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The philosophy of martial arts – the example of the concept of *ldo*

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ABSTRACT

The Ido philosophy is a proposal to clarify the meaning of today's warrior pathway.

The author tries to answer the following questions: In what way should we understand epistemology? How do we describe the human being and the phenomenon of martial arts? What is the meaning of the terms'*idō*' and '*ldōkan*'? What ethics, values and rules are prominent in the *ldo*? What is the specific, symbolic content of the *ldo*?

This is a single case study, involving a content analysis of literature and the wider discourse, and the hermeneutic phenomenology.

Epistemology is understood here as a way of understanding the martial arts by the practitioner, and as a way of reaching the truth about the philosophy of martial arts. In both cases it is the practice that is their own psychophysical experience. Man and the phenomenon of martial arts (ontology) here we treat holistically. *'Ido'* is an ambiguous concept, but in *Ido* philosophy we understand it in the first place as the principle of 'continuous movement'. The prevailing ethic is derivative of the tradition of chivalry, which is also accented in symbolism.

The *ldo* philosophy, as an anthropology of martial arts and today's Warrior Way, draws from the wisdom of the East and the West, but not uncritically. Normative ethics realizes the ideals of nobility, as *Homo Creator Nobilis*. This indicates the way in which value requires great effort, self-discipline and perseverance. It focuses especially on timeless, higher values, such as fidelity, truth, and the pursuit of wisdom.

KEYWORDS

martial arts; anthropology; Budo; Ido; Idokan

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INTRODUCTION

There is no overall agreement on the philosophy of martial arts. Some authors refer us to the literary production of the old masters (Oyama, 1979), others – to the religious traditions of their countries of origin (Priest, 2014). Only a few Western philosophers have made the attempt to describe such a philosophy in terms of conceptual Western philosophy in comparison to the concept of Aristotle and the Stoics (Kim & Bäck, 2000; Hackney, 2010; Cynarski, 2012, 2013; Priest & Young, 2014). Both in Japan and in Western countries the debate continues on the establishment of the importance of basic concepts (cf. Shishida & Flynn, 2013; Szmyd, 2013; Lloyd, 2014; Young, 2014; Nakiri, 2015; Martínková & Parry, 2016a). This study is a voice in the discussion and description of the philosophy functioning practically in the environment of martial arts, in one of many organizations.

Framework and Language

A philosophical perspective for reflection and explanation given here is the Humanistic Theory of Martial Arts, including a martial arts anthropology and a sociology of psychophysical systems (Bolelli, 2008; Cynarski, 2012). Therefore, we use the definition of martial arts according the Humanistic Theory of Martial Arts (Cynarski & Skowron, 2014): "Martial arts is a historic category of flawless methods of unarmed combat fights, and the use of weapons combined with a spiritual element (personal development, also in transcendent sphere)."

Different martial arts paths are accompanied by different philosophies. In the karate for example there are different, sometimes contradictory, interpretations of a meaning by way of the idea of 'empty hands'. For example, Masutatsu Oyama (*Kyokushin karate*) found meaning in hard training and contact fighting, and Peter Jahnke (*Zendo karate Tai-te-tao*) in his search for the humanistic law of the Great Way (cf. Oyama, 1979; Jahnke, 1992; Cynarski, 2016), rejecting sports competition.

American philosopher Allan Bäck, and the Korean GM Daeshik Kim (expert of *judo* and *taekwondo*) explain the philosophy of martial arts as "an understanding of the meaning of the way of meditation practice, including mental and physical exercise". They write about the ethics of martial arts, following the rules etc. '*The Way to Go*' is the way of practice that is combat training, daily training (Kim & Bäck, 2000). This pair of authors here presents the development of their earlier ideas about the meaning and philosophy of martial arts (cf. Massanori, 2001).

Individual philosophers also differ in their attitude to tradition. The philosophy of Shaolin warriors was identical to the Buddhism they professed (Shahar, 2008); it was conditioned religiously. Rigid standards of conduct and rules of exercise, etc., are applied here. On the other hand, in Bruce Lee (1975) we find the attitude of a rebel and a revolutionary. He focused on the real fight, rejecting the educational, moral way of martial arts taught traditionally. He undertook the modernisation of both training methods and teaching techniques, selecting elements from various systems. The school that he tried to create was eclectic in character, and also in terms of philosophical justifications. Bolelli (2008, pp. 153, 184) determines his attitude as epistemological anarchism – No Way. The *'Tao of Jeet Kune Do'* was to be such a method without method, style without style, as an expression of opposition to the old canons.

Significantly, in the names: *Judo-do/Ido, Tao of Jeet Kune Do, Zendo Karate Tai-te-tao*, i.e. in concepts by Fleck, Lee, and Jahnke, the concept of '*tao/do*' appears twice; as indeed in the title of a book written by Kim and Bäck (2000). This is not accidental – all those authors emphasize the importance of the way, as a method, to a greater extent than the pursuit of targets, as ends. Only the Absolute is perfect, and man can and really should try to get closer to this perfection.

Three qualitative methods were used. This is a case study (the descriptive, interpretative, and evaluative study of a single case) (Skinner, Edwards, & Corbett, 2015, pp. 116–133), which employs hermeneutic phenomenology (ibid., pp. 206–217) and a content analysis of literature and the wider discourse (Krippendorf, 2004).

Historical Dimension

Historically, the *Ido* conception was derived from the idea of *Judo-do*, created by Julius Fleck. Fleck tried to modify *judo* and develop its technical sphere. *Judo-do* ('extended path of *judo*') is a specific style among the various martial arts and combat sports. It was created in Austria after World War II (between 1947–1949) as a new, European kind of *judo* without the sport fight; as co-operation rather than competition, as "a new and expanded way" (Velte & Matschke, 2007, p. 110). New throwing techniques and counter-techniques were included.

The second Grand Master of the Idokan organisation (at that time the organisation operated under other names) and successor of Fleck was Dr. Wally Strauss. Mr Colin McGrath¹ from Australia, a student of Wally Strauss, emphasizes the role of Chinese martial culture in the *Ido*-idea of Strauss. He changed *judo-do* into *ido*, where various techniques were used that are altogether different from those used in *judo*. It is similar to a flexible martial art with *taiji quan* elements (*cf.* Sieber, Cynarski, & Kunysz, 2008).

Strauss' *ido* concept has been developed by successive leaders of Idokan. Hans Schöllauf from Vienna was the 3rd leader and Grand Master. He emphasized the brotherhood and tradition of knightly Europe. He also recommended studying the life-histories of the great martial arts masters, e.g. Musashi Miyamoto, but not uncritically. He practised *judo-do*, but also *taiji quan*. He taught an extended, benign path and an attitude of friendship in human relations, including international brotherhood. His Academy Idokan Europe (in Vienna) promoted humanistic and universal ethical values. Thanks to him the idea of *Ido* went to *shihan* (master-teacher of high degree) Lothar Sieber from Germany, and thanks GM Sieber – to Poland. The *Ido* philosophy was developed at the university level as well (Cynarski, 2009, pp. 38–85).

Epistemology

We must distinguish between two understanding of epistemology: 1) as a way of understanding the martial arts by the practitioner; and 2) as a way of reaching the truth about the philosophy of martial arts. In both cases it is – according to the Humanistic Theory of Martial Arts (Cynarski, 2012) – preferably a long-standing practice at an advanced level, which is its own psychophysical experience (effort, self-control, overcoming one's own weaknesses) and practical knowledge. Traditionally, '*shugyo*' was primarily an ascetic exercise to improve personal and spiritual

¹ Personal communication with the author (Dec. 2013 – March 2014).

Wojciech J. Cynarski



Figure 1 The *idō* kanji calligraphic records by Dr Taketo Sasaki (1a, b, c). Significantly: 1a–b) *idō* as movement (Chinese *yi dong dao*); 1c) – medicine (Cynarski, 2009, p. 147)

progress/development. In this kind of cultural studies it is a combination of participant observation and fieldwork.

Analysis of an external observer, without this practical knowledge, would be something like a music score (or painting) by someone who has never created and not even playing any instrument. Explanations, on the basis of logical deduction, would indeed possible, but the risk of making mistakes in kind would be very large.

Mastery of several disciplines of martial arts provides a broad overview of the subject of research. It must, however, be backed up by scientific research methodology. Especially the use of qualitative methods seems to be reasonable.

In the first case, the student learns a particular martial art, a long-time educational process aimed at perfecting his personality. It is also the path to self-discovery.

In the second case, the researcher compares the knowledge of historical and modern masters-experts and his own, creating (more or less accurate) concepts for explaining.

Ontology

Ontology of the Human and of Martial Arts

Here the main question is: How do we describe the human being and the phenomenon of martial arts? Then we ask: What is the meaning of the terms '*Ido*' and '*Idōkan*'?

The human is treated here holistically, that is, as an integral psycho-physical being (body and soul). Also, the impact of practicing martial arts on the human we grasp as a whole – its physicality and personality, to the realm of morality and spirituality. So we are interested not only in the technical or physical dimension, but also in other spheres of reality. That is, similarly to the case of health, the individual components apply not only to the body. We reject the reductionist treatment of the human – materialistic or biologistic explanations (instinctivism, behaviourism, etc.). We take into account the human's higher needs, aspirations, values-goals and responsibilities. Man is a personal being: he has the choice of values, which manifests itself in 'actions' (rather than 'behaviour').

On the other hand, the phenomenon of martial arts is both a component of physical culture, psychophysical, and mass culture. It is the area of the different martial arts, combat sports, health exercises, forms of ritual, meditation exercises, and the like. Their common denominator is the link to fighting techniques. In this multiform set of martial arts in the strict sense are the educational systems, as co-creating the Japanese *Budo* (*budō*) (Sasaki, 2009). Then, in addition to training in combat, there is a clearly accented educational aim, or a transcendent (spiritual) aim.

Thus the reduction of the martial arts to sports or to self-defence systems seems to be a major misunderstanding. Great teachers of martial arts reject sport and competition, a sense of 'Way of the Warrior': is seen a continuous improvement in the art of living and human. It is more a philosophy of man, than philosophy of fighting. (See the distinctions between close combat, martial path, martial art and martial sport in Martínková and Parry, 2016b.)

For old warriors and soldiers, their fate was linked to struggle and war (Yagyu, 2002; Żuk, 1996). Yet Lee (1975) and Oyama (1979) largely relate to fighting, which is for them the central concept equating human life with struggle. In the case of fighting a war, in self-defence or combat sports duel, the fight phenomenon can be interpreted on the basis of praxiology as negative cooperation. However, in *judo-do/ido*, and even more clearly in the *Zendo karate Tai-te-tao* we find a very different understanding of the meaning of fighting. The fight here is an exercise and test of skills, with full responsibility for co-practicing (Jahnke, 1992). So it is a form of positive cooperation. In the dojo ('place of learning path') we learn together and improve. Only in the defence of life have we the right to defend ourselves, but in the most humane way (which is accented in Sieber's school) (cf. Burrow, 2014).

Ontology of Ido

Generally speaking, the term '*ido*' is ambiguous. 1) Kopaliński *Dictionary* gives the following explanation: "ido – an artificial international language (reformed Esperanto), developed in 1908 in France by de Beaufront and Couturat. In another sense – 'descendent' of gr. -idēs 'patronymic suffix'; cf. eupatridae" (Kopaliński, 1983, p. 181).

2) In the international movement of martial arts (World Jiu-Jitsu/Judo-Do Center (WJJC) and Idokan International) '*Ido*' was originally an acronym for *Judo-Do*, analogous to 'J' – for *judo* and 'JJ' for *jiujitsu* (the early spelling of these terms adopted in Germany). '*Judo-Do*' and '*Ido*', however, are not synonyms, because *ido* has several meanings. *Judo-do* is a form of *judo*, rejecting sport competition and accenting the path of personal development. The author of the "enlarged way" of flexibility was Julius Fleck (1894–1957). He developed the technique of Japanese *judo* throws with numerous counter-techniques performed attacking and enriched with new technical elements (Sieber, Blumentritt, 1992). The concept of '*Judo-do*' is included in specialized lexicons (*cf.* Velte, 1976, p. 68; Lind, 1996, p. 382).

3) Wally Strauss introduced the understanding of the concept '*Ido*' as the principle of unstopped, perpetual movement. This movement is due to the continuity of action and reaction, a combination of techniques and counter-techniques of undisturbed harmony in movement and energy flow. This understanding is related for example in translating '*ido kihon*' – as defined in karate practicing basic techniques in motion, or *ido* – in the sense of "action in motion" (Piech, 1995, p. 22). This understanding is a reference to the meaning of *Ido* "movement; change; confusion" (Smith, 2000, p. 82) and "displacement; difference" (Lawrjentiew, 1984, p. 174), and "mobility" – *idōryoku* (Fig. 1a, b; Lawrjentiew, 1984, p. 175).

4) Modern Idokan leaders, in particular the director of Academy Idokan Europe in Vienna, Hans Schöllauf, added the rules of chivalric ethos (European and Japanese) and humanism, fraternity and friendship, cooperation and harmony. *Ido* is therefore

an idea, or even a philosophy of non-contended *Budo* – a way of peace of the modern "Fujiyama knight" – the noble warrior.

5) *Ido* has become a measure of mastery (not only technical) in *Budo* and versatility – a higher grade than the mastery *dan* grades. To obtain a master's degree in *Ido* one needs to have already a black belt in *judo* and *jujutsu* or in another martial art technique implemented in the harmony of movement, and to have an impeccable moral stance.

6) *Ido* – in the sense of "medicine, treatment" (Fig. 1c; Nowak, 2000, p. 308) – is used in the tradition of Japanese *Budo* e.g. in Takeda-ryu school. The term '*bujutsu ido*' means medicine in martial arts, and is taught in the program of this school (Maroteaux, 1993). This kind of medical practice was also defined as '*te-ate*' (mysticism and naturopathy) – e.g. in the tradition of the school Tenshinshōden Katorishintō-ryu (15th century).²

7) Among other interpretations we can specify the use of this term in conjunction with the pathway martial arts – as in the name of the Romanian specialist magazine³.

8) Werner Lind explains yet another aspect of the concept: "Ido (Jap.) Concept from *judo* – a movement action, consisting of 8 techniques (from the *Kime-no Kata*) for defense, which are executed consecutively" (Lind, 1996, p. 328). Also, it is the name of the fragment of the *Kime-no kata* form of *judo*. Werner Lind's more recent *Lexicon* mentions only the password: '*Ido*' – one of the 8 techniques *Kime-no kata*; 'Idokan' – as Idokan Europe (1990s) (Lind, 1999, p. 231).

For further theoretical considerations it will be particularly useful to understand the term *ido* in meanings 2–6. Of course, other ideograms of Chinese origin are written by: *ido* – as medicine and *ido* – as a movement. The derivative concept $Id\bar{o}kan$ is the name of the style, school and organization. Literally '*kan*' means 'building, a house' or 'school, academy'.

In summary, from the perspective of practical studies and research carried out in the IPA, it is most important to understand the following two concepts of *Ido*:

1) As adopted in the tradition of Australian-European (*judo-do ido*), or as 'extended path' (of martial arts) and 'perpetual movement';

2) In the tradition of old-Japanese martial arts (*bujutsu ido*) – as a 'medicine of martial arts'.

Axiology

Ethics

The ethics of *Ido*, like the ethics of *Budo* – the way of martial arts – is based on the ethos of *Bushido*. In general, the philosophy of martial arts is based on warriors' codes of different cultures. Nobility, honour, dependability, contempt for the accumulation

² Nota bene this understanding Ido presented W. J. Cynarski in Munich and Penzberg seminar DDBV & Idokan Europe – Germany (Europe Idokan e.V.) in June 1997. Earlier, European Idokan explained this concept in the senses 2, 3, 4 and 5. On the other hand, the Academy Idokan Europe and association DDBV (its leader L. Sieber was also the first representative of the federation Idokan Europe International for Germany) led earlier, next to the training of trainers, teaching sports medicine: Schöllauf under the auspices of the Austrian Red Cross, and Sieber as a specialist in alternative medicine (Ger. Heilpraktik) (Cynarski & Sieber, 2015).

³ Budo. Arte Martiale (serie noua). Budo – Kung Fu Magazin. I-Do (1994, no. 1).

of material goods for the benefit of the higher values, ethics, fidelity, truth, the pursuit of wisdom, courage in the struggle against evil, and similar universal values co-create the philosophy of martial arts – a product of patriarchal elite and military cultures of Asia and Europe. However, from long-term follow-up studies by psycho-sociological authors, participant observation, interviews, conversations, correspondence, content analysis of literature and other forms of discourse we know that only a certain part of the environment of martial arts involves the practice of the way of moral improvement. Contact combat sport, the learning of brutal self-defence, bringing martial arts to technology and the fight itself is a distortion of the meaning of *Budo*. A utilitarian approach to fighting techniques gives doubtful improvement in terms of socio-moral or spiritual values, and is more likely to develop aggressiveness (more or less controlled).

Few teachers of 'modern' trends in martial arts can understand the essence of the 'gentle way' of martial arts and the sense of non-aggression and, unfortunately, few are masters of martial arts in the sense of having achieved the required ethical and spiritual level (cf. Cynarski, 2016). *Ido* philosophy involves respect for tradition, rules and authorities, and in practice has been carried out since 1987 in Rzeszów Centre 'Dojo Budokan', the central centre of IPA.

Other Values

The new *ido* style contains old ideas and rules, which are exemplified in *jujutsu*, *karate* and *kobudo* techniques. Sieber and Cynarski combine *ido* with the principles of the performed techniques (*aiki*, *ju-no ri*, *wa-no ri*, *renzoku waza*⁴), and the moral philosophy, and medicine of martial arts (*bujutsu ido*, Fig. 1c – see above) (Sieber & Cynarski, 2013, p. 61). As a teaching programme and educational system *judo-do* has undergone *transformation* from modified *judo* to the Idokan *Budo* system, as it is taught today in the Idokan Poland Association (IPA). In this sense, its utilitarian value (fighting skills) is emphasized, which gives a sense of security.

Ido, actually *bujutsu ido*, is also known as the medicine of martial arts (Cynarski, 2012, pp. 48–65). *Ido*, meaning martial arts medicine, has been incorporated into the Idokan tradition recently. Wally Strauss taught the techniques named *kuatsu* to restore consciousness (traditional revival techniques). However, martial arts medicine (Japanese *bujutsu ido*) was not known at that time. It was developed only in the lineage Sieber-Cynarski. It is now a component of the system (Sieber & Cynarski, 2013; Cynarski & Sieber, 2015). Here is emphasized the value of human life and health, and measures towards its protection.

The philosophy of *Ido* refers to the ethos of noble sport and the chivalrous traditions of Europe. It refers to the whole, humanistically understood *Budo*. *Budo* is no longer directed against anyone, but it is a way of creating personality by the attitude of internalised morality, friendship, the idea of brotherhood and solidarity. The *dojo* practice uses exercises of fluent movement in performed techniques and continuity of action or reaction. Even on Fleck's account, the accent fell mainly on the harmony and aesthetics of movement (cf. Wroblewski, 2012). Fleck introduced, however, the prin-

⁴ These are the principles of harmonizing energy, flexibility, harmony and peace, and the use of technical combinations.

ciple that you should not fight against each other, but to practice working together – acting in concordance. So the paradigm of co-operation replaces here the dominant paradigm in sport competition (rivalry). This kind of *Budo* can also be treated as a 'ho-mocreative art', which is useful to counteract 'anthropological regression'. This means that it is the art which is helpful for human auto-creation and against dehumanisation (Szmyd, 2013a, b). It is also a vehicle to transfer values between civilizations. It brings back the partially forgotten ideals of nobility and honour, brotherhood and responsibility, discipline and respect for authority. So here we find the value of education, pro-social, personalistic and conservative, with an attitude of openness and dialogue.

Currently *Ido* is, in the teaching of Hans Schöllauf, the development of spiritual strength and 'perpetual' spiritual movement. Movement is the essence of life. *Ido* combines components of movement, harmony and spirit. It strives towards a state of psychophysical harmony and rejects the selfish attitude of openness; it seeks spiritual mastery while maintaining the best possible health and fitness. It implements the demands of physical culture.

Shihan Schöllauf encouraged the study of the biographies of eminent masters of martial arts. As a holder of the highest master degrees in *judo*, *jujutsu* and *ido*, he emphasized especially softness and gentleness, flexibility in combat techniques and the rejection of unnecessary brutality. In turn, the masters Hannelore and Lothar Sieber pay attention to the inadequacy of uncritical imitation patterns from Asia. The *Ido* idea, but to some extent akin to the principle of *Aiki*, is a creation of European masters (W. Strauss also came from Austria). Thus, it can be interpreted in the perspective of the cultural heritage of Europe – its traditions of chivalry, values and Christian personalism.

The concept of *Budo* – etymologically 'the way to stop the spear' – is carried out especially in the idea of *Ido* as created the West, which is the development of the humanistic philosophy of *Budo*. *Ido* contains the ideas of peace and friendship, cooperation and moral growth, referring to the principles of chivalry and *Budo* traditions. It is a philosophy of perpetual movement, associated with issues of health and medical knowledge, as well as ethics and psychology. This is the philosophy of the daily practice of the 'pathway'.

