affect the player's continued participation in standard football training.

After obtaining written consent to participate in the study from the player and his or her parent or legal guardian, the participants will be assigned to an experimental group and a control group (25 people in each group). The division into groups will be random and will be carried out by a member of the research team (a physiotherapist) who will not participate in the player qualification process and will not have contact with the players or their parents or guardians at the recruitment stage.

Randomization will be carried out using opaque envelopes containing appropriately marked cards (A — experimental group, B — control group). The cards will be placed in envelopes before the start of the study by a person not involved in the project. The envelopes will then be randomly mixed, numbered from 1 to 50, and handed over to the physiotherapist performing the randomization. After qualifying the next player for the study, the physiotherapist will open the envelopes one by one and assign the players to the appropriate groups according to the designation in the envelope.

Physical training used in both groups

In the experimental group and in the control group, standard football training will be conducted at the MTS Rybnik Football Academy, in accordance with the applicable training program for the given age category. The training includes technical, tactical, and general development exercises, including elements that shape speed, agility, motor coordination, and endurance, carried out in the form of

individual and team exercises and task-based games. The intensity and volume of training are adapted to the age, level of advancement and the current stage of the training season.

In the control group, this training is the only form of intervention.

Breathing training

In the experimental group, breathing training will be additionally implemented. This training will be complementary, low-intensity, and relaxing and activating. It will not interfere with the main course of the training unit and will not significantly increase the total training load of the players.

The exercises will be conducted for a period of 4 weeks, 3 times a week, immediately after the end of the football training session. Each breathing training session will last about 20 minutes and will be performed in a supine position, in conditions conducive to relaxation and concentration on breathing.

Breathing training will be introduced progressively, taking into account the gradual adaptation of the players to the exercises:

Week 1

The session will include:

- relaxation exercises using calm diaphragmatic breathing,
- learning the correct path of diaphragmatic breathing,

elements of prolonged exhalation (e.g., breathing with "pursed lips"), final relaxation.

The goal of the first week will be to adapt to breathing training, improve breath awareness, and learning to control the inhalation and exhalation phases.

Week 2

The session will be extended to include:

- diaphragmatic breathing with a gentle increase in resistance, achieved by a controlled increase in the resistance of the abdominal cavity's own tissues (e.g., by placing the hands on the abdomen and consciously directing the breath to the lower ribs),
- short rest periods between exercises.

The goal of the second week will be to activate the diaphragm and consolidate the correct breathing breathing pattern.

Weeks 3 and 4

In the next two weeks, the training will be supplemented with:

- diaphragmatic breathing with resistance manually applied by the attending physiotherapist through gentle, controlled pressure on the abdominal wall during the inspiratory phase,
- exercises aimed at activating the lower ribs,
- short elements of chest breathing as a supplementary exercise,
- final relaxation.

The intensity of the exercises throughout the training period will be individually adjusted to the players' abilities and will not cause pain, shortness of breath or other symptoms of discomfort.

The above protocol is based on methods used in respiratory muscle training, which in studies involving athletes, including young football players, showed a beneficial effect on exercise capacity and fatigue tolerance [McConnell 2004, Shei et al. 2018, Mackała et al. 2020].

Measurement methods

The study will use four fitness tests commonly used to assess the physical fitness of young football players, including the assessment of reaction time, agility, running speed, and exercise capacity.

1) Reaction time test using BlazePod sensors — assessment of selective reaction

A quick visual-motor reaction is an important element of the game of football, in which the player makes decisions in dynamically changing field conditions [Nakamoto, Mori 2008]. The BlazePod light sensor system will be used to assess reaction time. This system enables objective measurement of the reaction speed to randomly appearing visual stimuli and is widely used in sports training. Sensors will be placed on the floor, and the participant's task will be to touch a randomly illuminated sensor as quickly as possible. Each participant will complete five attempts, and the average of the three best results will be used for statistical analysis.

2) T-Drill Test – Assessment of Agility and Speed of Change of Direction

The T-Drill is a widely used tool for assessing agility, acceleration, and the ability to change direction quickly in team sports, including football [Pauole et al. 2000]. Four cones will be arranged in the shape of the letter "T." The player starts from a standing position at the center point, runs forward for a distance of 10 meters, then performs lateral movements to the left and right, returns to the center, and runs backward to the starting point. Time will be measured using an electronic stopwatch or photoelectric sensors. Each athlete will perform two practice runs, followed by two official runs; the best result achieved will be used for statistical analysis.