Buddhist priest and *aikido* scholar John Stevens writes that "in a sense Ueshiba's *ai-kido* can be interpreted as the culmination and realization of *Budo*: you can practice external forms of *aikido* by yourself, with a partner or in a group, with weapons or without them, like the movements of *judo* or *karate*". In contrast, internal *aikido* can be linked with any spiritual path (Stevens, 2001, p. 140). This statement is also applicable to *Ido*, which can be combined with any martial art, self-defence, sport or also with other forms of human activity. In addition, *Aikido* is derived from the teachings of the Shinto sect Omoto-kyo. In contrast, *Ido* is not linked to any religion, but humanist ethics, springing from the European cultural trunk and referring to widely recognized (at least in the Western world) values.

Homo Creator Nobilis – as an ideal type – has a developed intuition, imagination, aesthetic sensitivity and a high ethical level. He is noble; progressing along a spiritual path of love and truth, fighting for the good of man and the world. He is an ascetic and a wise man, a warrior and a holy man. He (or she) is not a passive 'fan' of reality, but its active entity, active and creative. Trying to comprehensively develop and improve

his own personality, and creating a 'positive' (in the moral sense) cultural reality. He is entirely open to dialogue and to others.

Ido as a Philosophy of Wisdom

The *Ido* idea restores the world of noble values, remaining in relation to truth and goodness. Here we find a reference to the idea of virtue, wisdom and goodness. This is an exceptional case which conjoins Far Eastern forms of asceticism with humanistic wisdom of Europe. Wisdom is the knowledge and love for all creation (as in Fromm's "biosophia" (1992)).

The sage praises virtue, and only virtue gives happiness. Wisdom, independence and happiness (*eudaimonia*, a sense of perfection) were combined, and virtue was the only true good. According to the Stoics, an appropriate selection of things can be divided into three categories: 1) spiritual (talent, memory, mental acuity, advances in knowledge); 2) bodily (efficiency sensory organs, life); 3) external (having children, parents, human love, appreciation, good origin, moderate possessions). Wisdom and moral virtue should ensure human happiness.

Today's mature Idokan warrior or martial artist (master) is a traveller on the path of virtue. According to the model of the ancient sages of East and West, he or she makes a selection of authentic values, and follows the noble path of active, creative life, which respects the principles of honour and justice, humanity and respect for all life. Like the old Stoics, he strives for self-control and harmony with the surrounding world, rejecting mere appearances. He takes full responsibility for his actions and endeavours to comply with the above described normative ethics.

Symbolic dimension

Idokan Poland Association, the IPA (including the European Nobility Club), established the idea of the *Homo Creator Nobilis* and developed the philosophy of *Ido*. The 'Noble and Creative Man' is to be a warrior of the Truth, a knight for modern times and the person who complies with the ethos of nobility in today's commercialized world. Knightly Order *Homo Creator Nobilis* is a cross with the image of St. George, who defeats the dragon – Good defeats evil forces.

The entrance on to the right path – the Way of Truth – shows in the logo of IPA, with the *torii* gate and a circle of infinity. The martial arts are a vehicle, to help in the way of personal improvement, similar to other possible precious paths – of scholar, priest, poet. On the other hand, the Humanistic Theory of Martial Arts indicates the existence of an 'Anti-Way' (an extremely selfish attitude and the cult of force), which is the opposite of the ideal Way.

CONCLUSION

The *Ido* philosophy, as an anthropology of martial arts and today's warrior pathway, avoids the pitfalls of the counterculture and New Age, fashionable ideologies, myths (the wisdom of the East, the Asian master, etc.), and pop-cultural mash. Indeed, it draws from the wisdom of the East and the West, but not uncritically. Normative ethics realizes the ideals presented above as *Homo Creator Nobilis*. This indicates that

value requires great effort, self-discipline and perseverance. It emphasizes especially the higher values, the timeless.

REFERENCES

Biuletyn Sōbudō (2004). Special issue, no. 1-2 (13-14). Rzeszów: IPA. (in Polish)

Bolelli, D. (2008). On the Warrior's Path. Philosophy, Fighting, and Martial Arts Mythology (2nd edition). Berkeley, CA: Blue Snake Books.

- Budo. Arte Martiale (serie noua). Budo Kung Fu Magazin. I-Do (1994), no. 1. (in Romanian)
- Burrow, S. (2014). Martial arts and moral life. In: G. Priest & D. Young (Eds.), *Philosophy and the Martial Arts* (pp. 50–67). London, New York: Routledge.
- Cynarski, W. J. (2009). Martial Arts Idō & Idōkan. Rzeszów: IPA.
- Cynarski, W. J. (2012). Antropologia sztuk walki. Studia i szkice z socjologii i filozofii sztuk walki. Rzeszów: University Press.
- Cynarski, W. J. (2013). General reflections about the philosophy of martial arts. *Ido Movement for Culture. Journal of Martial Arts Anthropology*, *13*(3), 1–6.
- Cynarski, W. J. (2016). A Christian and the martial arts path. *Ido Movement for Culture*. *Journal of Martial Arts Anthropology*, *16*(2), 1–7.
- Cynarski, W. J., & Sieber, L. (2015). Martial arts (alternative) medicine channel of transmission to Europe. *Ido Movement for Culture. Journal of Martial Arts Anthropology*, *15*(3), 8–21.
- Cynarski, W. J., & Skowron, J. (2014). An analysis of the conceptual language used for the general theory of martial arts Japanese, Polish and English terminology. *Ido Movement for Culture. Journal of Martial Arts Anthropology*, *14*(3), 49–66.
- Fromm, E. (1992). The Anatomy of Human Destructiveness. New York: Henry Holt.
- Hackney, C. H. (2010). La filosofia aristotelica de las artes marciales. *Revista de Artes Marciales Asiaticas*, 5(1), 7–18.
- Jahnke, P. K. (1992). *Zen-Do-Karate "Tai-Te-Tao"*. Nationale Stadtsbibliothek, Munich. (in German)
- Kim, D., & Bäck, A. (2000). The way to go: Philosophy in martial arts practice. Seoul: Nanam.
- Kopaliński, W. (1983). *Słownik wyrazów obcych i zwrotów obcojęzycznych*. Warsaw: Wiedza Powszechna.
- Krippendorf, J. (2004). *Content Analysis: An Introduction to Its Methodology*. Thousand Oaks, CA: Sage Publications.
- Kuczyński, J. (1979). *Homo Creator. Wstęp do dialektyki człowieka*. Warsaw: Książka i Wiedza.
- Kuczyński, J. (1998). *Wstęp do uniwersalizmu. t. I. Ogrodnicy świata* [Biblioteka Dialogu]. Warsaw.
- Lao Tzu (2001). *The Way (Tao te king)* (trans. by M. Fostowicz-Zahorski). Wrocław: "Arhat". (in Polish)
- Lawrjentiew, B. P. (Ed.) (1984). Japanese-Russian Dictionary. Moscow: Russkij Jazyk.
- Lee, B. (1975). Tao of Jeet Kune Do. Santa Clarita, CA: Ohara Publications.
- Lind, W. (1996). Ostasiatische Kampfkünste. Das Lexikon. Berlin: Sportverlag.
- Lind, W. (1999). Lexikon der Kampfkünste. Berlin: Sportverlag.
- Lloyd, H. M. (2014). The martial arts as philosophical practice. In: G. Priest & D. Young (Eds.), *Philosophy and the Martial Arts* (pp. 68–89). London, New York: Routledge.
- Maroteaux, R. J. (1993). Les 10 arts du Nihon Sobudo Rengo-Kai. *Aiki Goshindo Kai-Shi*, no. 12. (in French)
- Martínková, I., & Parry J. (2016a). The paradox of martial arts safe combat. *Ido Movement for Culture. Journal of Martial Arts Anthropology*, *16*(4), 4–10.

- Martínková, I., & Parry, J. (2016b). Martial Categories: Clarification and Classification. *Journal of Philosophy of Sport*, *43*(1), 143–162.
- Massanori, R. L. (2001). The Way to Go: Philosophy in Martial Arts Practice (by Daeshik Kim and Allan Bäck). *Journal of the Philosophy of Sport*, 28(2), 245–251.
- Nakiri, F. (2015). Concept of budo and the history and activities of the Japanese Academy of Budo. *Ido Movement for Culture. Journal of Martial Arts Anthropology*, *15*(1), 11–25.
- Nowak, B. (2000). Słownik znaków japońskich (3rd edition). Warsaw: WP.
- Oyama, M. (1979). *The Kyokushin Way. Mas. Oyama's Karate Philosophy*. Tokyo: Japan Publications Inc.
- Piech, K. (1995). *Podręczny słownik terminów stosowanych w karate i pokrewnych sztukach walki*. Choszczno: Akademia Budo Kobudokan.
- Piwowarski, J. (2011). Bezpieczeństwo i samodoskonalenie jako elementy świętej Drogi Wojownika. Zeszyt Naukowy "Apeiron" (pp. 231–245). Krakow: Wyższa Szkoła Bezpieczeństwa Publicznego i Indywidualnego, no. 6.
- Priest, G. (2014). The martial arts and Buddhist philosophy. In: G. Priest & D. Young (Eds.), *Philosophy and the Martial Arts* (pp. 192–201). London, New York: Routledge.
- Priest, G., & Young, D. (Eds.) (2014). *Philosophy and the Martial Arts*. London, New York: Routledge.
- Sasaki, T. (2009). Budo (the martial arts) as Japanese culture: the outlook on the techniques and the outlook on the human being. In: W. J. Cynarski (Ed.), *Martial Arts and Combat Sports – Humanistic Outlook* (pp. 12–19). Rzeszów: University Press.
- Shahar, M. (2008). *The Shaolin Monastery. History, Religion, and the Chinese Martial Arts.* Honolulu: University of Hawai'i Press.
- Shishida, F., & Flynn, S. M. (2013). How does the philosophy of martial arts manifest itself? Insights from Japanese martial arts. *Ido Movement for Culture. Journal of martial Arts Anthropology*, 13(3), 29–36.
- Sieber, L. (1992-2015). Meijin, 10 dan, Honour President of IPA. Consultations.
- Sieber, L., & Blumentritt, B. (1992). Judo-Do/Ido. Budo-Info, no. 2. (in German)
- Sieber, L., & Cynarski, W. J. (2013). A new stage in the history of the Idokan organization. Ido Movement for Culture. Journal of Martial Arts Anthropology, 13(3), 59–71.
- Sieber, L., Cynarski, W. J., & Kunysz, M. (2008). Chinese elements in the Idōkan system. *Ido Ruch dla Kultury/Movement for Culture*, *8*, 22–28.
- Skinner, J., Edwards, A., & Corbett, B. (2015). *Research methods for sport management*. London, New York: Routledge.
- Stevens, J. (2001). *Trzej mistrzowie budo: Funakoshi, Kano, Ueshiba*. Bydgoszcz: Diamond Books.
- Szmyd, J. (2013a). Homocreative arts and anthropological regression. *Ido Movement for Culture. Journal of Martial Arts Anthropology*, *13*(1), 58–63.
- Szmyd, J. (2013b). The flow of higher values in a globalised world. Notes based on the example of the homocreative arts. *Ido Movement for Culture. Journal of Martial Arts Anthropology*, *13*(3), 7–14.
- Velte, H. (1976). *Budo-Lexikon. 1500 Fachausdrücke fernöstlicher Kampfsportarten*. Berlin: Falken Bücherei.
- Velte, H., & Matschke, K. D. (2007). *Lexikon der asiatischen Budo-Kampfsport Philosophie*. Vierkirchen: Schramm Sport GmbH.
- Wróblewski, G. W. (2012). Walka jako forma sztuki. O estetyce dalekowschodnich sztuk walki. *Akcent*, *3*, 73–82.
- Yagyū Munenori (2002). Heihō kadensho. Księga przekazów rodzinnych o sztuce wojny uzupełniona listami Takuana Sōhō do Munenoriego Yagyū [The Book of National Messages

about the Arts of War supplemented with the letters of Takuan Söhö to Munenori Yagyū] (transl. by W. Nowakowski). Bydgoszcz: Diamond Books.

- Young, D. (2014). Bowing to your enemies: courtesy, budo and Japan. In: G. Priest & D. Young (Eds.), *Philosophy and the Martial Arts* (pp. 202–226). London, New York: Routledge.
- Żuk, A. (1996). Chińska, klasyczna filozofia wojny. In: A. Żuk (Ed.), *Konflikt i walka* (pp. 141–148). Lublin: UMCS.

The influence of explosive power on the performance of an elite swimmer in 25 and 50 metre pools

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ABSTRACT

Each swimming stroke, and each distance, requires a different approach to strength training. For sprinters in swimming the most essential part is explosive power. The goal of this case study was to find out how explosive training can influence the performance in both long course and short course meters swimming pools. This study was conducted with the cooperation of an elite swimmer over a time period of 6 years. Tests were performed twice a year (June and November) during the years of 2010–2016. The Myotest device was used to measure countermovement jump height. Swimming performance was evaluated by FINA points in the swimmer's three main disciplines. ANOVA, Cohen's d and regression equation were used for statistical analysis. The results showed that explosive power does not influence performance in the 50m swimming pool (p = 0.25; $r^2 = 0.08$). However the performance in the 25m pool is directly linked to the level of explosive power of the lower limbs (p < 0.001; $r^2 = 0.85$). The results of the swimmer in the 25m pool are closely related to the level of explosive power of the lower limbs. Performance in the 50m pool might not be affected by level of lower limb power.

KEYWORDS

swimming; lower limb; countermovement jump; longitudinal study

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INTRODUCTION

In no other sport than swimming do national and world records change so fast. Swim coaches in the Czech Republic tend to have a negative outlook towards additional exercise methods such as weights, rehabilitation, sports psychology and nutrition. Czech swimmers are trying to approach their European and world rivals via social or other communication methods, or tend to set up training camps with them. Based on this experience, swimmers are of the opinion that the reason why they are behind the world and European elite swimmers is because they lack diversity in training, and require more quality dryland training (Cronin & Sleivert, 2005).

Every Olympic sport has a 4-year cycle that athletes focus on, and swimming is no different. Olympic preparation is a long-term plan that has many partial periods. These partial periods are year cycles, that are divided into 6 periods – preparation period 1 (September–October), competition period 1 (November–December), transition period (January), preparation period 2 (February–May), competition period 2 (June–August). Competition periods lead to the highlight – the main competition of the season (World Championships, European Championships, or Olympic Games). After finishing one of the competition periods, a transition period of 7–14 days follows. After the summer competition period is finished, a longer transition period follows (usually between 7–28 days) depending on the swimmer (Dovalil et al., 2002; Perič & Dovalil, 2010). Swimmers have a very special preparation, which does not involve many days off.

Competitions in the summer season are usually held at 50m swimming pools. Winter season events, on the other hand, are held at 25m swimming pools. It is important that, in the 25m events, the swimmer manages well the technical parameters of the race, such as starts and underwater pull outs and turns, because they are doubled in number against the 50m pool (Bernacíková, Kapounková, & Novotný, 2011; Maglischo, 2003; Miler & Čechovská, 2008). The Czech Republic has more 25m pools than 50m ones, of which there are only 11 in the Czech Republic.

Regarding the demonstration of power capabilities, swimming puts great demand on explosive power, but also on speed strength. Each of these power components is differently stimulated in training. Cronin, McNair and Marshall (2010), Fleck and Kraemer (2014), Lehnert, Novosad and Neuls (2010), Prukner and Machová (2012), Smilios et al. (2013) and Verkhoshansky and Stiff (2007) argue that strength training with maximum resistance is a very important base for building explosive power. Both power components support the speed that plays an important role in the swimmer's preparation period. However, there is a lack of studies with top swimmers that focus directly on the relationship of explosive power indicators and swimming performance. Strength training is very important for sprinters (Cronin, McNair, & Marshall, 2010; Siff, 2003; Zatsiorsky & Kraemer, 2006, 2014). Sprinters need strong lower limbs not only for powerful kicking, but also for explosive starts and fast turns, where they can gain helpful tenths or hundredths of seconds. The power of upper limbs must be dynamically used during the entire race (Argus et al., 2010; Benjanuvatra, Edmuns, & Blanskby, 2007; Beretic et al., 2013; Cronin, Jones, & Frost, 2007; Durovic, Beretic, & Okicic, 2015; Haufler, 2007; Haycraft & Robertson, 2015). General strength - explosive power is being developed during dryland training as well as in the water by specific explosive power. Specific power has other manifestations, however without a general foundation it is particularly difficult to improve on. It has been proved that while swimming backstroke the propulsive power comes from the kick more from then any other strokes and backstroke kicking holds the body position up (Gatta, Cortesi, & Di Michele, 2012; Maglischo, 2003; Miler & Čechovská, 2008).

Cronin, McNair and Marshall (2010), Fleck and Kraemer (1987, 2014), Siff (2003), Šťastný and Petr (2012), Verkhoshansky and Verkhoshansky (2011) and Zatsiorsky and Kraemer (2006) argue that explosive quality and speed cannot be developed without having a sufficient base of maximum power. All the tests were made during practices, in which explosive power was the most stimulated, especially during June and November, but always a maximum of 6 weeks prior to main competition (Dovalil et al., 2002; Perič & Dovalil, 2010). This claim corresponds very well with the scientific literature (Baechle, Earle, &Wathan, 2008; Boyle, 2003; Dovalil et al., 2002; Lehnert, Novosad, & Neuls, 2001; Siff, 2003) and with scientific studies focusing on research of explosive power during the year's training swimming cycle (Cronin, Jones, & Frost, 2007; Dinu et al., 2011; Jebavý, Hojka, & Vojta, 2014; Newton, 2002; Schmidtbleicher, 2004; Smilios et al., 2013; Tillin et al., 2010; Vanderka, 2013; Van Oteghen, 1975).

This research is unique in that it assesses the long-term development of explosive power in the same period, always 2–3 weeks before the main competition of the winter season at a 25m pool and 4–6 weeks before the main competition of the summer season at a 50m pool, which has not been the subject of any previous research studies.

AIM OF THE STUDY

The aim of this case study was to discover the influence of the level of explosive lower limb power on the performance of an elite swimmer in 25m and 50m pools. According to our supposition the length of a pool influences the level of swimming performance compared according to FINA tables.

METHODS

The tested swimmer is a member of the Vysokoškolské sportovní centrum (VSC MŠMT) and has been a member of the Czech swimming national team since 2005. Since 2010 she has won 11 European medals, a bronze medal at the World Championships, and is a Czech national record holder in nine events. The swimmer focused on 50, 100 and 200 metre distances, so she is categorized as a sprinter (Neuls et al., 2014). The greatest emphasis in her dryland preparation is put on the second cycle period of maximum strength training, i.e. October–November, and then in March–April (Český svaz plaveckých sportů, 2012; Jebavý et al., 2016).

The swimmer underwent the tests twice during the annual training cycle:

- 1) November 2–3 weeks before the main competition of the winter season at a 25m pool European championships and World championships.
- June 4–6 weeks before the main competition of the summer season at a 50m pool European championships, World championships, Olympic Games and World University Games.



Figure 1 Countermovement jump with fixed arms placed on the hips and Myotest device at the waist

Before each test the swimmer performed the same warm-up, with 5 jumps at the end. The warm-up period was about 10 minutes including jogging, dynamic stretching and non-measured vertical jumps. After warm-up, there was a 2-minute rest, followed by execution of the 5 measured countermovement jumps (CMJ).

The swimmer's explosive power was tested using a countermovement jump with fixed arms placed on the hips (Figure 1). The swimmer performed two measured trials, which were separated by a 4-minute recovery period. Jump height was measured by a Myotest device (Myotest, Sion, Switzerland), which is based on 3D acceleration, is designed for commercial use, and is worn at the waist. The validity and reliability of the Myotest device have been recently verified (Casartelli, Muller, & Maffiuletti, 2010; Castagna, 2013; Comstock et al., 2011; Dinu et al., 2011; Gindre et al., 2016; Houel, Faury, & Seyfried, 2013; Choukou, Laffaye, & Taiar, 2013).

One-way ANOVA was used to evaluate the statistical significance of the differences between the levels of explosive power in 25m and 50m pools and also the level of performance. The Levene test was used to assess the equality of variance. The Kolmogorov-Smirnov test was used to test the normality of distribution. Cohen's d was calculated as the effect of size characteristics in order to evaluate the meaningfulness of differences. Effect sizes of >0.8, between 0.8 and 0.5, between 0.5 and 0.2, and <0.2 were considered to be large, moderate, small, and trivial, respectively (Cohen, 1988).

Regression equation (linear model) was used to present the relationship between vertical jump and swimming performance in 25m and 50m pools. The best point average of all backstroke events (50m, 100m, 200m) from the summer and winter season was calculated by using FINA point Calculator 2016 (Kaufmann, 2016). Coefficient of determination (r²) and standard error of estimate (SEE) were used to assess the appropriateness of the model. Software SPSS version 22 (IBM, Armonk, New York, USA) was used for statistical analysis execution.

ETHICAL ISSUES

As previously mentioned, since 2010, as part of the training process, my weights room coach has been measuring the height of my vertical jump before the main competition of both summer and winter seasons in order to find out if dryland training helps to achieve better swimming results. Testing was conducted for a period of 6 years, and a large amount of data has been collected, although this was done in the first instance simply as a training aid. I later decided to use the data for analysis in order to investigate the relationship between the height of the jump and swimming performance in 25m and 50m pools. As both the author and the research subject, I have given my consent to co-authors to work with the data thus obtained.

RESULTS

Comparison of performances in 25m and 50m pools and vertical jump height in winter and summer in the years 2010–2016 are presented in Table 1. For calculating The FINA point Calculator 2016 was used (Kaufmann, 2016).

	FINA points	Vertical jump [cm]
25m pool	894.0 ± 32.0	34.7 ± 0.6
50m pool	870.1 ± 25.2	35.0 ± 0.6
P-value	0.023	0.102
Cohen d	-0.75	0.54

Table 1 Level of explosive power of lower limbs restated to performance level

The regression equations of the relationship between FINA points and CMJ height with goodness of fit characteristics are displayed in Table 2.

 Table 2
 Relationship of jump height and performance, FP means FINA points (Kaufmann, 2016);
 denotes 25m pool;

 Image denotes points in 50m pool; JH means jump height [cm]
 Image denotes points in 50m pool;
 Image denotes pool;
 Image denotes pool;
 Image den

Regression equation	Slope 95% Cl	Intercept 95% CI	R	p-value	r ²	SEE
$FINA = 25.78 \times JH - 14$	8.3; 43.25	—622; 594	0.475	0.005	0.226	29.4
$FINA_{short} = 57.7 \times JH_{short} - 1106$	45.12; 70.28	—1542; 670.1	0.925	<0.001	0.855	13.5
$FINA_{long} = 12.18 \times JH_{long} + 445$	-12.03; 36.38	—403; 1292	0.288	0.25	0.083	26.8

DISCUSSION

The differences in explosive power level before the 25m pool and 50m pool seasons are not statistically significant (p = 0.10). However, the swimmer achieved significantly better results in the 25m pool (p = 0.023). As the correlation between explosive power and performance was average, the problem was divided into two separate situations. The performance of the swimmer in the 25m pool was closely related to the level of explosive power of the lower limbs. However, performance in the 50m pool was not improved by increasing the level of explosive power. Swimming was formerly the sport of the world powerhouses such as USA, Australia, China. Currently more swimmers from smaller and developing countries are able to succeed. Each swimming event requires a different approach to strength training, even in terms of percentage focusing on specific parts of the body (Fig, 2010; Morouco et al., 2011; Villarreal et al., 2013). Coaches and athletes, too, are often scared of lifting heavy weights, because of possible injury. Regarding this topic, the global competition is much further ahead. The possibility of getting injured during lifting is minimalized by compensation exercises and professional guidance in precise execution of strengthening exercise.

Although this study did not have a sample size as large as recent studies, the data showed how explosive power correlates with different performance in 25m or 50m pool. Even though, recent studies (Benjanuvatra, Edmunds, & Blanskby, 2007; Beretic et al., 2013; Cronin & Sleivert, 2005; Cronin, Jones, & Frost, 2007; Ďurovic, Beretic, & Okicic, 2015; Fig, 2010; Garrido et al., 2010; Haycraft & Robertson, 2015; Morouco, Gonzáles-Badillo, & Garrido, 2012) proved, that higher explosive power should correlate with higher performance, it was not confirmed in the case of our swimmer. The reason for such a difference in the swimmer's performance regard to the length of the pool could be her great use of explosive power of lower limbs in the specific technical skills of the race (starts, turns). In the longer-term perspective, the swimmer achieved better results in the 25m pool, according to FINA points (Kaufmann, 2016), where in the 100m, 25m swimming requires 3 turns compared to 1, and in the 200m requires 7 turns compared to 3. Therefore, the recommendation for the swimmer is to work on increasing the explosive power of the lower limbs prior to the 25m season, and then during the 50m season to focus mainly on the actual swimming workout.

It must be stated that there are more factors that might have influenced the swimmer's performance during this testing period. They may be physical, conditioning, whether everything from the training plan was executed (Baumrt, 2016), tactical (race tactics) or technical factors – e.g. the absence of underwater testing facilities, which are not available in the Czech Republic. It is difficult to increase the explosive power of the lower limbs in the water due to the equipment being unavailable (Dovalil et al., 2002; Lehnert, Novosad, & Neuls, 2001; Perič & Dovalil, 2010; Válková, 2015).

The results of this study cannot be generalized, because it is a case study. Since the tested person has been a top swimmer in the Czech Republic for the past 6 years, it might be beneficial to include testing of explosive power of the lower limbs at least to a wider selection of the Czech national swimming team. Should the test results come to the same conclusion as the investigated swimmer's results, then it would become necessary to focus on how to improve swimming practice, so that the results in the 25m pool and 50m pool would be equal. The basic problem is the number of 50m pools available for professional training. In the Czech Republic there are only eleven 50m pools, which is much less in comparison with similar sized countries, such as Hungary, where there is a total of forty 50m pools available for training (Magyar Úszó Szövetség, 2016). Since the most important swimming competitions, such as the Olympic Games, are always held in 50m pools, it would be appropriate to create the best possible conditions for swimming practice, so that Czech competitors would not be behind the world's most powerful swimming countries. Unfortunately, the 25m pools that are available in the Czech Republic cannot guarantee professional levels of preparation.

Therefore, the national teams should participate in more training camps where they can use a long course pool or try to swim more metres per training session.

CONCLUSION

The performance of the swimmer in the 25m pool is closely related to the level of explosive power of the lower limbs. However, performance in the 50m pool was not improved by increasing the level of explosive power. This suggests that, during the summer season, the swimmer should focus more on the actual swimming workout and not specifically train the aspects of explosive power such as start and turns.

Based on these basic results of this study it could be beneficial to include testing of explosive power of lower limbs at least to the wider selection of the national swimming team of the Czech Republic.

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REFERENCES

- Argus, C., Gill, N. D., Keogh, J. W., & Hopkins, W. G. (2010). Acute Effects of Verbal Feedback on Explosive Upper-Body Performance in Elite Athletes. *International* Symposium on Biomechanics in Sports: Conference Proceedings Archive, 28, 1–4.
- Baumrt, T. (2016). Intranet [The database to imput the training data]. Retrieved from: http://intranet.vsc-plavani.cz.
- Baechle, T. R., Earle, R. W., & Wathan, D. (2008). *Essentials of Strength Training and Conditioning* (3rd edition). Champaign, IL: Human Kinetics.
- Benjanuvatra, N., Edmunds, K., & Blanskby, B. (2007). Jumping Ability and Swimming Grab-Start Performance in Elite and Recreational Swimmers. *International Journal of Aquatic Research and Education*, 1(3), 231–241.
- Beretic, I., Durovic, M., Okicic, T., & Dopsaj, M. (2013). Relations between Lower Body Isometric Muscle Force Characteristics and Start Performance in Elite Male Sprint Swimmers. *Journal of Sports Science and Medicine*, 12.
- Bernacíková, M., Kapounková, K., Novotný, J. (2011). *Fyziologie sportovního tréninku* [Physiology of sports discipline]. Retrieved from: http://is.muni.cz/do/rect/el/estud/fsps /ps10/fyziol/web/sport/plavani.html.
- Boyle, M. (2003). Functional Training for Sport. Champaign, IL: Human Kinetics.
- Casartelli, N., Muller, R., & Maffiuletti, N. A. (2010). Validity and reliability of the Myotest accelerometric system for the assessment of vertical jump height. *Journal of Strength and Conditioning Research*, 24(11), 3186–3193.
- Castagna, C. (2013). Concurrent Validity of Vertical Jump Performance Assessment Systems. *Journal of Strength*, 27(3), 761–768.
- Choukou, M., Laffaye, G., & Taiar, R. (2011). Reliability and validity of an accelerometric system for assessing vertical jumping performance. *Bioliogy and Sport*, 31(1), 55–62.
- Cohen, J. (1988). Statistical Power Analysis for the Behavioral Sciences. L. Erlbaum Associates.
- Comstock, B. A., Solomon-Hill, G., Flanagan, S. D., Earp, J. E., Luk, H. Y., Dobbins, K. A., Dunn-Lewis, C., Fragala, M. S., Ho, J. Y., Hatfield, D. L., Vingren, J. L., Denegar, C. R.,

Volek, J. S., Kupchak, B. R., Maresh, C. M., & Kraemer, W. J. (2011). Validity of the Myotest in measuring force and power production in the squat and bench press. *Journal of Strength and Conditioning Research*, 28(8), 2293–2297.

- Cronin, J., Jones, J., & Frost, D. (2007). The Relationship between Dryland Power Measures and Tumble Turn Velocity in Elite Swimmers. *Journal Swimming Research*, 17(1), 17–23.
- Cronin, J. B., McNair, P. J., & Marshall, R. N. (2010). The role of maximum strength and load on initial power production. *Medicine and Science in Sport and Exercise*, 32(10), 1763–1769.
- Cronin, J., & Sleivert, G. (2005). Challenges in Understanding the Influence of Maximal Power Training on Improving Athletic Performance. *Sports Medicine*, *35*(3), 213–234.
- Český svaz plaveckých sportů (2012). *Plavecká příprava Simony Baumrtové* [Swimming preparation of Simona Baumrtová]. Prague: Czech Swimming Federation.
- Dinu, D., Houel, N., Faury, A., & Seyfried, D. (2011). Accurancy and reliability of the Myotest Pro System to Evaluate a Squat Jump. *Procedia Engeneering*, *13*, 434–438.
- Dovalil, J., Choutka, M., Svoboda, B., Hošek, V., Perič, T., Potměšil, J., Vránová, J., & Bunc, V. (2002). *Výkon a trénink ve sportu* [Performance and training in sport]. Prague: Olympia.
- Ďurovic, M., Beretic, I., & Okicic, T. (2015). The Relations between Power and Force Variables Realized during the Squat Jump with Start Performance in National Level Male Sprint Swimmers. *Physical Education and Sport*, 13(1), 89–96.
- Fig, G. (2010). Why competitive Swimmers Need Explosive Power. *Strength and Conditioning Journal*, 32(4), 84–86.
- Fleck, S. J., & Kraemer, W. J. (1987). *Designing Resistance Training Programs*. Champaign, IL: Human Kinetics.
- Fleck, S. J., & Kraemer, W. J. (2014). *Designing resistance training programs* (4th edition). Champaign, IL: Human Kinetics.
- Garrido, N., Marinho, D. A., Barbosa, T. M., Costa, A. M., Silva, A. J., Peréz-Turpin, J. S., & Margues, M. C. (2010). Relationships between Dryland Strength, Power Variables and Short Sprint Performance in Young Competitive Swimmers. *Journal of Human Sport and Exercise*, 5(2), 240–249.
- Gatta, G., Cortesi, M., & Di Michele, R. (2012). Power production of the lower limbs in flutter-kick swimming. *Sports Biomechanics*, *11*(4), 480–491.
- Gindre, C., Lussiana, T., Hebert-Losier, K., & Morin, J. B. (2016). Reliability and validity of the Myotest^{*} for measuring running stride kinematics. *Journal of Sports Science*, 34(7), 664–670.
- Haufler, S. (2007). Coaching the Details: Turns, Underwaters, Breakouts, and Finishes. *World Clinic Series*, 39, 181–189.
- Haycraft, J., & Robertson, S. (2015). The Effects of Concurent Aerobic Training and Maximal Strength, Power and Swim-Specific Dryland Training Methods on Swim Performance. A review. *Journal of Australian Strength and Conditioning*, 23(2), 91–99.
- Houel, N., Faury, A., & Seyfried, D. (2013). Influence of the point of attachment of two accelerometres on the assessment of squat jump performances. *International Journal of Computer Science in Sport*, *12*(1), 1–17.
- Jebavý, R., Hojka, V., Crossan, W., & Baumrtová, S. (2016). A Comparison of lower extremity explosive power among elite swimmers throughout the yearly training cycle. *Česká kinantropologie*, *20*(3), 89–97.
- Jebavý, R., Hojka, V., & Vojta, Z. (2014). Úroveň explozivní síly u extraligových hráčů ledního hokeje [The level of explosive strength in Extraliga ice hockey players]. In: M. Pupiš et al., *Kondičný tréning v roku 2014*, recenzovaný zborník z medzinárodnej vedeckej konferencie (pp. 49–55). Banská Bystrica.
- Kaufmann, C. (2016). Fina Point Scoring. Switzerland: Splash Software Ltd.
- Lehnert, M., Novosad, J., & Neuls, F. (2001). *Základy sportovního tréninku 1* [Fundamentals of sports training 1]. Hanex: Olomouc.

- Lehnert, M., Novosad, J., Neuls, F., Langer, F., & Botek, M. (2010). *Trénink kondice ve sportu* [Condition training in sport]. Olomouc: Palacky University.
- Maglischo, E. W. (2003). Swimming fastest. Alabama: Human Kinetics.
- Magyar Úszó Szövetség (2016). *Építése hosszú medencék* [Construction of long pools]. Hungary: Budapest.
- Miler, T., & Čechovská, I. (2008). Plavání [Swimming]. Prague: Grada Publishing.
- Mohadjer, S., Dittmar, A., Mazet, J., Machet-Pietropaoli, H., & Dejour, H. (1990). MYOTEST: an isokinetic and isometric testing device. *Medical and Biological Engineering and Computing*, 28(3), 264–268.
- Morouco, P., Gonzáles-Badillo, J. J., & Garrido, N. (2012). Effects of Dryland Strength Training on Swimming Performance: A Brief Review. *Journal of Human Sport and Exercise*, 7(2), 553–559.
- Morouco, P., Neiva, H., Gonzáles-Badillo, J. J., Garrido, N., Marinho, D. A., & Marques, M. C. (2011). Associations Between Dry Land Strength and Power Measurements with Swimming Performance in Elite Athletes: A pilot study. *Journal of Human Kinetics, Special Issue*, 29, 105–112.
- Neuls, F., Svozil, Z., Viktorjeník, D., & Dub, J. (2014). *Plavání* [Swimming]. Olomouc: Palacky University.
- Newton, H. (2002). Explosive lifting for sports. Champaign, IL: Human Kinetics.
- Perič, T., & Dovalil, J. (2010). Sportovní trénink [Sport training]. Prague: Grada Publishing.
- Prukner, V., & Machová, I. (2012) *Didaktika atletiky* [Didactics of athletics]. Olomouc: Palacky University.
- Schimdtbleicher, D. (2004). Jumping exercises for explosive strength development in athletes. *4th International Conference on Strength Training*. Serres, Greece.
- Siff, M. C. (2003). Supertraining. Supertraining Institute Denver, USA.
- Smilios, I., Sotiropoulos, K., Christou, M., Douda, H., Spaias, A., & Tokmakidis, S. (2013). Maximum power training load determination and its effects on load-power relationship, maximum strength, and vertical jump performance. *Journal of Strength and Conditioning Research*, 27(5), 1223–1233.
- Šťastný, P., & Petr, M. (2012). *Funkční silový trénink* [Functional strength training]. Prague: Charles University.
- Tillin, N. A., Jimenez-Reyes, P., Pain, M. T., & Folland, J. P. (2010). Neuromuscular performance of explosive power athletes versus untrained individuals. *Medicine and Scienece in Sport and Exercise*, 42(4), 781–790.
- Válková, H. (2015). Sports training within Special Olympics fitness innovation program. In: *The 10th International Conference in Kinanthropology*. Brno: FSpS MU.
- Vanderka, M. (2013). *Silový tréning pre výkon* [Strength training for performance]. Bratislava: Slovenská vedecká spoločnosť pre telesnú výchovu a šport.
- Van Oteghen, S. L. (1975). Two Speeds of Isokinetic Exercise as Related to the Vertical Jump Performance of Women. *Research Quarterly*, *46*(1), 78–84.
- Verkhoshansky, J., & Stiff, M. (2007). Supertraining Special Strength Training for Sporting Excellence. Moscow: Verkhoshansky SSTM.
- Verkhoshansky, V. Y., & Verkhoshansky, N. (2011). Special Strength Training: Manual for Coaches. Moscow: Verkhoshansky SSTM.
- Villarreal, E. S., et al. (2013). Enhancing Sprint and Strength Performance: Combined versus Maximal Power, Traditional Heavy-Resistance and Plyometric Training. *Journal of Science* and Medicine in Sport, 16, 146–150.
- Zatsiorsky, V. M., & Kraemer, W. J. (2006). *Journal of Science and practice of strength training*. Champaign, IL: Human Kinetics.
- Zatsiorsky, V. M., & Kraemer, W. J. (2014). *Silový trénink, praxe a věda* [Strength training, practice and science]. Prague: Mladá fronta.

Monitoring of total body water to examine the progress of acclimatization of runners at varying altitudes

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ABSTRACT

The purpose of our pilot study was to find out if total body water (TBW) changes could objectively modify the course of adaptation during training for elite runners at different altitudes. The aim of this pilot study is to summarize the indication of the progress of acclimatization at high altitudes (1000-2700 meters above sea level) during alpine conditioning. In three training camps at various altitudes the TBW of elite runners (F = 3, M = 1; n = 4; age 23 ± 0.9) was monitored, in order to check the progress of acclimatization. We used BIA measurement methods (Bodystat 1500) at different high altitude running camps at the Czech Republic, Morocco and Ethiopia. Changes in TBW were used to check the progress of acclimatization. We discovered that the retention peaks of TBW corresponded with critical days ($p \le 0.04$; Cohen's d). The highest measured increases of TBW at an altitude of 1000 m were for runner 1, 1.7 litres and for runner 2, 2.1 litres with retention peaks for both occurring on the 5th day. At an altitude of 1770 m runner 1 reached an increase of TBW of 6.3 litres, with a retention peak on the 11th day, and runner 3 had an increase of 5.1 litres with a peak on the 8th day. In the acclimatization phase we found two critical periods, from the 4th-6th day, and after the 10th-12th day. For runner 4 in altitude 2700m who completed the camp at a higher altitude, the situation is more complicated because there were fluctuations of the content of TBW in the range of 1.25 litres, with the highest depression on the 5th and then again an unsettled rise and reaching a maximum on the 12th, when she nearly returned to the initial value. Detected retention peaks reflected different levels of altitude (5th-12th days). We can conclude that the measuring of changes in TBW during camps at higher altitudes may be one of the biomarkers during acclimatization to altitude.

KEYWORDS

acclimatization; high altitude; total body water (TBW); bioelectrical impedance (BIA); retention peak; elite runners

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INTRODUCTION

Preparation in a high altitude environment is an intensive option of endurance training (Neumann et al., 2000). The positive effect of altitude training is attributed to the changed physical conditions of the atmosphere, especially to the lower partial pressure of oxygen, which leads to stimulation of the entire system of processes in the organism involved with oxygen transportation. The main benefits of adaptation are an increase in red blood cell mass and in oxygen transportation capacity (Noakes, 2003; Alonso, 2004; Arrese et al., 2005; Legrand, 2005; Lungby et al., 2012). Since physical training in the mountains plays an important role in the overall preparation of elite male and female endurance athletes, this pilot study considers the possibility of monitoring acclimatization to high altitude training through changes in TBW. We assume that the conduct and completion of acclimatization at various levels of higher altitudes could be indicated by means of TBW and also that the higher the altitude, the greater the number of days required to reach the retention peak of TBW.

In general, the literature agrees that the ideal conditions are provided by repeated stays of between 21–28 days in length at an altitude of 1800–2200 meters above sea level. Key factors influencing the organism and the training process at high altitudes are: decreasing barometric air pressure, decreasing partial pressure of oxygen (pO_2), decreasing air temperature (declining by about 1°C for every 150m of increased altitude), decreasing humidity, and increasing radiation (ultraviolet radiation increases by 20–30% for every 1000m (Basset & Howley, 2000; Katyama et al., 2003; Gore et al., 2001; Green et al., 2000; Levine et al., 2005; Morrison & Cooper, 2006; Neumann et al., 2000). The process of acclimatization at higher altitudes depends on the following factors: training level before arrival, physical condition, health and mental stability, altitude of the stay, altitude of personal workout, length of stay, volume and intensity of training load during stay, season and stage of preparation within the framework of the annual macrocycle, and drinking and dietary régime (Noakes, 2003; Green et al., 2000; Bragada, 2010).

An important factor in altitude training is also played by the selection of the location and the frequency of repeated visits. When the length of stay is three weeks or longer, it can be distinguished into three basic phases of the acclimation process – accommodation, adaptation and acclimatization (Bragada et al., 2010; Noakes, 2003; Wilber, 2004; Billat et al., 2003; Suchý et al., 2012).

The classification of altitudes from the perspective of sports training has not been clearly settled. According to most authors (Wilber, 2004; Noakes, 2003; Gore et al., 2001) they should be broken down as follows:

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Low	>800m above sea level
Medium	800–1500m above sea level
Higher	1500-3000m above sea level
High	<3000m above sea level

The basis for successful training at high altitude is the course of acclimatization. Due to the course of acclimatization it is good to obtain objective indicators. The time to reach full acclimatization is in the range 5th to the15th day, according to the classification of altitude. The process is individual and can be monitored by objective parameters including HR, VO_{2max}, Lactate, Urea in blood serum, Hemoglobin level,

Hematocrit level, etc. (Noakes, 2003; Wilber, 2004; Green et al., 2000; Neumann et al., 2005; Levine et al., 2005).