3) 30-meter sprint – assessment of running speed

The 30-meter sprint is a standard method for assessing speed and acceleration in youth football, serving as a significant predictor of the effectiveness of offensive and defensive actions [Haugen et al. 2012]. Timing will take place over a 30-meter distance. The player begins the run from a standing position. Running time will be measured using photoelectric cells or an electronic stopwatch. The test will be performed twice, and the shorter of the two times recorded will be used for statistical analysis.

4) Yo-Yo Intermittent Recovery Test (Yo-Yo IR1) – assessment of exercise capacity

The Yo-Yo IR1 test is a widely used and well-documented tool in the literature for assessing aerobic and anaerobic capacity in intermittent sports such as football [Bangsbo et al. 2008]. The test assesses the ability to perform repeated high-intensity efforts and the efficiency of recovery between them. The athlete performs shuttle runs between lines 20 meters apart, following the pace dictated by an audible signal. After each pair of runs (2 × 20 m), a short active rest period is taken, consisting of a 5-meter jog and a return to the starting line. The test ends when the athlete is unable to reach the line twice within the specified time.

Test Conditions

Measurements of reaction time, agility, speed, and exercise capacity will be conducted before the

study begins, immediately after its completion, and then 4 weeks after the end of the intervention. All measurements will be performed by the same team of two physical therapists under identical, standardized conditions in a sports hall. Before beginning the tests, each participant will undergo an identical, standardized warm-up. At least two attempts will be made for each test; the better result or the average of the results will be used for analysis—in accordance with the procedure for the given test.

Justification of the Project's Purpose, Safety, and Feasibility

This research project is low-risk and aims to verify the effectiveness of commonly used training methods in a population of young athletes. The planned intervention does not interfere with the standard training process, and the respiratory training used constitutes a safe, complementary activity performed after the completion of a training session. The study is conducted by physical therapy students as part of their thesis work, under the supervision of experienced physical therapists and a physician, which ensures its practical, applicable, and safe nature.

Football is a highly dynamic and reactive sport that requires players to quickly process visual stimuli and respond with immediate motor reactions [1]. Key components of young football players' performance include reaction time, the ability to sprint over short distances, agility, and exercise capacity [2]. These parameters are crucial both for on-field effectiveness and for the athletes' athletic development during youth training.

In recent years, there has been growing interest in respiratory training as a method to support the training process by increasing the efficiency of the respiratory muscles, delaying the onset of fatigue, and improving exercise tolerance [3,5].

Previous studies indicate a beneficial effect of respiratory muscle training on physical fitness, respiratory function, and the ability to perform intense exercise in athletes, including young football players [4].

Despite the growing number of publications on respiratory training, there remains a limited number of studies analyzing its impact as a supplement to standard training sessions in young football players, particularly with regard to parameters such as reaction time, the 30-meter sprint, agility assessed using the T-Drill test, and exercise capacity assessed using the Yo-Yo test [4,6–8]. It therefore seems

reasonable to conduct studies that will assess whether incorporating breathing training into the routine training process can yield measurable functional benefits in this age group.

The results obtained may have practical implications, providing a basis for the rational and safe use of respiratory training elements in the training of young football players, as well as in physical therapy and coaching practice.

References:

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Expected benefits and risks for study participants:

Participation in this study may contribute to expanding knowledge about the effects of respiratory training as a supplement to standard football training in young athletes. Potential benefits for participants may include improved reaction time and concentration [6], increased aerobic endurance [5], delayed onset of muscle fatigue [3], and improved exercise performance [2,4].

From a practical perspective, the study's findings may serve as a basis for the rational incorporation of breathing training elements into the training of young football players. The available scientific literature indicates that breathing training may enhance the effectiveness of general physical and sports training; however, its impact on young athletes requires further verification [2,3].

Effects of Possible Adverse Effects

Breathing training is considered a safe method for healthy individuals, including children and adolescents. Possible, though rare, adverse effects include dizziness associated with excessive breathing rate (hyperventilation) and a temporary sensation of shortness of breath or fatigue in the respiratory muscles. These symptoms are transient and do not pose a health risk to participants. All training sessions will be conducted under the supervision of a qualified physical therapist, and participants will be informed in advance of the need to report any symptoms of discomfort.

If any adverse effects occur, the training will be stopped immediately.

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Potential conflicts of interest: no conflict of interest

Method of publication of results: master's thesis, scientific publication

/Signature of the Research Director/