Altitude training is accompanied by hyperventilation, resulting from the higher proportion of anaerobic energy requirements, leading to increased acidosis in endurance athletes (Julian, 2003; Lungby et al., 2012). In addition, fluids are lost through sweating, and hyperventilation must be checked (Billat et al., 2003; Sherry et al., 1998; Neumann et al., 2005). This can lead to disruption of the electrical conditions on the muscle membrane during muscle activity. The result is a disruption of muscle contraction (Malina et al., 2004; Weineck, 1998). An increased proportion of anaerobic coverage of energy requirements in training, partly as a result of hyperventilation, partly as a result of the intensity of the applied load – deepening acidosis – is reflected in the recovery stage (Julian, 2003; Katyama et al., 2003; Lungby et al., 2012).

A number of very valuable findings on the progress of acclimatization can be obtained from evaluation during recovery, especially the rate of return of function parameters to sleep or in initial values. Significant information can be gained from monitoring and evaluation of the amount of TBW, which is especially sensitive to changes in volume of training load (Legrand, 2005; Gore et al., 2001; Bunc, 2016). From the perspective of parameter selection and load evaluation, it could be that TBW (together with some biochemical and physiological parameters) appears as a useful biomarker for everyday measurement (Morrison, 2006).

One of the objectives of the training process is to compile an intervention programme that would operate on the organism as efficiently as possible in terms of the development of physical performance. As a part of this programme a large number of changes take place that allow us during the regular monitoring to effectively assess the quality of interventions. One possibility is the monitoring of selected variables of body composition and their changes (Bunc, 2012). Current methods of assessing body composition allow us to evaluate not only the total amount of body fat and fat-free mass, but also to evaluate the 'quality' of muscle mass. TBW includes any water presented in the body (Seunghoon, 2001). Normally the amount of TBW ranges between 60–70% of body weight depending on age and sex (Deurenberg et al., 2002). One of the main tasks of dietary strategies during mountain training is to minimize dehydration and, together with the intervention programme, to contribute to accelerating the process of adaptation (Legrand, 2005; Levine et al., 2005; Lungby et al., 2012).

Staying at higher altitude is accompanied with increased ventilation and thus greater loss of body water. For successful acclimatization, fluid intake is essential, together with the monitoring of its impact on the current status of the individual. For this purpose it is possible to use tracking of TBW in the known fluid intake (Bunc, 2016). The measurement of TBW is possible due to the development of technologies that are practicable even in field conditions. A suitable method is the use of whole-body bioimpedance analysis, which as a basic quantity measures volumes of bodily fluids – water. A mono-frequency device operating at a frequency of 50 KHz is able to determine the amount of TBW (Sheunghoon, 2001). A quality drinking regime includes adequate fluid intake, which is recommended at around 4 litres per day, because in mountain conditions it is easier to become dehydrated. Fluid loss can occur due to insufficient fluid intake, urination and increased ventilation (Bunc, 2016). The acclimatization process does not proceed smoothly, but usually progresses in several stages. Customary crisis days are the 2nd (caused by travel), the 9th (when the intensity of crisis is defined as 'bad mood') and the 15th (when a deeper crisis might be expected, due to depression) (Neumann et al. 2005). The "crisis-depression performance" and fatigue can usually be seen on the 4th–6th and 10th–12th days (Billat et al., 2003; Lungby et al., 2012). The course of acclimatization cannot be accelerated, on the other hand, by not respecting the individual specific reaction of the organism to various contents of the intervention programme. Disregard of the recommendations for acclimatization can disrupt the speed and quality of acclimatization, and can also lead to overload. In the opinion of some experts, assessments during adaptation to high altitude may be indicated by changes in body composition parameters (Lungby et al., 2012; Green et al., 2000).

MATERIAL AND METHODS

Participants

Participants in the study included three members of the Czech national team competing at international competitions, and another runner who was a medalist at the national championship (M = 1), (F = 3), (n = 4). The physical and performance characteristics of subjects are given in Table 1 below. The locations of the training camps were selected according to the experience and expertise of the personal trainers, in agreement with the Czech Republic head coach of running and the head coach of the Czech athletics federation. The decision to prepare at different altitudes and lengths of stay corresponded to the normal practice and experience of national coaches. The focus and content of the camps met the requirements of the phases of preparation and specialization of the runners.

Instrumentation

The camps were gradually organized in the following locations and altitudes: CZECH REPUBLIC (Šumava, October, altitude 1000m above sea level), MOROCCO (Ifrane, February, altitude 1770m above sea level), ETHIOPIA (Sululta, December, altitude 2750m above sea level). We evaluated the results in terms of effect size and consequently of statistical significance. We found statistical significance at the level of $p \le 0.04$. We used Cohen's d for evaluating the effect size for finding the fraction of variability between participants. The commonly used evaluation of the coefficient size d is as follows: trivial (0–0.19), small (0.20–0.49), medium (0.50–0.79), and large (0.80 and greater) (Cohen, 1992). For non-homogeneity and low number of participants in the study, we did not detect deviations between male (n = 1) and female (n = 3). Runner 1 (F) attended camps in the Czech Republic and Morocco, runner 2 (F) attended camp in the Czech Republic, runner 3 (M) attended camp in Morocco and runner 4 (F) attended camp in Ethiopia.

PROCEDURES

Measurement of TBW was carried out at 08.00 under standardized conditions, on an empty stomach and after drinking about 2 ounces of water. During the day drinking habits were checked and controlled. The personal trainer noted all quantities of fluids

Runner	Age (year)	Height (cm)	Weight (kg)	BMI (kg m²)	Gender	Time of training (years)	Personal best (min)
1	23	171	55.0	18.9	F	4	36:17 (10 km)
2	22	163	50.5	19.0	F	5	4:20,07 (1500 m)
3	23	180	61.5	19.1	М	2	31:22 (10 km)
4	23	170	52.0	18.5	F	6	15:35 (5 km)

 Table 1
 Selected physical and performance characteristics of participants

received. Changes in TBW were monitored using bioelectrical impedance analysis (Bodystat^{*}1500, Data Input, Darmstadt, Germany). The mono-frequency Bodystat 1500 (operating at a frequency of 50 kHz) was used to measure TBW. The advantages of this device include: cost, easy transportation, safety and simplicity of operation, and the ability to do field measurements. For the evaluation of the relation to physical load, the training programme was divided into aerobic, mixed and anaerobic zones by running speed (according to individual speed zones) and exercise-induced lactate levels (Lactate Scout+, Amount of lactate, mmol/l). In addition, the corresponding intensity was in the energy zones controlled by continuous measurement, using the Garmin Forerunner sport testers (HR). As a criterion of completion of acclimatization we set the achievement of peak retention of TBW.

Owing to the relatively small sample size (n = 4) data collection was carried out every day. From daily readings we retrospectively investigated the conduct of TBW and then compared the data with expert information on critical days and during the acclimatization (Noakes, 2003). The data were evaluated by effect size as trivial (0–0.19), small (0.20–0.49), medium (0.50–0.79) and large (0.80 and greater) (Cohen, 1992). Consistent with the expert literature (Noakes, 2003; Lungby et al., 2012; Bunc, 2016), we considered changes of TBW \pm 0.1 litre/day.

ETHICAL STATEMENT

Participants in the study were elite Czech runners (n = 4) in high altitude preparation and using standard training methods and approaches within their training. The participants were informed of the methods and all the measurement procedures, including the risks, and also about the possibility of further usage of the measured data. Each participant of the study signed an informed consent form, agreeing to the publication of the obtained data, and the four informed consent forms were approved by the Ethics Committee of the Faculty of Sport and Physical Education of Charles University.

RESULTS

The pattern of change in TBW varied during the different training camps (figures 1–3). The first four measurements found water retention in the first stage of each training camp regardless of the altitude, with differences between individuals and training camp sites in the size and day of reaching peak TBW. The highest measured increases of TBW at an altitude of 1000 meters above sea level was from 1.7 to 2.1 litres. Both



Figure 1 The course of changes in TBW at an altitude of 1000m (Czech Republic) Note: $P \le 0.04$, Num = 10 (Retention Peak, 5th day)



Figure 2 The course of changes in TBW at an altitude of 1770 m (Morocco) Note: $P \le 0.04$, Num = 11 (Retention Peak, 8th or 11th day)

tested runners reached a peak of retention on the 5th day of stay. Similarly, in the second half of the same camp, the tested runners' curves showed a propensity to maintain an increase in TBW.

At an altitude of 1770 m above sea level runner 1 reached an increase of TBW of 6.3 litres, with a retention peak on the 11th day, and runner 3 had an increase of 5.1 litres, with a peak on the 8th day. Runner 3 had a lower TBW at the end of the camp than when they had arrived. We believe that individual differences between runners could be probably caused by gender or vegetarianism.



Figure 3 The course of changes in TBW at an altitude of 2750m (Ethiopia) Note: $P \le 0.04$, Num = 27 (Retention Peak, 12th day)

For runner 4 at 2700 m above sea level the TBW decline occurred at the beginning of the camp, and she returned to the original value on the 12th day of stay. Then the decline occurred again, with a gradual rise to the 24th day of stay, which was again followed by a decline. Considering the course of TBW changes, this day (12th) is considered a retention peak. The higher value from the first measurement is considered a consequence of travel. In the overall context a TBW decrease in absolute terms of 1.25 litres was recorded compared to the situation at the beginning of camp.

DISCUSSION

Changes in the distribution of TBW reflect progress of acclimatization. In practice, this means that data monitoring of TBW can individualize the process of acclimatization and adaptation to training load at high altitude. Our pilot study confirmed the relationship of the current acclimatization and distribution of TBW. The number of days when retention peaks of TBW were achieved corresponded with higher levels of altitude. From this perspective we can say that progress of TBW ($p \le 0.04$, effect size-medium, 0.77) indicated completion of acclimatization (Cohen, 1992).

Within the context of our general knowledge about mountain stays, where the literature suggests rather threatening dehydration (losses increased by ventilation and the excretion of urine) it shows that all athletes were well hydrated and the question is whether water retention is an indicator of the acclimatization process, or, conversely, lack of training process and therefore losses of water during physical exercise (Noakes, 2003; Basset & Howley, 2000; Lungby, 2012; Billat et al., 2003; Bunc, 2012; Saunders et al., 2004; Green et al., 2000; Legrand, 2005). Generally, in the acclimatization phase, we observed two critical periods: 4th–6th day of a stay, and 10th–12th day of stay (Gore et al., 2001; Green et al., 2000; Lungby, 2012; Saunders et al., 2004; Wilber, 2004). From this perspective, the measurement results show that the retention peaks

in runners 1, 2, and 3 fall within these periods. For runner 4, who attended camp at a higher altitude, the situation is more complicated because there were fluctuations in the content of TBW in the range of 1–2 litres, with the highest depression on day 5 and then again a gradual rise, reaching a maximum on the 10th day, when she returned almost to the initial value. Kinetics TBW corresponded with the theoretical, expert assumptions on critical days during endurance training at high altitudes (Noakes, 2003; Wilber, 2004). We can therefore conclude that the kinetics of TBW can be used for indication during the acclimatization.

Although there are not so significant fluctuations (in the range of 6.25%), the results of the onset of retention peaks agree with the general findings and also with the results of runners 1, 2, and 3. We believe, therefore, that changes in TBW could be one of the biomarkers which affect the acclimatization process. Conversely, a big effort to accelerate the adaptation may adversely affect the course of acclimatization. It can be assumed that even better results would be obtained by measuring not only TBW, but also extracellular and intracellular water, which would allow the precise assessment of the movement of water within the organism, which, for example, may affect the value of hematocrit (Wilber, 2004; Saunders et al., 2004; Julian, 2003; Legrand, 2005; Levine et al., 2005). The course of TBW changes for runner 4 could be more influenced by the training process than runners 1, 2, and 3. A larger role in altitude 2700m above sea level could be played by external conditions (climate, wind, total fluid intake of the athlete, the presence of food in the digestive tract, the saturation of the muscles with carbohydrates, women's premenstrual phase and finally a clearly demonstrated link with ethnicity (Gore et al., 2001; McCully & Hamaoka, 2000; Legrand, 2005).

CONCLUSION

Based on the monitoring of changes in TBW at higher altitudes during the preparation of elite runners we can conclude that the measuring of changes in TBW during training camps at higher altitudes may be one of the biomarkers during acclimatization. In the expert literature, the issue of acclimatization is associated with dehydration. Excessive increases in TBW by the organism can slow down acclimatization. The results of our study correspond with the findings of previous researchers on critical days during the stay of elite runners at higher altitudes. Retention peaks were reached in the periods that correspond with acclimatization "crisis-depression performance", as reported in the literature (Billat et al., 2003; Lungby et al., 2012; Neaumann et al., 2005). Given that the group consisted of only four participants and was not fully homogeneous, we interpret the data as significant ($p \le 0.04$) with medium effect size (0.77).

A promising direction for future research is suggested as further follow-up of ECW and ICW.

REFERENCES

- Alonso, J. (2004). Methods to increse the delivery of oxygen *New studies in Athletics*, *19*, 33–43.
- Arrese, A., Izquierdo, D. M., & Urdiales, D. M. (2005). A review of the maximal oxygen uptaken values necessary for running performance levels. *New Studies in Athletics*, 20(3), 7–20.

- Basset, D., & Howley, E. T. (2000). Limiting factors for maximum oxygen uptake and determinants of endurance performance. *Med. Sci. Sports Exerc.*, 32(1), 70–84.
- Billat, V., Lepretre, P. M., Heugas, A. M., Laurence, M. H., Salim, D., & Koralstein, J. P. A. (2003). Training and bioenergetic charakteristic in elite male and female Kenyan runners. *Med. Sci. Sports Exerc.*, 35(2), 297–304.
- Bragada, J. A. (2010). Longitudinal study in 3000 m male runners: relationship betwen performance and selected physiological parameters. *Journal of Sports Science Medicine*, 9(3), 439–444.
- Bunc, V. (2012). Diagnostika ve sportu. Trenér biatlonu, 1-17.
- Bunc, V. (2016). Obesity Causes and Remedies. Physical Activity Rewiew, 4, 55-56.
- Bunc, V., & Skalská, M. (2012). Funkční a pracovní charakteristiky zdravotnických záchranářů. Česká kinantropologie, 16(3), 89–100.
- Cohen, J. (1992). A power primer. Psychological Bulletin, 112(1), 155-159.
- Deurenberg, P., Deurenberg-Yap, M., & Schouten, F. J. (2002). Validity of total and segmental impedance measurements for prediction of body composition across ethnic population groups. *European Journal of Clinical Nutrition*, 56(3), 214–220.
- Dovalil, J., et al. (2000). *Sportovní výkon a trénink ve vyšší nadmořské výšce*. Prague: Český olympijský výbor, Fakulta tělesné výchovy a sportu Univerzity Karlovy, Olympia.
- Fuchs, U., & Reiss, M. (1990). Höhentraining das Erfolgskonzept der Ausdauersportarten (Trainerbibliotek 27). Münster: Philippka Verlag.
- Gore, C., Hanhn, A. G., Aughey, R. J., Martin, D. T., Ashenden, M. J., & Clark, S. A. (2001). Live high: train low increases muscle buffer capacity and submaximal cycling efficiency. *Acta Physiol. Scand.*, 173(3), 275–286.
- Green, H., Roy, B., Grant, S., Hughson, R., Burnett, M., & Otto, C. (2000). Increase in submaximal cycling efficiency mediated by altitude acclimatization. J. Appl. Physiol., 89(3), 1189–1197.
- Hamar, D. (1996). Fyziologické a biochemické aspekty rozvoja vytvalostných schopností. In: *Teoretické a metodické problémy súčasnej atletiky* (pp. 4–12). Bratislava: FTVŠ UK.
- Julian, G. (2003). Intermittent normobaric hypoxia does not alter performance or erythropoetic markers in highly trained distance runners. *J. Appl. Physiol.*, *96*(5), 1800–1807.
- Katyama, K., Matsuo, H., Ishida, K., Mori, S., & Miyamura, M. (2003). Intermittent hypoxia improves endurance performance and submaximal exercise efficiency. *High Alt. Med. Biol.*, 4(3), 291–304.
- Kučera, V., & Truksa, Z. (2000). Běhy na střední a dlouhé tratě. Prague: Olympia.
- Kushner, R. (1992). Bioelectrical impedance analysis: A rewiew of principles and applications. *Journal of the American College of Nutrition*, 11(2), 199–209.
- Lean, M., Han, T. S., & Deurenberg, P. (1996). Predicting body composition by densitometry from simple anthropometric measurement. *Am. J. Clin. Nutr.*, *63*(1), 4–14.
- Legrand, R., et al. (2005). O2 arterial desaturation in endurance athletes increase muscle deoxygenetion. *Med.Science in Sports Exerc.*, *37*(5), 782–788.
- Levine, B., & Stray-Gundersen, J. (2005). Point: positive effects of intermittent hypoxia (live high: train low) on exercise performance are mediated primarily by augmented red cell volume. *J. Appl. Physiol.*, *83*(1), 102–112.
- Liška, J., & Písařík, M. (1985). Běhy na střední a dlouhé tratě. Prague: ÚV ČSTV.
- Lungby, C., Millet, G. P., & Calbet, J. A. (2012). Does altitude training increase exercise performance in elite athletes? *Br. J. Sports Med.*, 46(11), 792–795.
- Malina, R., Bouchard, C., & Bar-Or, O. (2004). *Growth maturation and physical activity* (2nd edition). Champaign, IL: Human Kinetics.
- McCully, K., & Hamaoka, T. (2000). Near-enfrared Spectroscopy: What can it tell us about oxygen saturation in skeletal muscle? *Exerc. Sport Sci. Rev.*, *28*(3), 123–127.

- Morrison, E., & Cooper, P. D. (2006). Some Bio-Medical Mechanismus in Athletic Prowess. *West Indian Medical Journal*, 55(3), 205–209.
- Neumann, G., Pfützner, A., & Hottenrott, K. (1993). *Alles unter Kontrolle*. Aachen: Meyer & Meyer.
- Neumann, G., Pfützner, A., & Hottenrott, K. (2005). *Trénink pod kontrolou*. Prague: Grada Publishing.
- Noakes, T. (2003). Lore of Running (4th edition). Champaign, IL: Human Kinetics.

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- Pařízková, J. (1998). Složení těla, metody měření a využití ve výzkumu a lékařské praxi. Medicina Sportiva Bohemica et Slovaca, 7(1), 1–6.
- Písařík, M., & Liška, J. (1985). Béhy na střední a dlouhé tratě. Prague: ÚV ČSTV Sportpropag.
- Pupiš, M., & Korčok, P. (2007). Hypoxia jako súčast športovej přípravy. Banská Bystrica: Univerzita Mateja Bela, FHV.
- Reiss, M., & Meinelt, K. (1985). Erfahrungen, Probleme und Konsequenzen bei der Erhöhung der Wirksamkeit der Steurung und Regelung des Hochleistungstrainings. *Theorie* und Praxis Leistungssport (Leipzig), 23, 26–50.
- Saunders, P., Telford, R. D., Pyne, D. B., Cunnigham, R. B., Gore, C. J., Hahn, A. G., & Hawley, J. A. (2004). Improved running economy in elite runners after 20 days of simulated moderate – altitude exposure. *J. Appl. Physio.*, 96(3), 931–937.
- Seunghoon, C. (2001). A New Method for BIA. Research thesis based on InBody. Biospace.
- Sherry, E., & Wilson, S. F. (1998). Oxford handbook of sports medicine. Oxford: University Press.
- Suchý, J., et al. (2012). Fáze adaptace na vyšší nadmořskou výšku. In: J. Suchý, *Využití hypoxie a hyperoxie ve sportovním tréninku* (pp. 42–43). Prague: Karolinum.
- Suchý, J., et al. (2014). Trénink ve vyšší nadmořské výšce. Prague: Mladá fronta.
- Thomas, B., Cornish, B. H., & Ward, L. C. (1992). Bioelektrical Impedance Analysis for Measurement of Body Fluid Volumes: a Review. *Journal of Clinical Engineering*, *17*(6), 505–510.
 Weineck, J. (1998). *Optimales Training*. Balingen: Spitta Verlag GmbH.
- Wilber, L. (2004). *Altitude Training and Athletics Performance*. Champaign, IL: Human Kinetics.

A long-term cohort study of the muscle apparatus of female volleyball players after the application of a compensatory programme

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ABSTRACT

Volleyball is a sport with great unilateral load that can have a negative impact on a postural system. The aim of the study was to perform a detailed examination of posture and muscle imbalance in elite female volleyball athletes and, according to the results of the examination, to put together compensatory exercises and to assess their effect. A group of elite junior female volleyball players (n = 12) was examined by an experienced physiotherapist using a complex kinesiological analysis especially focused on body posture (from frontal, sagittal and dorsal plane), shortened muscles and performance of basic movement patterns (hip extension, hip abduction, sit-up, cervical flexion, shoulder abduction, push-up). The preliminary examination showed that every tested player had some kind of posture deficiency. The compensatory programme, consisting of breathing techniques, stretching exercises, strengthening exercises with an elastic band, and balance exercises with a Bosu balance trainer, was applied at the end of every training session over the competitive parts of two volleyball seasons. Before the application of the exercise programme we found flat back in 92% subjects, whereas 33% of subjects exhibited it after compensation. Improvement was noted in the intensified lumbar lordosis (from 50% subjects to 42%), and scoliotic body posture (from 50% to 17%). The biggest improvement in shortened muscles in the upper body was observed on the m. levator scapulae (from 83% subjects to 8%) and the m. trapezius (from 42% subjects to 8%); and in the lower body m. triceps surae (from 75% subjects to 33%) and hip abductors (from 83% subjects to 25%). The study suggests that balance exercises with a Bosu balance trainer and exercises with an exercise elastic band seem to be useful for volleyball since we noted improvement in body posture, movement patterns and muscle shortness. We therefore highly recommend this compensatory programme.

KEYWORDS

kinesiological analysis; compensatory exercise; muscle imbalance; Bosu balance trainer

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INTRODUCTION

Volleyball is a physically demanding sport with many rapid changes of bodily direction as well as many rapid reorientations of body segments toward each other. Even though it is a sport in which the players are not in direct contact, there are still many acute and overuse injuries. This is due to repeated jumps, stops and movements that exert great pressure on joints, e.g. the serve and the hit (Manshouri, Rahnama, & Khorzoghi, 2014). The most common injuries include traumas of fingers and especially their joints, the biggest load being on the dominant arm, and mainly on the shoulder joint (McFarland, Muvdi, Jia, Desai, & Petersen, 2010). Čučková and Süss (2014) found the following body parts overused: abdominal and lumbar muscle ligaments, the lower limbs and knee joints. Ankle sprain is the most common acute injury (Vorálek, Palová, & Süss, 2009) and, because of an extensive one-sided load, muscle imbalances in the shoulder, lumbar, pelvic and lower limb regions are also common (Čučková & Süss, 2014).

As shown in previous research (Grabara & Hazdik, 2009; Modi et al., 2008; Oyama, Myers, Wassinger, Ricci, & Lephart, 2008; Větrovcová, 2007; Vařeková, Vařeka, Janura, Svoboda, & Elfmark, 2011; Vorálek, Süss, & Parkanová, 2007), a high number of tested volleyball players have faulty posture, tension of m. trapezius, tension of paravertebral muscles in the lower back region and (owing to a forwarded carriage of the head and shoulder protraction) intensified cervical lordosis. Some muscles or muscle groups of the tested players are weakened, especially the lower section of the abdominal muscles. All these problems affect lower back posture. Muscle groups are impacted which are not usually used in volleyball training, such as the lower abdominal muscles or m. trapezius (lower fibers). Those muscles are weakened, which leads to quite severe muscle imbalance and faulty posture, as well as chronic pain in some segments. Volleyball players also have some overused body parts, such as m. trapezius (upper fibers) or m. pectoralis major, which are often shortened (Čučková & Süss, 2014).

Owing to the problems mentioned above, the application of an interventional compensatory programme to counterbalance the lateral asymmetries is necessary, as demonstrated in previous research, not only in volleyball but also in other sports, such as softball, football and skiing (Matošková, Süss, & Vorálek, 2009b). For the correct composition of a programme it is necessary to evaluate individual postural stereotypes and perform functional muscle tests accurately.

The compensatory programme should be a set of relaxing, stretching and strengthening exercises, which means the muscles that tend to shorten need to be adequately stretched, and the muscles with a tendency to weaken need to be strengthened (Čermák, Chválová, Botlíková, & Dvořáková, 2008). Every interventional programme must be planned according to the training periodization of the particular sport and must ensure the absence of undesirable effects, such as disproportionate load (Matošková et al., 2009b). The positive effect of exercising with a Bosu balance trainer and elastic exercise bands was demonstrated on tennis players by Sannicandro, Cofano, Rosa and Piccinno (2014), where balance training significantly reduced percent lower-limb asymmetry. Behm and Colado (2012) stated that unstable surfaces are able to enhance intermuscular coordination between agonist and antagonist muscles, permitting improved control of joint position and reduced joint stiffness. Finally, Sannicandro et al. (2014) found that balance training exercises force the subjects to distribute body weight uniformly between the two limbs.

At the present time, many modern devices are being used to examine the state of the body apparatus, such as BIA methods devices (Bedogni et al., 2002), but is still important that classical physical examinations, such as complex kinesiological analysis, are conducted by experienced physiotherapists. The reason for testing the shortness of these particular muscles (m. triceps surae, hip flexors, knee flexors, hip abductors, m. quadratus lumborum, paravertebral muscles, m. pectoralis major, m. trapezius (upper fibers), m. levator scapulae and m. sternocleidomastoideus) was based on previous research performed on volleyball players (Čučková, Znášiková, Vorálek, & Süss, 2013; Vařeková et al., 2011; Vorálek et al., 2007), which showed a shortening of those muscles, since volleyball exerts a very heavy load on both upper and lower extremities and spine, and also involves very many jumps, hits, and overhead passes. The testing of movement patterns and body posture assessment on a regular basis are part of Janda's method (Janda, 1996).

The aim of the study was to assess posture asymmetry and muscle imbalance (muscle shortness or weakness and poorly performed movement patterns) in elite female volleyball players. According to the results of the physical examination performed by an experienced physiotherapist, the aim was to put together compensatory exercises and assess their effect on the muscle apparatus (body posture, muscular system) after their application.

METHODS

Subject

Elite junior volleyball players (n = 12) participated in this study. All of them were members of the team PVK Olymp Praha, from the Czech Republic in the highest national division. The reason for choosing this particular group was simple, they are the best team for their age in the Czech Republic and won the title several years in row. My (the examiner's) attendance was important so only one team out of the whole division could have been chosen. This team was also chosen for the willingness of the team and the whole management to fully participate in the project for two years. At the beginning of the research (the first year out of two) the subjects had mean age 15.5 years, mean height was 178.6 cm, mean weight 68.6 kg. The players practiced intensively for at least 4 years, had 4 training units per week for two hours, plus two matches per week, usually played during the weekends. The second year the players had mean age16.6 years, mean height 179.8 cm, mean weight 66.6 kg. The number of matches and training sessions was the same as in the first year. Informed consent was obtained from all tested subjects. The study was approved by the Ethics Committee of the Faculty of Physical Education and Sport, Charles University on 12/12/2011 (no. 188/2011).

Method

The kinesiological analysis was performed by an experienced physiotherapist. The examination of body posture consisted of visual inspection of the frontal, sagittal,

and dorsal planes. The subjects were dressed only in their underwear, standing upright with their feet pelvis-width apart. The examiner palpated the asymmetrical height of the acromion process, the angles of scapula, and the symmetry of paravertebral muscles. The visual inspection exhibits any faulty posture such as flat back, round shoulders, intensified lumbar lordosis, any kind of scoliotic posture, the position of iliac crests, pelvis in anteversion, retroversion, winged scapula, head carriage, position of shoulders (protraction, elevation), as well as the position of lower limbs (flat feet, pes valgus, knee joint position). We only specified the type of problem with body posture not the seriousness. The reason for testing particular muscle shortness was based on previous research mentioned above (Čučková et al., 2013; Vařeková et al., 2011; Vorálek et al., 2007). The reason for choosing young athletes was simple: the young body usually exhibits only functional changes otherwise the adults can record structural changes in their muscle apparatus and it is difficult to improve it by tailored exercise.

Data collection

The examination of shortened muscles and movement patterns performance were based on Janda's methods (Janda, 1996). The following muscles were tested: m. triceps surae, hip flexors, knee flexors, hip abductors, m. quadratus lumborum, paravertebral muscles, m. pectoralis major, m. trapezius (upper fibers), m. levator scapulae and m. sternocleidomastoideus. The testing was performed in the same room at constant temperature under the same circumstances and also by the same physiotherapist to guarantee the same conditions.

The data was collected every three months for two years. The second year of the study was performed the same way as the first one so again the subjects were examined by the same experienced physiotherapist every three months. The last data collection was made in May 2013, and all data collected were compared. To show the general trend of the state of body apparatus of the subjects and the impact of the compensatory exercise, only the initial testing and then testing at the end of each year were presented in this paper.

Data analysis

The data analysis was done by the assessment of frequency, by means of percentage analysis, the significant quotient being the value of 70% (Matošková, Tietz, & Süss, 2009a). The same data analysis was used in similar research done on downhill skiers. The same significant quotient was used to distinguish the skiers' shortened muscles (Matošková et al., 2009a). The performance of movement patterns was evaluated as performed correctly or not by means of percentage analysis. The significant quotient of these two tests was also the value of 70% (Matošková et al., 2009a). The shortened muscles were evaluated on a two-value scale: S – shortened muscle, N – non-shortened muscle. Another part of the kinesiological analysis was also an interview with each subject about their subjective feeling (pain, injury, headaches) and also their private feelings about the exercise programme. The preliminary data (September 2011) acquired from the kinesiological analysis was compared with the data obtained in the middle of the volleyball season (January 2012) and at the end of the volleyball season (May 2012).

Compensatory exercises

To counterbalance lateral asymmetries, muscle imbalance, poor body posture and shortened muscles, an interventional compensatory programme was applied at the end of each training session over the competitive parts of two volleyball seasons was completed. The compensatory programme was a combination of relaxing exercises (especially breathing techniques) (Bursová, 2005), stretching (put together with the physiotherapist) and strengthening exercises with the elastic exercise band Theraband and the Bosu balance trainer inspired by Jebavý and Zumr (2009), Kubišová (2006) and Muchová and Tomanková (2009). All subjects were taught how to do full set of exercises from the starting position to the end of each movement, were constantly checked by the examiner, coach and the physiotherapist and were corrected when exercising incorrectly. The full compensatory programme took 30 minutes and was applied at the end of every training session and after the match – 5 times per week. The players exercised together which enabled a good opportunity to check that all exercises being completed properly.

When putting together the breathing exercises (thoracic, costal and abdominal breathing and inspiratory waveform), which initiated the whole compensatory programme, we began with the findings of Bursová (2005) that they could improve the position of the chest and pelvis while playing a big role in relaxation, while the secondary breathing muscles (m. pectoralis, abdominal muscles and scapular muscles) are active. The volleyball players preferred the laying down position, as Hošková (2003) perceived it to be the easiest due to the least muscles being active to hold the said position. Each player performed the same relaxation techniques after every training session in preparation for further exercise. The rhythm of breathing was checked by a metronome at a speed of 18 breaths per minute. The first year each breathing technique was repeated 5 times, the second year 7 times (Bursová, 2005). The full breathing exercise took 5 minutes.

After the breathing session all the subjects performed the full set of stretchers on all the muscles that tend to shorten and are being extensively used during volleyball. None of the players exhibited muscle hypermobility they performed the same set of stretching exercises. Minor changes were made in the case of injury to the individual and always followed the advice of the physiotherapist. The particular exercises were chosen together with the physiotherapist, the stretching time of each muscle/muscle group was set for 10 seconds, the time was checked by the metronome again. The stretching focused on these muscles: Achilles tendon and calf muscles, hamstrings, hip flexors, gluteal muscles, quadriceps femoris, lumbar and abdominal muscles, m. pectoralis, m. trapezius and biceps and triceps brachi. The full stretching exercise took 10 minutes.

For the strengthening and balance exercises, the individual differences and needs of each player were taken into consideration and were adjusted to the state of their body apparatus (the physiotherapist did an easy muscle test to see the strength of specific muscles). At first, everything was done without the balance utilities, in order to learn the movement precisely and only later did the research subjects start to use the Bosu balance trainer. The players were constantly monitored when exercising, and they were also photographed and corrected when performing incorrectly. The level of difficulty of the particular exercises was increased as the volleyball player reached the necessary level. The elastic exercise bands were used in a set of exercises to employ the antagonists of the muscles mainly used in hitting and serving and to counterbalance the unilateral load. The specific exercises are shown in Table 1. The full balance and strengthening exercises took 15 minutes.

The first year's compensatory exercise (September 2011 – May 2012) was led by the physiotherapist, who taught the players the correct techniques of exercising and made corrections as necessary. The same physiotherapist was used during the study. She was available the second year but not present at the training sessions. As the second year was completed without the presence of the physiotherapist, the players exercised under the supervision of the examiner, coach, and assistant coach. All subjects exercised together right at the conclusion of each practice at the same location of the gym so further control was possible. All players exercised barefoot and were doing the same type of exercise at the same time.

Exercise	Task
Compensatory exercise	position of cat, one arm raised upwards (head height), opposite leg backward, hold
Bosu balance trainer	two-legged squats, arms raised forward, back straight, centre of gravity backward
Bosu balance trainer	toe standing position, arms raised upwards holding 1kg medicine ball, then squat with a side trunk rotation, arms in turns towards one foot
Bosu balance trainer	standing position on the floor, lunge backwards on Bosu balance trainer, legs in turns
Bosu balance trainer	standing on Bosu, bend legs forward in turns keeping the pelvis in a stable position
Bosu balance trainer	sitting position on Bosu, legs bend of the floor, back straight, trunk rotation holding 1kg medi- cine ball placing it on a side towards the floor
Bosu balance trainer	two-legged jumps from one Bosu balance trainer to other ones in a row (12 together), holding in a squat position after each jump
Elastic exercise band	holding the elastic band, arms raising forward in turns (shoulder height), elastic band kept under feet
Elastic exercise band	elastic band bound to a bar in a height of waist, drawing it diagonally upwards
Elastic exercise band	simulating the hitting movement with the non-dominant arm, elastic band bound to a bar
Elastic exercise band	holding the elastic band bound to a bar, facing it, arms swinging down-wards backwards
Elastic exercise band	two elastic bands bound to a bar approximately 30cm above head, arms winding down keeping the shoulders down and scapulae towards spine

 Table 1
 Strengthening and balance exercises

RESULTS

We listed the results of the kinesiological analysis in the tables. The preliminary examination showed that every tested player exhibited some kind of problem with posture (Table 2). In September 2011 (preliminary testing) we observed flat back in 92% subjects, 25% after the first year of testing, and 33% at the end of the second year. Intensified lumbar lordosis appeared in 50% subjects (42% in May 2012, 42% in May

2013) and 50% exhibited scoliotic body posture (75% in May 2012, 17% in May 2013), 11 subjects (92%) exhibited pelvis in anteversion (17% in May 2012, 0% in May 2013). 10 subjects (83%) exhibited elevated shoulders (50% in May 2012, 67% in May 2013), and 58% winged scapula (92% in May 2012, 42% in May 2013). The problems with lower limb posture were demonstrated by knee joint hyperextension (42% September 2011, 42% in May 2012, 50% in May 2013) and flat feet (50% September 2011, 42% May 2012 and 2013). 4 subjects (33%) exhibited forwarded carriage of head during the preliminary testing and 17% in May 2012 and 0% in May 2013.

	Type of problem	Prevalence								
Body part		Septem	ber 2011	May	2012	May 2013				
		n	%	n	%	n	%			
	flat back	11	92	3	25	4	33			
Cuina	round shoulders	0	0	2	17	0	0			
Spine	L-lordosis intensified	6	50	5	42	5	42			
	scoliotic body posture	6	50	9	75	2	17			
	anteversion	11	92	2	17	0	0			
Pelvis	retroversion	0	0	0	0	0	0			
	inclination	3	25	8	67	2	17			
Scapula	winged scapula	7	58	11	92	5	42			
Chauldon	protraction	3	25	2	17	4	33			
Shoulders	elevation	10	83	6	50	8	67			
Head	forwarded carriage	4	33	2	17	0	0			
Lower limbs	flat feet	6	50	5	42	5	42			
	pes valgus	3	25	4	33	4	33			
	knee joint hyperextension	5	42	5	42	6	50			

Table 2	Posture examination	(September 2011,	May 2012, May 2013)
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Note: Significant frequency of body posture deviation in bold

The results of the movement patterns examination (Table 3) also showed problems. 83% of the tested players performed hip extension (92% in May 2012 and 75% in May 2013) and hip abduction (75% in May 2012 and 50% in May 2013) poorly. While 8 subjects (67%) did not succeed in sit-up and cervical flexion in the preliminary testing, the numbers of sit-ups improved to 42% in May 2012 and 25% in May 2013, and the performance of cervical flexion varied from 75% in May 2012 to 42% in May 2013. There was also a high incidence of poorly performed shoulder abduction (50% in September 2011, 92% in May 2021, and 67% in May 2013) as well as push-up, 9 subjects (75%) exhibited it in September 2011, 6 (50%) in May 2012 and the same percentage in May 2013.

Type of movement	Poorly performed movement pattern							
	September 2011		May 2012		May 2013			
puttern	n	%	n	%	n	%		
Hip extension	10	83	11	92	9	75		
Hip abduction	10	83	9	75	6	50		
Sit-up	8	67	5	42	3	25		
Cervical flexion	8	67	9	75	5	42		
Shoulder abduction	6	50	11	92	8	67		
Push-up	9	75	6	50	6	50		

 Table 3
 Movement patterns (September 2011, May 2012, May 2013)

Note: Significant frequency of poorly performed movement pattern in bold

	Prevalence of muscle shortening							
Muscle	September 2011		May	2012	May 2013			
	n	%	n	%	n	%		
m. triceps surae	9	75	6	50	4	33		
hip flexors	7	58	8	67	6	50		
knee flexors	3	25	7	58	6	50		
hip abductors	10	83	6	50	3	25		
m. quadratus lumborum	8	67	9	75	4	33		
paravertebral muscles	8	67	7	58	10	83		
m. pectoralis major	1	8	3	25	3	25		
m. trapezius	5	42	4	33	1	8		
m. levator scapulae	10	83	3	25	1	8		
m. sternocleidomastoideus	1	8	2	17	2	17		

 Table 4
 Muscular shortening (September 2011, May 2012, May 2013)

Note: Significant frequency of muscular shortening in bold

Table 4 represents the results of the shortened muscles examination. The table includes the subjects whose muscles were shortened only on one side. As significant shortening we noted the m. levator scapulae in 83% of cases in the preliminary examination in September 2011. This muscle exhibited the biggest improvement in May 2012 (25% incidence of muscle shortness) and 8% in May 2013. The prevalence of muscle shortness of hip abductors was significant in preliminary examination and exhibited 10 subjects (83%) then 50% in May 2012 and 25% in May 2013. M. triceps surae, another typical muscle shortening for volleyball players, was exhibited in 9 subjects (75%) in September 2011, 50% in May 2012, and 33% in May 2013. M. quadratus lumborum and paravertebral muscles shortenings were present in 8 subjects

(67%) in preliminary examination and varied throughout the two years the shortened m. quadrates lumborum appeared in 75% cases in May 2012 and 33% in May 2013, otherwise the paravertebral muscles got to 58% of prevalence in May 2012 and then to 83% in May 2013. The incidence of muscle shortness of m. sternocleidomastoideus as well as knee flexors and m. pectoralis major worsen over the two volleyball seasons. Particularly from 8% prevalence in September 2011 in sternocleidomastoideus to 17% in both other examinations. The knee flexors from 25% in September 2011 to 58% in May 2012, respectively 50% in May 2013 and m. pectoralis had one subject (8%) shortened in September 2011, and 25% in May 2012 as well as May 2013. The upper fibers of m. trapezius noted an improvement in the shortness over the period of time from 42% in September to 33% in May 2012 and 8% in May 2013.

DISCUSSION

The aim of the study was to perform a detailed examination of posture and muscle imbalance in elite female volleyball athletes and according to the results of the examination put together compensatory exercises and assess their effect. The compensatory programme was a combination of relaxing exercises, stretching and strengthening exercises with the elastic exercise band Thera-band and the Bosu balance trainer (Table 1). The positive effect of exercising with a Bosu balance trainer and elastic exercise bands was demonstrated on tennis players by Sannicandro et al. (2014), where balance training significantly reduced percent lower-limb asymmetry. Behm and Colado (2012) stated that the incidence of ankle sprains in a group of volleyball players was reduced with balance training. While the effect of our exercise programme was not as effective as others mentioned, we noted some improvement.

Scoliotic body posture (50% incidence in September 2011 to 17% in May 2013) or position of the pelvis showed the biggest improvement (pelvis in anteversion improved from 92% to 0% of incidence). The most successful effect of our interventional compensatory programme was recorded on the basic movement patterns; except for the shoulder abduction (worsen from 50% to 67%), every movement improved (Table 2) compared to the beginning of the whole programme.

The lack of improvement of shoulder abduction may be explained by the disproportion between the extreme load on this region caused by constant hitting and serving actions, as well as the extreme load on m. trapezius when performing the overhead pass, as the upper extremities are constantly raised upward and the amount of compensation, as found in the studies of Vorálek et al. (2007) and McFarland et al. (2010). The results suggest that the presence of the physiotherapist in the training sessions seemed to have a slightly higher efficiency of the exercising programme compared than the second year, when the physiotherapist was not present at the training sessions.

The study shows a typical posture pattern for overhead athletes, volleyball players especially. The scoliotic spinal curve was found in 6 subjects (50%) in preliminary examination and was usually combined with the shoulder elevation of the dominant upper extremity and the winged scapula. The clinical findings were evident during the visual inspection. As for body posture, our findings correspond to the findings of other authors, such as Modi et al. (2008), who tested young volleyball players on

the prevalence of scoliosis. The number of players with scoliotic body posture in our study was as high as in Modi's study (47%). Our findings correspond to the statement that volleyball players had a statistically significant increase in the incidence of scoliotic spinal curves, and that hand dominance was related to the curve direction. Grabara (2015) used the Moiré method to examine the spine curve and the whole body posture of young male volleyball players from frontal and transverse planes. Right-handed volleyball players were usually characterized by a slight, left-sided curvature of the spine, left-sided inclination of the torso, left-sided lowering and right-sided torsion of the pelvis. The right shoulder was higher than the left, the right scapula was more protruding than the left one and was further away from the spine (Grabara, 2015).

Similar inclinations were found in our tested group. Contrary to our findings, Vařeková et al. (2011) exhibited the presence of a depressed shoulder on the preferred side combined with the elevation of the contra-lateral iliac crest. The examination of body posture exhibited lumbar lordosis intensified in 6 subjects (50%) together with the pelvis in anteversion. The reason for markedly bad posture of lower back area in our tested group could be an inadequate training load due to high amount of jumps and falls as well as bending the trunk backwards during hitting the ball. Muscle imbalance in the pelvic region, which was also shown in this research, can intensify the lumbodorsal lordosis that leads to appearance of lower back pain or some functional blocks. These findings correspond to Vorálek et al. (2007), who reported scoliosis in 43% of young elite volleyball players aged 15–19 as well as faulty posture in lower back area in 70% of subjects.

The movement patterns examination (Table 3) is widely used in clinical practice. Our subjects exhibited poor performance of the majority of the movement patterns. These results could be expected due to chronic overloading that cause muscle imbalance, lateral asymmetry that go hand in hand with poor muscle coordination. The most common cause of incorrect extension in our case was insufficient activity of the gluteus muscle. The abduction was mainly performed together with flexion and hip rotation. Another incorrect movement pattern was the push-up, which was performed by 75% of players with a poor scapula stabilization, significant weakening of m. serratus anterior and overload of the m. trapezius. We can state that over the time these movement patterns improved. 83% of the tested players performed hip extension (92% in May 2012 and 75% in May 2013) and hip abduction poorly. While 8 subjects (67%) did not succeed in sit-up and cervical flexion in the preliminary testing, the numbers of sit-ups improved. The improvement could be due to the learning process as well as the effect of the compensatory exercise programme. In contrast, shoulder abduction worsened, as well as push-ups. The shoulder abduction was mainly performed with the superiority of m. trapezius (upper fibers). This can be explained by the negative effect of very heavy load on this muscle during all volleyball movements, especially the overhead pass, hit and serve. Our findings correspond to the findings of Kanásová (2005) who tested young volleyball players aged 15 to 18 for the movement patterns performance according to Janda (1997). The results were not as significant: 90% of the subjects exhibited poorly performed hip extension, 30% sit-up test and 15% shoulder abduction performed poorly. It is again explained by the dominant one-sided muscle usage of the sport.

The muscle shortness test is also widely used in practice. When looking at the impact of volleyball on muscle apparatus, our findings were not surprising. Preliminary examination show that a very high percentage of the players had a shortened m. levator scapulae, m. trapezius (upper fibers), paravertebral muscles, hip abductors, m. triceps surae and m. quadratus lumborum. Some of the players had other additional problems with shortened muscles, e.g. hip and knee flexors. These results correspond to Vorálek et al. (2007) whose volleyball players aged 15–19 years exhibited extremely high incidence of muscle tightness and muscle shortness on lower extremities and upper fibers of m. trapezius as well (90%). This is explained by the chronic overload because of a multitude of jumps and stretching methods performed incorrectly. Vařeková et al. (2011) explain the muscle shortness on lower extremities by chronic overloading and a bad stretching method, which is omitted in most cases. The poor results of the kinesiological analysis can be linked to uneven and extreme load on the athletes and little or no compensation.

CONCLUSION

Our findings exhibit a typical posture pattern for volleyball players, since volleyball imposes an extensive load on the dominant upper extremity. A scoliotic spinal curve was found in 6 subjects (50%) in preliminary examination and was usually combined with shoulder elevation of the dominant upper extremity and the winged scapula. Notable muscle shortness was found (m. trapezius upper fibers, calf muscles, hip abductors and lower back muscles were shortened the most), and also poor performance of basic movement patterns (e.g. hip extension and hip abduction, as well as shoulder abduction).

An improvement in body posture of tested players and also in movement patterns and muscle shortness could have been achieved owing to the interventional programme consisted of relaxing (breathing techniques), stretching and strengthening (exercise elastic band) and balance exercises (Bosu balance trainer). We noticed a slightly lower efficiency of the exercising programme in the second year, which can be explained by the absence of the physiotherapist at the training sessions. Due to this we highly recommend that the physiotherapist should be in full control of the exercises. Balance exercises with a Bosu balance trainer and exercises with an exercise elastic band were found suitable, and so we can recommend them for the complete programme to improve the unilateral muscle load.

REFERENCES

- Bedogni, G., Malavolti, M., Severi, S., Poli, M., Mussi, C., Fantuzzi, A., & Battistini, N. (2002). Accuracy of an eight-point tactile-electrode impedance method in the assessment of total body water. *European Journal of Clinical Nutrition*, 56, 1143–1148.
- Behm, D. G., & Colado, J. C. (2012). The effectiveness of resistance training using unstable surfaces and devices for rehabilitation. *International Journal of Sports Physical Therapy*, 7(2), 226–241.

Bursová, M. (2005). Kompenzační cvičení. Prague: Grada Publishing.

Čermák, J., Chválová, O., Botlíková, V., & Dvořáková, H. (2008). *Záda už mě nebolí*. Prague: Vašut.

- Čučková, T., & Süss, V. (2014). Muscle imbalance and body composition of elite junior female volleyball players. *Paripex Indian Journal of Research*, *3*(4), 1–2.
- Čučková, T., Znášiková, I., Vorálek, R., & Süss, V. (2013). Pohybový aparát mladých volejbalistek. *Rehabilitácia*, *50*(4), 235–240.
- Grabara, M. (2015). Comparison of posture among adolescent male volleyball players and non-athletes. *Biology of Sport*, *32*(1), 79–85.
- Grabara, M., & Hazdik, A. (2009). Postural variables in girls practicing volleyball. *Biomedical Human Kinetics*, 1(1), 67–71.
- Hošková, B. (2003). ABC kompenzace pohybem. Prague: Olympia.
- Janda, V. (1996). Funkční svalový test. Prague: Grada Publishing.
- Jebavý, R., & Zumr, T. (2009). Cvičení s balančními pomůckami. Prague: Grada Publishing.
- Kanásová, J. (2005). Funkčné svalové poruchy u atlétov, tenistov, plavcov, hokejistov, volejbalistiek a moderných gymnastiek OŠG v Nitre. In: J. Vindušková (Ed.), *Atletika 2005: sborník mezinárodní vědecké konference 24.–25. 11. 2005* (pp. 1–7). Prague: KA FTVS UK.
- Kubišová, H. (2006). *Kompenzační cvičení v odbíjené.* Brno: Masarykova Univerzita, Fakulta sociálních studií.
- Máhrová, A., & Bunc, V. (2008). Význam kompenzačních cvičení v prevenci a terapii svalových dysbalancí v tréninku badmintonistů. *Studia Kinantropologica*, 2, 266–269.
- Manshouri, M., Rahnama, N., & Khorzoghi, M. B. (2014). Effects of pilates exercises on flexibility and volleyball serve skill in female college students. *Sport SPA*, *11*(2), 19–25.
- Matošková, P., Süss, V., & Vorálek, R. (2009a). Kompenzační programy ve sportu. In:
 P. Matošková & D. Jonášová (Eds.), *Intervenční pohybové programy*. Svatoňova stráž 2009 (pp. 97–118). Prague: UK FTVS.
- Matošková, P., Tietz, J., & Süss, V. (2009b). Vyšetřeni postury a stav pohybového aparátu u dětí lyžařů sjezdařů. *Rehabilitácia*, 46(4), 207–215.
- McFarland, E. G., Muvdi, J. G., Jia, X., Desai, P., & Petersen, S. A. (2010). Clinical and diagnostic tests for shoulder disorders: a critical review. *British Journal of Sports Medicine*, 44(5), 328–332.
- Modi, H., Srinivasalu, S., Mehta, S., Yang, J. H., Song, H. R., & Woo Suh, S. (2008). Muscle imbalance in volleyball players initiates scoliosis in immature spines: A screening Analysis. *Asian Spine Journal*, 2(1), 38–43.

Muchová, M., & Tománková, K. (2009). Cvičení na balanční plošině. Prague: Grada Publishing.

- Oyama, S., Myers, J. B., Wassinger, C. A., Ricci, D., & Lephart, S. M. (2008). Asymmetric resting scapula posture in healthy overhead athletes. *Journal of Athletic Training*, 43(6), 565–570.
- Sannicandro, I., Cofano, G., Rosa, R. A., & Piccinno, A. (2014). Balance training exercise decrease lower-limb strength asymmetry in young tennis players. *Journal of Sport Science and Medicine*, 13(2), 397–402.
- Stodolová, L. (2009). *Kompenzační cvičení v odbíjené žen*. Brno: Masarykova Univerzita, Fakulta sociálních studií.
- Vařeková, R., Vařeka, I., Janura, M., Svoboda, Z., & Elfmark, M. (2011). Evaluation of postural asymmetry and gross joint mobility in elite female volleyball athletes. *Journal of Human Kinetics*, *29*, 5–13.
- Větrovcová, M. (2007). *Nervosvalová kontrola kolenního kloubu u mladých hráček volejbalu*. Prague: UK FTVS.
- Vorálek, R., Palová, H., & Süss, V. (2009). Nejčastější zraněni ve volejbale a rehabilitace. *Rehabilitácia*, 46(2), 70–75.
- Vorálek, R., Süss, V., & Parkanová, M. (2007). Poruchy pohybového aparátu a svalové dysbalance u hráček volejbalu ve věku 15–19 let. *Rehabilitácia*, 44(1), 14–20.

Sport as art, dance as sport

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ABSTRACT

A standing debate in philosophy of sport concerns whether sport can count as art in some sense. But the debate is often conducted at cross purposes. Naysayers insist that no sport is an art*form* while proponents insist that certain sport performances count as art*works* – but these are entirely consistent claims. Both sides make unwarranted assumptions: naysayers are purists about sport and art (no transaesthetic purposes) whereas proponents are tokenists about artforms. Naysayers admit that figure skating may count as art yet only in non-competitive contexts. Their burden is thus to explain why a routine (e.g., Torvill and Dean's 'Bolero') may count as art, neglecting the equally viable question of whether art in some form (e.g., competitive dance) may also count as sport. I conclude in favour of an appropriately qualified sport-as-art thesis.

KEYWORDS

aesthetics; movement; competition; transaesthetic

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INTRODUCTION

The debate about whether sport can count as art is of long standing if not always of sustained interest. Diving into the literature one soon gets a sense of immersion in a surprisingly viscous liquid through which it is exhausting to make any headway much less achieve a breakthrough. This overall impression remains even in the face of fresh approaches that emerge from time to time in the literature.

Part of the problem is that art is a notoriously difficult subject to handle theoretically. Even assuming that art can be defined – a big if – or at least that certain conditions of inclusion and exclusion may simply be assumed, it is too easy to resolve this stubborn debate, as it were, by stipulation. If we understand the term 'art' to designate any domain of skilled activity, as in 'the art of living on a budget' or 'the art of winning friends and influencing people', and so on, then any sport - a game of physical skill will trivially count as art, though this is not the sense in which we are interested in the question of whether sport can be art, that is, whether sport can be *fine* art. Suppose we cite Beardsley's aesthetic definition of art as "an intentional arrangement of conditions for affording experiences of marked aesthetic character" (Beardsley, 1979, p. 729; quoted in Arnold, 1990, p. 181). Granting this definition straightforwardly implies that many sports count as art, since playing for aesthetic effect is a part of scoring in some sports and in others is frequently intended as desirable if unnecessary. On the other hand, if we assume that the beauty created in art must not be realized for some further end, that it may have no *transaesthetic* purpose, then sport will be, again trivially, excluded from the art class, since aesthetic effects will either be inessential or essential only as means to the end of scoring and winning.¹ Similarly, following David Best's curious life situations argument (1978, p. 115), if we stipulate that art must say something about life situations and that sport cannot do so, it naturally follows that sport cannot be art. Such stipulation is as vexingly arbitrary as it is convenient.

As we shall see, this is by no means the only way in which philosophers on either side of the sport-as-art debate tend to talk past one another. However, it does reflect the relative impasse at which the debate has seemed to stand for some time. Part of my purpose here is to reframe the debate so that the impasse can be overcome, giving both sides the due often denied them. I will argue that some sport performances count as artworks, though fewer than is often supposed, and that figure skating (if no other sport) counts as an artform. A corollary of this view is that most sports are not artforms and most sport performances are not artworks. Where most philosophers begin with established sports and try to determine whether and how they may count as art, I also approach the question from the neglected other side by considering whether some art may count as sport, specifically artistic dance in competitive contexts.

Before (re)framing the debate, it will be helpful to highlight certain essential distinctions and terms. First, we should mark the aesthetic/artistic distinction. Being beautiful or aesthetically pleasing is different from and insufficient for art. No one denies that sport can be beautiful, with certain elegant movements, graceful styles, and dramatic contests, for instance. These qualities may be associated with art, but they are also distinguishable from art, as a sunset and a painting of it may both be aes-

¹ See Mumford (2012, p. 41) for a succinct expression of this view.

thetically pleasing although only one of them, the painting, is a work of art. Second, by art in this sense we mean individual works and general forms that count as fine art: painting, sculpture, poetry, theatre, dance, music, and so on. If any sport counts as art, it will be something akin to theatre or dance. Third, we should also note the beauty/aesthetic distinction in that something that would be totally unappealing in real life, such as an evil character, may well be aesthetically pleasing when depicted in an artwork. Hannibal Lecter may delight us in fiction, but should not do so in real life. Fourth, we should note the aesthetic/purposive sport distinction: in aesthetic sports such as gymnastics, diving, and synchro the scoring and outcome are at least partly determined by judged aesthetic criteria, whereas in purposive sports such as soccer, track, and weightlifting the aesthetic is at most a byproduct, immaterial to competitive outcomes.

FRAMING THE DEBATE

One of the reasons the sport-as-art debate appears to be deadlocked, again, is that philosophers on either side appear to be talking past one another. Those naysayers who deny that sport is art tend to insist, for various reasons, that no sport counts as an art*form* (e.g., Best, 1978; Cordner, 1988; Hyland, 1990; Mumford, 2012; Allen, 2013). As David Best succinctly puts it, "I contend that *no* sport is an art *form*" (1980, p. 69, original and added emphasis). Those who rather affirm the sport-as-art thesis, however, tend to focus on insisting that certain sport performances count as art*works* (e.g., Boxill, 1985; Wertz, 1985; Arnold, 1990; Platchias, 2003; Elcombe, 2010). As Peter J. Arnold articulates the point, "a skater like Katarina Witt [...] embodies and articulates her aesthetic intent [...] In her rendering of the music from Bizet's *Carmen* at the 1988 Olympics she was able to do this with perfection [...] Similarly in the pair skating [*sic*] of Torvill and Dean [...] skating to the music of Ravel's *Bolero*" (1990, p. 175).² Although the point of contention might not be entirely clear here, it should be evident that there is a sharp division between both hostile and friendly attitudes toward the idea that sport is or can be art in some sense.

What might strike one, however, is the impression that critics and advocates of sport as art are focused on supporting positions that are neither contrary nor contradictory but are rather entirely consistent. The naysayers might be right about artforms even if the proponents are right about individual artworks. It might be the case *both* that no sport counts as an artform *and* that certain sport performances count as artworks. This is because questions about artforms concern *types*, which are logically distinct from questions about individual artworks: tokens rather than types. Analogously, mental states may be token-identical to brain states – i.e., each one *is* a brain state – even if, for principled reasons, there is no single *type* of physical state that corresponds to the mental type. More concretely, note that Marcel Duchamp's *Fountain*, a urinal presented in a gallery, may count as an artwork even though urinal presentation per se is not an artform. It may likewise be the case that figure skating, say, is not an artform

Note that Torvill and Dean competed in ice dance, not pairs, and that if any subclass of figure skating as sport also counts as art, ice dance is the most plausible given its particular constraints on jumps and so forth.

even if certain performances count as artworks. If one were to counter that *Fountain* is an example of *object trouvé*, or 'found art', which is an artform, two replies are in order. First, *Fountain* was one of the first *objects trouvés*, paving the way for – and thus not depending on – the established artform. Second, even if the art status of certain skating performances required an associated artform, just as *Fountain* stands in relation to found art, so too would they stand in relation to the artform. If anything can be art, that doesn't mean any type of thing can be an artform.

But the debate does not stop here. Both sides press further on the basis of problematic if largely implicit assumptions. For naysayer Best, for instance, figure skating as a sport will in *no instance* count as artwork (1978, p. 121). This is in part because the activity of creating art is or is supposed to be autotelic or aesthetico-telic, something done for its own sake or the sake of aesthetic creation alone. Since the aesthetic is created in sport at most as a means to the desired end of scoring and winning, it is thereby not properly, since not purely, artistic. On the other side of the debate, a proponent like Boxill contends that a sport like basketball – indeed, sport generally – should be seen as an artform because great players like Dr. J and Kareem Abdul-Jabbar show great artistry in their unique, creative styles of play (1985, pp. 36, 46).³ In other words, the navsayers tend to be implicit *purists* about both sport and art, taking the view that no sport is an artform to imply that there is no case of sport performance that counts as an artwork, as well as seeing the creation of aesthetic beauty for some further end, like scoring or winning, to exclude the product from the art class. But just as such purism seems unwarranted, proponents tend to fall prey to undue *tokenism* by taking the view that some sport performances are artworks to imply that the sport itself is straightforwardly and unproblematically an artform. When made so explicit, neither the naysayers' purism nor the proponents' tokenism appears sufficiently plausible.

Since it is a matter of some dispute whether any individual sport performance counts as art, the best way to proceed, I think, is to replace the somewhat nebulous question "Is sport art?" with the more focused "Is sport *ever* art?" If sport is ever art, it will no doubt be so in the case of an aesthetic rather than purposive sport, and if any such sport is to count as an artform, doubtless it will be some such sport as figure skating. If figure skating as a sport ever counts as art, it will most plausibly be a performance such as Torvill and Dean's gold-medal 'Bolero' routine at the 1984 Sarajevo Olympics, a routine many consider to be one of the all-time high-water marks of figure skating artistry. Even Best, the most adamant naysayer of all, admits that figure skating is the most plausible case for sport as art, conceding even that it sometimes *does* count as art, albeit only in essentially non-competitive (i.e., non-sport) contexts like a professional showcase where the purpose is entertainment, not winning (1978, p. 121). We can use 'Bolero' as a test case to determine first whether sport is ever art, and then move to address the larger question of whether any sport is an artform.

The 'Bolero' burden

The naysayer's concession is a reasonable one. It is too implausible to deny that figure skating performances outside the competitive context of sport may constitute artworks. After all, figure skating is a peculiar kind of dance – dance on ice – and

³ Boxill also highlights notable athletes from other sports (1985, p. 42).

although some types of dance are non-artistic activities, dance is a bona fide artform. On the surface at least, the naysayer is perfectly consistent in affirming the arthood of skating outside the sport domain but denying the arthood of skating within the sport domain.

Problems arise, however, when we consider the possibility of particular routines being performed *both* in sporting and in non-competitive contexts; Torvill and Dean have performed their 'Bolero' routine in non-competitive showcases as well as in winning Olympic gold. The naysayer's position implies that this very same routine performed by the very same dance pair fails to qualify as art in the Olympics yet qualifies admirably in the showcase. We may assume for argument's sake that the aesthetic appeal of these several performances is similar, although the Olympic performance, because of the heightened tension of an event viewed by millions, is in reality a far more dramatic one. If the showcase 'Bolero' counts as art, the naysayer's burden is to explain why essentially the same performance, the Olympic 'Bolero', fails to count as art. If the 'Bolero' is showcase art, why not Olympic art as well?

It would be natural for the naysayer to answer this 'Bolero' burden by appealing to the landmark work on indiscernibles by Arthur Danto (1964). Part of Danto's insight is that what makes something an artwork is perceptually unavailable to an observer insofar as a pair of perceptually indistinguishable artifacts – such as one of Andy Warhol's *Brillo Boxes* and an ordinary carton of Brillo pads – may constitute art in the one case and non-art in the other. In a similar vein, the naysayer might claim that the Olympic 'Bolero', like the ordinary Brillo box, is not art, whereas the showcase 'Bolero', like a Warhol *Brillo Box*, is art. This insight has been a significant force in sculpting the profile of recent philosophy of art for decades now.

However, although this is a possible move by the naysayer, it is the wrong way to think of the Brillo box analogy. In the 'Bolero' cases it is not as though we have different agents with different performative intentions fashioning different works that happen to look the same, rather we have the same performers doing the same beautiful routine with the same aesthetic intention: to represent a loving relationship, in rhythm with the music from Ravel, between two sometimes birdlike creatures in harmony with each other and ending with the beings' or their love's literal or metaphorical death. True, the Olympic 'Bolero' is intended to be aesthetically appealing for the sake of winning, just as the design of a normal Brillo box is meant to entice consumers. But it is more as if we have two Warhol *Brillo Boxes*: one in a gallery, one in a supermarket. Both count as art despite their different contexts and whether or not there are any transaesthetic purposes in play.

For the naysayer to insist, moreover, that the competitive context of sport is an *excluding* condition from the art class, leads to the following reductio: that there can be no such thing as an art competition. This is because the minute an artist submits their work to be considered for some transaesthetic purpose – a sale, a critique, a competition – the naysayer's position implies that the art status of the work is thereby nullified, the 'proper' purpose of art being no more, and no less, than aesthetic creation itself. But this position is untenable, or at the very least rather naïve about the artworld. There *are* various permissible transaesthetic purposes for which art is made, among which we may count winning art competitions, and to deny this is too idealistic, somewhat naïve about the motives of many artists for creating their works. So considered,

the 'Bolero' test case shows that at least some sport performances, however few, also count as genuine artworks.

Dance as sport

Even if we could not show, as I believe I have, that some established sport also counts as art, that by itself would not close the debate, since it could turn out that some established art, in particular dance, in some cases might also count as sport. It is somewhat curious that philosophers of sport have effectively ignored this line of inquiry, although it should be noted that dance theorists have not been so neglectful. Guarino for instance maintains that as an art dance is not only sufficiently physically demanding to qualify as sport, but also, no less importantly, that it is often sufficiently competitive to so qualify as well (2015, pp. 77–78). I believe this line of argument is essentially correct. The art-to-sport inference seems at least as and perhaps more plausible than the sport-to-art inference, so it would behoove us to explore the art-as-sport angle of the sport-as-art question.

Backing up a bit, we should note that dance is not always an artform and comprises three different broad types: ceremonial dance of the sort we might find in a tribal ritual, social dance as happens for instance in nightclubs, and proper artistic dance such as ballet (Cohen, 1962, p. 19). There may be some overlap among these categories. As I dance a foxtrot it is barely even a social dance and certainly no artform, yet as Fred Astaire danced it, it is unquestionably art. Since not all dance qualifies as art, we must be careful to focus our question accordingly. The question is not whether dance simpliciter may count as sport, but whether dance qua art may count as sport. Dance in a general unqualified sense fails to count as sport just as in a general unqualified sense dance fails to count as art. This is because sport is essentially a type of physical contest, whereas dance as an activity is not necessarily competitive.

But this does not settle the question of whether artistic dance in certain contexts qualifies as sport. Dance need not be artistic but is still an artform, and likewise artistic dance need not be competitive but still may qualify as sport, and even as a 'sportform', when it is competitive. We should distinguish at least two types of such competitive dance. First, there are types of artistic dance that are essentially competitive: competitive ballroom (i.e., so-called *dancesport*), b-boy battles, power cheerleading, and so forth. Then there are types of artistic dance that, though not inherently competitive, have significant, clearly defined competitive contexts. Take ballet. There are longstanding ballet competitions, such as the Prix de Lausanne, not to mention the inherently competitive nature of auditions, competing for roles and status within and among dance troupes, and so on. In both types of competitive artistic dance, the activity meets such a criterion of sport as "competitive events involving a variety of physical (usually in combination with other) skills, where the superior participant is judged to have exhibited those skills in a superior way" (Suits, 1988, p. 2).⁴ It is no accident that Sylvester Stallone, perhaps the quintessential sport film icon, directed the dance movie sequel Staying Alive. The opening scene is of John Travolta at a dance audition leaving it all on the stage to the music of Frank Stallone's 'Far from Over', a soundtrack

⁴ It should be noted that this is Suits' mature view, in contrast to his earlier, game-centered, and explicitly institutional view (1973).

that might just as well have accompanied an athlete at a walk-on tryout leaving it all on the field.

Setting aside the unfortunate, often implicit, and clearly problematic tendency to gender sport as 'masculine' and the arts as 'feminine', perhaps the strongest resistance to dance as sport is grounded in institutionalism. An institutional theory of sport requires that a sport be not only a game of physical skill but also have a "wide and stable" following (Suits, 1973, pp. 59, 60). By this objection, although ballet has a wide and stable following, that is only in its non-competitive artistic form; it lacks such a following in its competitive varieties. Likewise, dance activities like power cheerleading may be essentially competitive, but their followings also seem of insufficient standing for sport.⁵

In response to this naysayer's objection, the proponent has several plausible responses at the ready. First, we may object on principled grounds to an institutional requirement for sport (e.g., Meier, 1988, pp. 15–17). Second, we may note that institutional theories of *art* rather than sport do not require a wide and stable following for the activity type but rather artistic status conferral on, or public presentation of, the token: a criterion of artworks rather than artforms (Dickie, 2000, pp. 93, 96). Third, on the heels of this point, and returning to the sport-as-art question again, we may note that on the institutional theory of art a skater like Toller Cranston was perfectly able to make his competitive performances art, as he intended, by his own status conferral and public presentation. To object that the artworld and 'sportworld' are wholly disjoint institutions is simply a non-starter. Fourth, we should note that at least some artistic dance competitions *do* have wide and stable followings, not only individual competitions like ballet's Prix de Lausanne (an international competition in its forty-fifth year), but also artistic dance types like competitive ballroom. It is entirely fitting, not merely aspirational, to refer to competitive ballroom as *dancesport.*⁶

The artform question

Backing away from institutionalism, we may turn to considering what it means for a *practice* to count as an artform. Urinal presentation never became an artform, but the more general category of found art did become an artform, partly because of such groundbreaking works as Duchamp's *Fountain*. Intuitively, if somewhat sketchily, what makes something an artform is a combination of a sufficient number of artwork instances overarched by a sufficiently robust creative practice. Thus *Fountain* helped inaugurate the artform of found art rather than urinal presentation. More traditionally, dance and painting are artforms because there are significant numbers of paintings and dances that count as artworks and because these works are embedded in sufficiently robust practices of creating such works. Their artform status is not undermined by the fact that not all painting activities or dancings are artworks or by the possibility that such practices might exist outside institutional contexts.

Very few sports meet such a criterion for artforms, but at least figure skating does.⁷ We should note that the failure of most sports to meet this criterion is at the heart of what makes the naysayer's position attractive. Very few of the arts satisfy an analogous

⁵ See for example Johnson and Sailors (2013, p. 270).

⁶ For a useful discussion of competitive ballroom as sport, see Marion (2008, Chapter 6).

⁷ Synchronized swimming might also qualify, though again the vast majority of sports will not.

criterion for sportforms, but at least some competitive dance does. Even as a sport, figure skating is too similar to other forms of artistic dance not be considered a variety thereof. Even as an art, competitive dance is too similar to other sportforms not to be considered a variety thereof.

My conclusions, then, are that (1) some figure skating performances count as both sport and art; (2) some dance performances count as both art and sport; (3) figure skating (if no other sport) counts as an artform; (4) competitive dance (if no other sort) counts as a sportform.

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REFERENCES

- Allen, B. (2013). Games of sport, works of art, and the striking beauty of Asian martial arts. *Journal of the Philosophy of Sport*, 40(2), 241–254.
- Arnold, P. J. (1990). Sport, the aesthetic and art: Further thoughts. *British Journal of Educational Studies*, 38(2), 160–179.
- Beardsley, M. C. (1979). In defense of aesthetic value (Presidential address). *Proceedings of the American Philosophical Association*, 52(6), 723–749.
- Best, D. (1978). Philosophy and human movement. London: Allen & Unwin.
- Best, D. (1980). Sport and art. Journal of Aesthetic Education, 14(2), 69-80.
- Boxill, J. M. (1985). Beauty, sport, and gender. Journal of the Philosophy of Sport, 11(1), 36-47.
- Cohen, S. J. (1962). A prolegomenon to an aesthetics of dance. *Journal of Aesthetics and Art Criticism, 21*(1), 19–26.
- Cordner, C. (1988). Differences between sport and art. *Journal of the Philosophy of Sport*, 15(1), 31–47.
- Danto, A. (1964). The artworld. Journal of Philosophy, 61(19), 571-584.
- Dickie, G. (2000). The institutional theory of art. In: N. Carroll (Ed.), *Theories of art today* (pp. 93–108). Madison: University of Wisconsin Press.
- Elcombe, T. (2010). Is Ronaldo a modern Picasso? In: T. Richards (Ed.), *Soccer and philosophy: Beautiful thoughts on the beautiful game* (pp. 161–171). Chicago: Open Court.
- Guarino, L. (2015). Is dance a sport? A twenty-first-century debate. *Journal of Dance Educa*tion, 15(2), 77–80.
- Hyland, D. (1990). Philosophy of sport. New York: Paragon House.
- Johnson, A. B., & Sailors, P. R. (2013). Don't bring it on: The case against cheerleading as a collegiate sport. *Journal of the Philosophy of Sport*, 40(2), 255–277.
- Marion, J. S. (2008). Ballroom: Culture and costume in competitive dance. New York: Berg.
- Meier, K. V. (1988). Triad trickery: Playing with sport and games. *Journal of the Philosophy of Sport*, *15*(1), 11–30.
- Mumford, S. (2012). Watching sport: Aesthetics, ethics and emotion. New York: Routledge.
- Platchias, D. (2003). Sport is art. European Journal of Sport Science, 3(4), 1-18.
- Suits, B. (1973). The elements of sport. In: R. G. Osterhoudt (Ed.), *The philosophy of sport: A collection of original essays* (pp. 48–64). Springfield: Charles C. Thomas.
- Suits, B. (1988). Tricky triad: Games, play, and sport. *Journal of the Philosophy of Sport*, *15*(1), 1–9.
- Wertz, S. K. (1985). Sport and the artistic. *Philosophy*, 60(233), 392-393.

Faith, hope and love in sport

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ABSTRACT

In the Christian religious tradition, theological virtues of faith, hope and love have a central role. Along with the cardinal virtues of prudence, justice, fortitude and temperance they present the whole of the good human life. While cardinal virtues can be cultivated by human will, faith, hope and love are given by God and therefore open 'natural' human life on Earth toward transcendent spiritual realities. Human beings as bio-psycho-social and spiritual beings incorporate theological virtues in all the activities of their life. In sport, faith, hope and love have an important, though often neglected, role. On a practical level faith can be recognized in any relation between athlete and coach. To trust one's coach, without any guarantee that the outcome of prescribed workouts will lead to the desired results, needs strong faith, trust and confidence. Moreover, faith is the virtue that makes sport so attractive also for spectators even to the point of being a 'secular' religion for the masses. Hope is the virtue of 'not yet' or of something 'being on its way'. For most athletes, daily workouts are not a goal, but just the means to that end. Any reason for doing sports needs a hope behind it in order to move or will oneself to action. Along with hope, understood as a golden mean, we find despair on the one hand and 'false hope' on the other. Both are corruptions of hope seen daily in the world of sport. To manage hope in sport practices correctly offers a path to success in sport at all levels. Love is at the apex of the theological virtues. There are many formulations of love both in ancient Greek and Roman times: eros, agape, caritas, amor. Each has its special characteristic meaning also in sport. In sport we can see laughter and tears because any love is connected with highest human joy and deepest depression. Yet, in summation, it is argued that love in sport must be understood as the binding force and source of cooperation and fulfilled life for any athlete *qua* human being.

KEYWORDS

sport; theological virtues; ethics; faith; hope; love; spirituality

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INTRODUCTION

Sport has long been connected with religious dimensions of human beings. This connection may be more explicit, as in Homer's writings and in the ancient Olympics, or more implicit, as in a modern secular religion of sport from Coubertin's ideas on to modern times (Parry, 2007). But why are sport and religion so closely connected? One common element or connection between sport and religion is the human being, qua believer and athlete; so the answer that will be offered below will focus on some characteristics of being human, and the human capacity for spiritual life. The focus will be on three classical theological virtues: faith, hope and love, which are in Christian teaching understood as a 'pledge of the presence and action of the Holy Spirit in the faculties of the human being' as presented in the *Compendium* (2005, p. 384).

So, no matter what man is doing, in deeds of faith, hope and love the spiritual dimensions of human being are manifested. Faith, hope and love were recognized from ancient times onwards as a means to help people grow spiritually (Augustine, 1955). In present times, too, cultivating those virtues can be a way to God and personal spiritual development (Ratta, 2014). The whole life of any spiritual human being should be touched (and, ideally, filled) with these three virtues. It is not surprising, therefore, that faith, hope and love play an important role in every activity, and also in sport. Moreover, it is not only religious people who experience faith, hope and love in sport; non-believers do, too. This leads us to two insights: that human beings as such are spiritual beings, and that sport as human activity is in itself open to spirituality. As already mentioned this fact is not something new, since from ancient times athletic events were connected with religious rituals (Sansone, 1993). Nevertheless, our task here is more explicitly to reveal this connection, recognizing theological virtues of faith, hope and love as something common in everyday sporting practices.

Spiritual dimensions of sport through theological virtues of faith, hope and love

We can say that religions are external manifestations of the similar inner spiritual experiences of people. We start, then, with a consideration of the religious dimensions of sport. First, it is possible to recognize that sport and religion are once again becoming more closely aligned. On the one hand, some religious practices, like walking or biking pilgrimages, have become truly sporting tests and/or events. On the other hand, sport has become a place of deep faith, source of hope and experience of love for many people. Today, sport may be seen as the last transformation of traditional confessional religions and the only religion for many people. Sport is increasingly becoming a religion and religion is becoming a sport. The borders between the two, at first sight opposing human practices, one focusing on the body and the other on the soul, are diminishing. As we have already seen, this is not something new and not even surprising, because as we will see both practices highly estimate faith, hope and love. But before we focus on these three theological virtues, let consider some other reasons for religiosity of sport.

It is hard to avoid the well-known saying of Karl Marx that "religion is [...] the opium of the people" (2009, p. 3). Religion is, for Marx, an anaesthetic for the exploited masses. Indeed, religion proved to be a very successful medicine in healing pain:

religion indeed gives the meaning to pain. Although Friedrich Nietzsche directed his criticism of religion to this fact, religion proved to be a good medicine against pain. However, in some modern societies where confessional religions are not present or strong any more, many people find their anti-pain 'opium' in sport. If we paraphrase Marx's saying we get: "Sport is the opium of the people." Once again, this is not some-thing surprising because it was obviously well known by many more or less totalitarian state leaders, e.g. in 20th century Eastern Europe.

Similarly Michael Novak (1988, p. 183) characterizes the faith of people from USA with the saying: "In sport we (should not) trust." Furthermore, Thomas Luckmann (1967, p. 72) recognized the 'invisible' religion in any meaning-system for a society or an individual. Thus, the invisible religion of modern man can be, among others, sport (Pisk, 2010). The religious believers and believers in sport share many things: they search for salvation in special 'sacred' space and time, and adore their G(g)od(s). There are regular rituals, symbols, poems, strong group cohesion and relics. In both cases the option of achieving immortality is offered (Pisk, 2012). Here and there miracles happen, and after the fall it is possible to 'forgive sins' and start again from the beginning.

From the other side, some religious practices are more like sport. For an average modern western believer sport is an important means of searching for the self and for meaning in life. It may represent a kind of 'spiritual wellness' or 'soul-wellness', much like sport practices are important for 'body wellness'. The shared aim is in attaining an inner harmony (Jirásek, 2015, p. 297). This can be attained by different body-spiritual practices, like meditation, yoga, etc. The meaning of anthropocentric exercises like these is similar to the meaning of body exercises – the (self-centred) search for the self, peace and meaning. Also salvation is not understood as a gift, or the gift of grace of any deity anymore, but must be earned by one's own work. Therefore, the temptation of self-salvation is very frequent in sport as well as in this kind of religion. In this manner in religious and spiritual personal life, practices from sport – such as meritocracy – may be introduced.

The interconnections of sport and religion within the search for meaning and self-salvation, while important, do not reveal the whole picture. Modern pilgrimages can be understood as sport-like tests of personal endurance, the search for the self and one's other capabilities. Yet sport can also be the place for developing and ramifying meaning and thus the essence of one's own life. Yet, the question of deeper congeniality between sport and religion, between the sporting life and the spiritual life of the human being, is still unanswered simply by observing these commonalities. Therefore, our further investigation must try to expose deeper similarities between the two, focusing on three classical theological virtues: faith, hope and love. We will show how these three virtues shape human experiences in sport. Faith, hope and love are more than just something arbitrary in sport. They can partly reveal to us the essence of sport – they make sport attractive, something special and worth engaging in. Through faith, hope and love, it will be argued, the spiritual dimensions of sport are revealed.

Faith in Sport

Immanuel Kant defines faith or belief¹ as a subjectively adequate but objectively inadequate acceptance of something as true (1896, p. 741f). A believer is someone who possesses no exact knowledge of the thing(s) (s)he believes. In religious discourse, there is a sense in which it is redundant to speak of 'belief' where the subject of that belief could be proven. Josef Pieper, who wrote about faith, hope and love, emphasized that there are two important elements of any faith: "Unfamiliarity with the subject matter and yet, at the same time, unconditional conviction of its truth" (Pieper, 2012, p. 23). But, as Pieper further emphasized, the believer must know enough about the matter to understand "what it is all about", in order to open up a path to recognizing the role of faith in sport.

Faith is definitely no stranger in sport. Among other things every competition confronts athletes with unknown future outcomes. If somebody could know (not merely believe) that they would accomplish the task perfectly or win the competition, then why try? The meaning of the contest would disappear. The results of contests test our beliefs and show if they were well-founded or not. Athletes are not entirely ignorant concerning their beliefs. They must know enough to understand what is going on: athletes believe that they can accomplish the task, though they cannot guarantee it before the fact. A good skiing coach will not let their charges attempt a run before they are ready for it, irrespective of the confidence of the novice. Yet athletes must believe that they can make progress with training, that they are capable of accomplishing different and superior tasks, to make it to the finish line, and so on.

Athletes believes that their trainer or coach is the one who can help them on their way. If they stop believing – and lose confidence – in their trainer, then it is time to change them. A part of one's predispositions as a successful athlete is a prior belief in oneself that cannot be atomised; athletic success is no orphan. Athletic self-belief is wrapped up with the belief of critical others such as the coach or trainer. Without strong belief in his trainer and his programme of workouts it is difficult, perhaps impossible, to succeed (Vodeb, 2001, p. 203).

So it is very important for the trainer or coach to be as trustworthy a person as possible, because this is in part the foundation of the faith of the athlete's belief in themselves too. Besides his own knowledge of sport, a good trainer must work on his own credibility and develop it. Yet the abilities of the trainer are not enough. Every athlete must understand what the trainer wants or demands of them, and judge reasonably the extent to which their instructions make sense.² Aquinas states (1920, II, II, 8, 8 ad 2): "Man could not believingly assent to any proposition if he did not in some way understand it." Trainers convince athletes to trust in them, in their experience, replacing doubt with reference to past results and with the strength of their knowledge and character.

¹ 'Faith' or 'belief'? We will use these two words interchangeably. The Latin word 'fides' can be translated both ways.

² Success, here, may of course be understood in relation to external goods such as adulation and trophies but may just as well be understood in terms of accomplishments related to the internal goods of the activity (Brown, 1992; McNamee, 1995).

From these everyday interactions, it is clear that two things are in play: to believe always means to believe someone and to believe something (Aquinas, 1920, II, II, 129, 6); and to believe someone seems to be the more important of the two. That is clear in sport training as well: the athlete must first believe a given person (coach, co-player, event organizer, captain, masseur, scientist and so on), and only after that does he believe a given matter (training programme, etc.). The reason why we believe something is because we believe someone. This faith of the athlete in others runs deep. This is important, since if the athlete is to pledge all his powers, time, money and even his own life in sport, they must be assured of the possibility of success therein. Athletes do not have rock solid assurance that their investment in sport will pay off. So faith plays a central role in every athlete's life. Confidence in the competence of critical others is paramount. Mature athletes will judge trainers using their own experience but nevertheless the athlete's faith is not grounded on scientific proofs, because it cannot be: it is rather reasonable faith about his or her unpredictable future.

John Caputo has made a useful distinction here between 'relative' and 'absolute' future, which can help us understand what is going on in sport, and why sport is so attractive.

There is a relatively foreseeable future, the future for which we are planning, the future on which we are all hard at work, the future we are trying to provide for when we save for our retirement or when a corporate team sets up a long-term plan. Let us call that the 'relative future' – the future present, by which I mean the future of the present, the future to which the present is tending, the momentum of the present into a future that we can more or less see coming. [...] But there is another future, another thought of the future, a relation to another future, which is the future that is unforeseeable, that will take us by surprise, that will come like a thief in the night (I Thess. 5:2) and shatter the comfortable horizons of expectation that surround the present. Let us call this the 'absolute future'. When it comes to the relative future, the future present, we have 'reasonable expectations', 'cautious optimism', 'bulls and bears', but as regards the absolute future we must be like the lilies of the field who sow not, nor do they reap, but who are willing to go with what God provides, which also means that they are ready for anything. For the relative future we need a good mind, a decent computer, and horse sense, those three; for the absolute future, we need hope, faith, and love, these three (Caputo, 2001, pp. 7–8).

Although the process of sport training, with all its scientific support, is directed toward mastery over the future, that is into the 'future present' or 'relative future', everyday sport practices (especially competitions) show us that the 'absolute future' is at all times a concern. Nobody can know the outcome of the competition, and big surprises or 'miracles' are not something wholly unusual in sport (Fry, 2008). These facts clearly direct us to the religious or spiritual dimensions of sport, to the 'absolute future' where faith, hope and love are important. This is one reason why sport is today 'the last transformation of religion' or the place of religious or spiritual experiences for many people.

Further we can recognize that belief is not grounded on any special interest or constraint, but on our willful striving for the good. To put this differently: faith is a voluntary decision of the will in pursuit of the good. In this manner athletes voluntarily

decide to do a workout and fulfil the demands of sport training, because he or she recognizes them to be good, a partial good on the way to some larger athletic goal. But, it must be emphasized, athletes do not have certain knowledge of the truth about the effects of training in advance. Their decision is made largely on goodwill, and priori expectation and experience of that goodwill in relation to the other.

So, uncertainty is always present. Uncertainty about the outcome maintains a degree of freedom in their faith; their belief is to some degree an act; a product of agency. And, precisely because of its voluntariness, the athlete is responsible and meritorious for the results of success or defeat in sport. At the same time, of course, uncertainty can be the source of doubt, which is a permanent companion of faith. On the one hand, uncertainty and doubt can be valued negatively, but on the other hand this can partly explain to us the attractive power of sport. Aquinas (1955, 3, 40) claims that "the cognition of belief does not quiet the craving but rather kindles it". Sport is attractive precisely because it is uncertain, precarious: it is based on faith.³ It is uncertain for the athlete and trainer, as well as for fans. Everyone is longing for the knowledge that is still unknown in the future.

At last we must acknowledge that believing is included in any human learning. Aristotle (1994–2009, 165b) once said that "he who wishes to learn must believe". Anybody who wants to learn a new body movement or to gain special motor capabilities must believe those who have experiences and stand before him, who have already accomplished demands and can direct the novice in the right way. Without belief, any learning would become enormously demanding and very ineffective. What then of hope?

Hope in sport

For any religious or spiritual life the basic concept of *status viatoris* – the condition or state of "not yet" or of "being on the way" (Pieper, 2012, p. 91) – is foundational. Prayers and other spiritual exercises are the means, and not the end of spiritual life. Or, rather, there can be no clear separation of means and ends in a faithful life. It is not hard to recognize that the major part of the athlete's life is just that – being 'on the way'. Indeed, tragedies arise when that trajectory is no longer meaningful (Edgar, 2016), such as that experienced at the premature ending of a career by injury; or failure to make it to the next level; and so on. For most athlete daily workouts are not the aim, but simply the means to the end. The aim is to master some body 'techniques' or to achieve success in the competition.

But most of the time the athlete, as well as any human being, is in *status viatoris*, the state of 'not yet'. And hope is the virtue of 'not yet'. "It includes both a negative and a positive element: the absence of fulfilment and the orientation toward fulfilment" (Pieper, 2012, p. 93). Most of the time any athlete knows that he or she is not in a state of already having achieved the abilities he wants to have. So, hope is the reasonable response to this problematic: without it nobody would endure the process of training, because the aim is too far away. As we saw above, the unknown 'absolute future' is the

³ This is why the phenomenon of match fixing, or event manipulation, represents such a threat to sports integrity (Cleret, McNamee, & Page, 2015).

reality of sport. Nobody knows whether all the efforts of their training will bear fruit: the final results are uncertain at the time.

So hope must accompany any athlete, trainer or sports fan. Hope is directed into the future: it is not in fact here and now, but in hope it is. So in hope athletes, trainers and fans get a taste of the fruits before they ripen. Understood thus, hope can be the source of motivation and meaning for the daily efforts. It gives the power and energy to endure training until the day of the competition comes. Without hope, athletes would fall into despair.

Despair is one of two possible corruptions of hope. Beside despair the opposite kind of hopelessness is *preasumptio* or 'false hope'. "*Preasumptio* is a perverse anticipation of the fulfilment of hope. Despair is also an anticipation – a perverse anticipation of the nonfulfillment of hope" (Pieper, 2012, p. 113). Both of them transform the 'not vet' of hope into either the 'not' or the 'already' of fulfilment. While hope says: it will turn out well, despair says: it will turn out badly. Therefore despair is the characteristic state of those who have already - to some degree - given up. Any athlete or team who falls into despair before or during the competition, thereby enhances their likelihood to lose. With despair the athlete closes the door to success. This can be recognized as a distinction between big and small names in sport. The hopeful athlete does not stop until the end although the match seems already lost. There are numerous almost mythological stories from sport fields about a 'miraculous' recovery in a match that seemed completely lost, but when the result turned before the end of the game (Fry, 2008). Only those with strong hope can achieve victory in these cases. So it is clear why Aquinas (1920, II, II, 20, 3) claims that despair is not the most serious sin, but it is the most dangerous. And it is the most dangerous also for any serious athlete. One root of it is acedia or slothfulness. Pieper (2012, p. 119) defines it thus: "One who is trapped in acedia has neither the courage nor the will to be as great as he really is. He would prefer to be less great in order thus to avoid the obligation of greatness. Acedia is a perverted humility."

On the other hand, we can recognize *preasumptio*: presumption or 'false hope'. This disposition can be seen in some cases of doping-enhanced performance and other forms of cheating in sport. The doping or otherwise cheating athletes comes to believe that "he has actually attained the 'arduous' goal that, in reality, lies still in the future, the tension of the hope is relaxed in the middle of the 'way' and passes into the peaceful certainty of possession" (Pieper, 2012, p. 124). That happens in cases when the athlete or trainer does not wait or endure in the process of training until the time when the compensation of their athletic abilities will occur, and which will bring athlete to their peak performance. They want to make a shortcut to the result, sooner and/or with less hard work.

The other reason for presumption also common in sport practice is the athlete's need for security and certainty. Athletes paradoxically want what they cannot have: they want to be sure about their success in a venture where it cannot be known before the fact. They want to be secure in their results, but this can indirectly lead to the abuses of doping and cheating. A false self-esteem is common because there is no valid ground for it. Athletes and trainers need a special kind of humility manifested in stoic patience. Of course, here it is the coach who is usually the midwife of this virtue; reassuring the athlete, timing their entry to competitions or levels, staging skill acquisition with skillful timing, and so on. We saw that is not possible to fully dismiss the uncertainty of human existence, but we can fight against it with hope. This is especially true for athletes living in the uncertain world of sport. Hope is always connected with the future, whether it be my own future or the future of those I love.

Love in sport

What has love to do with sport? First of all we must recognize that love is a word with many meanings, from that on the 'yellow pages' or in teenage magazines on the one hand, to the deeper formulation of God as Love in Christian religion on the other. Therefore, it is necessary to expose some common characteristics of love. For now we will not go into different meaning of different words for love from Latin (e.g. amor, caritas, etc.) or Greek (e.g. agape, eros, philein, etc.). What do the different names for love have in common? One of the first things included in love is approval of someone or something. Pieper (2012, p. 164) puts it like this: "It's good that you exist!" Beside this love is usually something that comes upon us, not something that we decide for or do. Someone or something fascinates us and takes us over. At last, in the beginning of love, we are not so much active ourselves as stirred, changed, moved by something lovable. Plato in his Symposium (201a) maintained that the quality that makes a thing the object of possible love is beauty that attracts us as something perfect. Augustine makes a similar claim in his Confessiones (2009, 4, 13): "Do we love anything but the beautiful?" It is not for nothing that the slogan of one manufacturer before the FIFA 2006 soccer World Cup adopted the characterization 'the beautiful game'. The beauty of football makes the game liked and loved. Because the human being as such is not perfect, but is striving for perfection or fulfilment in different areas of his life, beauty attracts us. In this we will later recognize the love as eros. These few remarks are enough to start recognizing love in sport.

First of all we must recognize that to love something means to 'keep the beloved in being', to sustain its existence. Therefore if human beings have a power to do or not to participate in sport (literally to give - or not to give - existence to sport) the mere fact of existence of sport indicates that humans love sport. It is very simple: if people did not love sport, it would not exist because there can be any sport without human beings (Pisk, 2003, p. 159). From this ontological connection between human being and sport another characteristic of love in sport is derived: oneness. A common characteristic of love is "the reunion of those who have been alienated from one another. But alienation can exist only on the basis of a pre-existing original oneness" (Pieper, 2012, p. 160). At first sight this claim cannot be something special, but it can reveal some interesting insights of relation between being human and sport. If people love sport that can mean that in sport is something that corresponds to human being as such, to their human nature. People like sport because they recognize in sport something human, something that fits their nature. This claim could open the whole new theme of research: the question of human nature and sport. How they are interconnected, how sport can fulfil the natural potentials of human being, and how different understandings of human nature are reflected in different understandings of sport. Finally, sport can reveal to us something about our human nature (Pisk, 2014, p. 295). But these thoughts go beyond the scope of our present concerns.

The next characteristic of love is that we are engrossed by it. "One of the ideas behind 'love'," said Caputo, "is that it represents a giving without holding back, an 'unconditional' commitment, which marks love with a certain excess" (2001, p. 4). Similar experiences come from the world of sport when athletes and spectators are often totally taken over by sport. The etymology of fan – fanatic – is not idle here. This identification and commitment can go even to the level addiction with sport: they think that they cannot live without sport, being actively engaged in it or actively watching it. In either case, to love something means to give preference to it. The most of time and money is invested into the loved one. In this case danger arises because to love sport more than anything, means that everything is less important than sport. Sport can securely 'compete' for the love of human beings against other activities e.g. music, art, wine; but to love sport more than other human being means that 'in the name of sport' also some unethical decisions seem natural. In these cases our priorities are disordered. Humans can exist without sport, but sport cannot exist without human beings.

One of the most important characteristics of sport is the fact that in sport people can feel joy. And, if the source of joy is "our receiving or possessing something we love" (Pieper, 2012, p. 225), then the joy in sport reveals the love that partly comprises sport. But joy in sport is just one side of the coin. Probably everyone will acknowledge from his own experiences that love is also connected with pain and suffering. C. S. Lewis (1960, p. 169) once characterized what means to love somebody or something:

There is no safe investment. To love at all is to be vulnerable. Love anything, and your heart will certainly be wrung and possibly be broken. If you want to make sure of keeping it intact, you must give your heart to no one, not even to an animal.

And not even to sport, we can add. Love in sport is not connected only to the highest joy, but also to the deepest pain. Everyday experience shows that in sport there are many tears: tears of joy when athletes or teams succeed and tears of pain when things are not going as we wished. The athletes' tears reveal what really matters in sport and, as such, is a token of love in sport.

Leibnitz said that "to love means to rejoice in the happiness of another" (Pieper, 2012, p. 231). Rejoicing in the happiness of another can be seen daily on sport fields. Although only one athlete or team may win, this can bring happiness to the whole variety of people: not only their relatives and friends, but also fans, team mates and even other competitors. All of them can be fascinated with the performance of the winner, but identify with the merits of the loser(s) too. For example when the new record is made, or when a successful attempt of athlete is made. Examples of less tribal sports such a ski jumping offer arenas where there is widespread joy in great performances, no matter who performs them. Competitors are fascinated and congratulate the winner. This happiness is possible when there is a kind of love between competitors. Because love wishes only good to others, no matter how good he or she already is in reality, this means that love is faithful. This is an important characteristic of good spectatorship.⁴ A good fan will stay loyal to his team or athlete even though he or she

⁴ See also the contrast between Mumford (2013) and Culbertson (2015).

is in a time of crisis and does not perform well. In difficulties one can get to know who are one's authentic friends, and in loyalty to athlete or team in case of defeat someone can prove a deep belonging, perhaps true love.

True love is without calculation – a fact that once again is proved in everyday sport reality. "Whoever seeks anything else in love except love will lose both love and the joy of love at the same time" (Pieper, 2012, p. 244). Whoever will cultivate sport because of any other reason than love for sport is apt to lose the very joy that sport can give. For example, when people practise sport predominantly or exclusively for other instrumental pragmatic reasons, like health, body weight control etc., they will likely lose their joy of and love for sport. It is possible to see daily that they no longer experience joy from sport. On the other hand whoever cultivates sport because of their love for it, he or she gets plenty of love, plenty of joy. Just take a look at children or other groups of people who voluntary engage in different sport activities. Listening to the loud laughter of the playground is evidence enough.

A special kind of love is friendship or the love of friends. Aristotle spoke in *Nicomachean Ethics* of *philia*, meaning a compassionate relation between friends. Once again, this is a kind of love we can readily find in sport. Friends usually do not speak of their friendships in the way that erotic lovers do about their love. Rather, "their gaze is fixed upon the things in which they take a common interest" (Pieper, 2012, p. 272). That is why sport has the power to weave friendships among, at first sight, incompatible people. Just call to mind examples of fans from different national, social, religious and other backgrounds. When they meet at the stadium or in the bar before or after the match, they meet as complete strangers to one another, but after a minute when they realize that they are supporting the same team, they become friends (and drink a beer together). Similarly, Pierre de Coubertin, the founder of modern Olympic Games, recognized the power of sport to work for peace in the world, using international meetings of athletes from different nations and building internationalism.

One of important characteristics of love is forgiveness. "Forgiveness is one of the fundamental acts of love," claims Pieper (2012, p. 189). Once again, it is hard to find any successful sport team where forgiveness does not have its place. Anywhere where many people live or work together, where there are strong relations of interdependence, as in team sports, the need for forgiveness is present. Without it, small resentments between players might grow into major disharmony. No matter how good its individual players, without forgiveness the team does not have good possibilities to succeed – or at least, they do not play to the maximum of their abilities. So a wise coach would take care about the relations inside the team, cultivating the environment of love between players and stimulating forgiveness as much as possible. Every form of love essentially seeks oneness and has union for its fruit (Pieper, 2012, p. 247), which is very important in any sport team. In team sports, an in relations within individual sports (such as with the coach and the athlete) reconciliation and harmony between actors are essential. The team must work as a unity, and love is the mean to achieve that.

One of the most well-known forms of love is *eros*. For ancient Greeks *eros* was the central word for love. Everything revolved around *eros*. Plato wrote extensively about it in his dialogue *Symposium*. However, because of some misunderstandings *eros* has in recent times got itself a 'bad name'. The undeserved reputation ignores the distinction

between 'need-love' and 'gift-love', *eros* occupies the first one, the 'need-love' which was often characterized as selfish and not a 'true' love. However, as Pieper (2012, p. 222) has shown, this view is based on misunderstanding of human being as such. Nobody is perfect and everyone needs a lot of things. We can say that we are beings of need, of potentials which they try to fulfill. Therefore, *eros* corresponds to our human reality, which is 'on the way' to fulfilment of its potentials. Just give attention to our body needs and potentials: as bodily beings we need to preserve and develop the motor potentials of our body. We need bodily movement to function well. And if we are short of something (e.g. short of bodily movement) *eros* is the one which drives us into movement, into its own fulfilment. So, *eros* lies in the essence of sport as such because it is a 'natural' force directed into our own development. *Eros* is "the desire for full existence, for existential exaltation, for happiness and bliss" (Pieper, 2012, p. 234). As self-love, *eros* is also the root of all other love. It is the model and standard of love for others. Such 'self-love' can be recognized in recreational sport, which re-creates human being.

If *eros* is on the one side of a coin *agape* is on the other side. *Agape* (or in Latin *caritas*) is 'gift-love' – the original basic conception of love in Christianity. It is entirely unselfish love, the love that "does not seek to win life but dares to lose it" (Pieper, 2012, p. 211). It is love of sacrifice, which can be recognized in sport as well. One example of *agape* may be found in team sport where considerable sacrifice is required by individual players for the success of the team as a whole. Good players sacrifice for one another – is this not a sign of love? Moreover, in different 'fair play' acts, like when one competitor helps another who is in trouble, or lends him his sport equipment because his is broken, we can see *agape*. Sometimes athletes help their competitors, even though this may mean a loss for them. As Caputo said (2001, p. 4):

Love is not a bargain, but unconditional giving; it is not an investment, but a commitment come what may. Lovers are people who exceed their duty, who look around for ways to do more than is required of them.

Finally, we must acknowledge that every human being has a need to be loved, to get approval from other human being. According to Bauer (2008) this is the most important source of motivation for any human activity. In many cases sport can fulfil this need. Usually sport is a public activity, which means that an athlete is performing in front of an audience, who could be parents and friends, or fans and other people. No matter of the level of sport activities, sport gives us an offer to present our self, to gain respect or even become the idols of people. So the humans' need to be loved is partly fulfilled.

CONCLUSION

We have shown that sport is wholly impregnated with faith, hope and love – three classical theological virtues. From ancient times onwards, athletic events were connected with a human religious dimension, and nowadays sport is for many modern secular people the last transformation of confessional religion. In sports, non-believers too can experience some similar feelings which accompany confessional religious

practices, starting with faith, hope and love. Caputo has said of religion what is also true of sport:

If safe is what you want, forget religion and find yourself a conservative investment counselor. The religious sense of life has to do with exposing oneself to the radical uncertainty and the open-endedness of life, with what we are calling the absolute future, which is meaning-giving, salt-giving, risk-taking [...] The absolute future is a risky business, which is why faith, hope, and love have to kick in (Caputo, 2001, p. 14).

These ideas point not merely to similarities between religion and sports. As we have seen, they rather point out the sharedness of form between the two. They also point to the value of considering more seriously the place of the theological virtues in sport.

REFERENCES

- Aquinas, T. (1920). *Summa Theologica*. Retrieved 25.05.2016 from: http://www.newadvent .org/summa.
- Aquinas, T. (1955). *Contra gentiles*. New York: Hanover House. Retrieved 25.05.2016 from: http://dhspriory.org/thomas/ContraGentiles.htm.
- Aristotle. (1994–2009). On Sophistical Refutations. Retrieved 25.05.2016 from: http://classics .mit.edu/Aristotle/sophist_refut.html.
- Aristotle. (1994–2009). *Nicomachean Ethics*. Retrieved 25.05.2016 from: http://classics.mit .edu/Aristotle/nicomachaen.html.
- Augustine (1955). *Enchiridion: On Faith, Hope, and Love*. Dallas: Southern Methodist University.
- Augustine (2009). *The Confessions*. Retrieved 25.05.2016 from: http://www.augustinus.it /links/inglese/opere.htm.
- Bauer, J. (2008). *Princip človeškosti* [The Principle of Humanity Why we co-operate by nature]. Ljubljana: Študentska založba.
- Caputo, J. D. (2001). On Religion. London and New York: Routledge.
- Cleret, L., McNamee, M. J., & Page, S. (2015). 'Sports Integrity' Needs Sports Ethics (and sports philosophers and sports ethicists too). *Sport, Ethics and Philosophy*, 9(1), 1–5.
- *Compendium of the Catechism of the Catholic Church.* (2005). Vatican: Libreria Editrice Vaticana. Retrieved 25.05.2016 from: http://www.vatican.va/archive/compendium_ccc/documents/archive_2005_compendium-ccc_en.html.
- Culbertson, L. (2015). Perception, Aspects and Explanation: Some Remarks on Moderate Partisanship. *Sport, Ethics and Philosophy*, 9, 182–204.
- Fry, J. (2008). On Fumbling the Ball. In: M. W. Austin (ed.), *Football and philosophy going deep* (pp. 18–30). Kentucky: The University Press of Kentucky.
- Jirásek, I. (2015). Religion, Spirituality, and Sport: From Religio Athletae Toward Spiritus Athletae. *Quest*, *67*, 290–299.
- Kant, I. (1896). Critique of Pure Reason. New York: 1873 Press.
- Lewis, C. S. (1960). The Four Loves. Harccurb: Braes.
- Luckmann, T. (1967). The Invisible Religion. New York: The Macmillan Company.
- Marx, K. (2009). *Critique of Hegel's Philosophy of Right*. Retrieved 25.05.2016 from: https:// www.marxists.org/archive/marx/works/1843/critique-hpr/intro.htm.
- Mumford, S. (2013). Watching Sport: Aesthetics, Ethics and Emotion. London: Routledge.
- Novak, M. (1988). The Joy of Sports. Lanham: Hamilton Press.
- Parry, J. (2007). The 'Religio Athletae', Olympism and Peace. In: J. Parry, et al. *Spirituality and Sport* (pp. 201–214). London: Routledge. Reprinted in Georgiadis, K. and Syrigos, A.

Olympic Truce – sport as a platform for peace (pp. 37–49). Athens: International Olympic Truce Centre, 2009.

- Pieper, J. (2012). Faith, hope, love. San Francisco: Ignatius Press.
- Pisk, J. (2003). Sport and Being as Being. In: M. Hosta (Ed.), *Philosophy of Sport and Other Essays*. Ljubljana: Fakulteta za šport.
- Pisk, J. (2010). (Ne)vidna religija športa [(In)visible religion of sport]. Šport, 1-2, 65-68.
- Pisk, J. (2012). Search for Immortaliy in Ancient and Modern Sport. Physical Culture and Sport. *Studies and Research, LIV*, 5–12.
- Pisk, J. (2014). *Misliti šport: filozofska analiza športa* [Thinking sport: philosophical analysis of sport]. Ph.D. diss. University of Ljubljana.
- Plato. (1994–2009). *Symposium*. Retrieved 25.05.2016 from: http://classics.mit.edu/Plato /symposium.html.
- Ratta, A. (2014). *Making Spiritual Progress: Building Your Life with Faith, Hope, and Love.* Downers Grove: IVP Books.
- Sansone, D. (1993). *Greek Athletics and the Genesis of Sport.* Berkeley: University of California Press.
- Vodeb, R. (2001). Šport skozi psihoanalizo [Psychoanalysis of sport]. Trbovlje: Fit.

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