Beach Handball: application and influence on indoor handball

The well-known member within the Olympic sports family, handball or as some like to refer to it “decathlon with a ball” branched out with its “younger brother” sport, mainly to be played in summer, beach handball. The sport, which rapidly gained popularity, continued to spread around the globe developing at unbelievable speed. The “younger brother” was accepted fast, gained respect and won the hearts of many people; not only those of the active and less active “indoor” handball players, but also of other people who, up until recently were just spectators, who did not have the courage to try their potential indoors, but found themselves in the summer with the sand version of handball. The fact that the beach handball is played in traditionally non-handball countries as Belgium, Cyprus, England, Netherlands, Uruguay, Pakistan, Iran, Togo and many others, substantiates the simplicity and amusement of the sport, that has made it famous world over, simultaneously popularising indoor handball.

Consequently, the main intention of the sport, which was developed as an alternative to indoor handball, was to bridge the gap between the competitive seasons and to maintain an acceptable level of physical readiness among the players, while at the same time enabling the athletes to relax and recover psychologically. Therefore, much emphasis is placed on entertainment and the attractiveness of the game itself, as the tensions and anxiety are minimal. Beach handball has many similarities as well as many differences to indoor handball, e.g. smaller playing area, different surface, fewer players as well as the technical and tactical diversities.

As with most novelties, beach handball was welcomed with enthusiasm, as well as with resistance and defiance. Given that a few coaches have shown scepticism towards the new sport and have even forbidden their players to partake in this variation of the sport stating fear of possible injury, the following questions needs to be asked “are the coaches right to forbid their players the enjoyment of beach handball?” and “is this reaction, scepticism and prohibition, just a result of their lack of knowledge about what this version of handball has to offer?

Although direct translation of the word scepticism means lack of trust, however, as the word originates from the Greek word *skepsa* meaning thinking, revising; this leads to the possible conclusion that scepticism is not actually a bad thing and this is something that the coaches should recognise before performing the sport and certainly before rushing to any ill-conceived conclusions. Motivated by the above mentioned issues, I started researching and analysing the
positive and negative sides of the beach handball, i.e. training on sand, as well as its application and influence on indoor handball.

**How does training on sand work?**

Have you ever tried jumping on a trampoline and then tried to jump on solid ground? The feeling you get is that your legs become very heavy and there is no ability to jump. The reason is that the trampoline not only absorbs and spreads all the force when landing, which reduces the stretch-shortening reflex, but also performs all the work necessary to direct the body back in the air. This means that the muscles, as well as central nervous system, receive the message that their activity is not necessary, and therefore shut down. Jumping on the sand has a similar effect as trampoline, as the permeability of the sand during the landing, absorbs and disperse the forces, which takes away any plyometric advantages of the stretch-shortening cycle.

On the other hand, the sand will intensify the work of the muscles needed in order to perform any jump at all, as well as attaining height in the jump. Thus, when training takes place on sand, the ground reaction forces on which the athletes relies upon in the gym, are modified by changeable and permeable surface which yields when the athlete applies muscle force. The lack of ability to produce the ground reaction forces challenges and disturbs stability of the entire body as well as use of triple-extension mechanism (ankle, knee and hip) which triggers propulsion. This means that during movements on sand, the ankle is limited by the force it can produce, because part of this applied force is lost due to the instability of sand. The instability and permeability of the sand require additional overwork of the muscles and tendons of the foot, in order to stabilize the foot, which results in greater energy consumption. Increase in energy consumption, during movements in sand, caused by the instability of the surface, is result of additional mechanical work and reduced efficiency of positive actions in the muscles and tendons.

In order to compensate for these forces’ modifications, the body tries to balance and equalize the movement by increasing the force and amplitude of extension in the hip. Activation of a larger number of muscle fibres, while performing same moves on solid ground, explains very perceptible feeling of quick tiredness while training on sand. Although at the first sight, it seems that the differences in mechanics between the indoor and beach handball are minimal, actually the differences of the performance environment and variability of the surface force the player to use quite different movements in order to perform successfully. It seems that sport performed on sand is different in regards to the same sport performed on the solid ground, due to the fact that the permeability as well as abrasion on the sand requires usage of methods that control movements that are quite different than the ones on the solid ground. Therefore, during training on the sand more effort, higher energy consumption and higher blood lactate concentration have been recorded than during training on solid and/or grass surfaces.

**Influence of the training on the sand on player’s capabilities**

Due to the specific characteristics of the sand, numerous scientists and experts in the area of strength and conditioning invested their time in research of the influence of the training on sand on development of player’s capabilities. The results of this research revealed lots of interesting and useful information about influence of sand training on abilities, and this article will focus only on the ones characteristically for handball. Handball is a sport in which
strength dominates, a sport that requires fast repetitive usage of force while performing movements as jump shot; block jump, explosive reactions towards the ball or the player, etc. The movements in the indoor, but also in beach handball require agility and reactivity for successful defence, transitions from defence to offence, as well as adjustment to the various “moves” typical for the game. The traditional handball training includes strength development through weight lifting, pliometry, strength training; combined with various speed, agility and quickness exercises (SAQ) which include horizontal ladders, cones, jumping rope, etc. The training is usually performed in the closed training place (gym or similar), and the focus is on triple extension and development of strong complex of ankle for fast and explosive moves.

However, as previously mentioned, when the training is moved to the sand, ground reaction forces on which the athlete relies in the gym are exchanged with permeability of the surface. The compliance of the sand to the movements of the body makes it difficult for the ankle buoyancy through the vertical axis and the consequence of that is sinking back in the sand while trying to increase the propulsion. These changes in the ground reaction forces disturb the stability of the entire body, significantly influencing the height of the vertical jump, as well as to decreased ability to change direction and acceleration. Still, these negative influences do not mean that listed capabilities cannot be developed through sand training. The research has shown that sand training results in same or similar improvements in the increase of the sprinters or jumpers ability as with the training on the solid or grass surface. Moreover, the larger number of muscle fibres are activated, and the advantage is that usual training with this technique begins to develop by adapting on activation of all these extra fibres, so when the jump is performed on the solid ground as the indoor surfaces not only benefit and effect of plyometric response is recovered, but also the ability of the activation of more muscle fibres.

The negative side is that the long-term usage of sand training can decrease the degree of force development, crucial to the height of vertical jump. The reason behind is sinking of the feet in the sand, which leads to longer contraction time, which results in a less explosive upward movement. Therefore, the sand training itself is not a long-term solution for increase of the functional results of height of the vertical jump. However, in shorter periods of 4-8 weeks, due to the variability, challenges, as well as the interesting and entertaining character, makes this type of training recommendable to include in a training programme. The similar thing happens with the maximal speed. Higher maximal speed is achieved with applying the bigger rely forces on the surface, and not through faster movement of the limbs through air, i.e. faster leg frequency. During running in the sand, due to the sinking of the feet in the sand, the contact time with the surface is significantly longer. Running in the sand not only impairs the dynamic stereotypes in the motoric patterns, which is the goal of contrast training, but also dramatically changes these patterns. The soft surface produces an entirely different stimulus. As the muscle receptors adjust reactive time to the surface, running trough the sand does not stimulate explosive (stretch – shortening) running contact in the phase of maximal speed. This means that the sprints in sand are not appropriate for development of maximal speed, but it should be noted that in fact the maximum speed as the ability is very rarely manifests in sports games, especially in the games such as handball. In beach handball, as well as in indoor handball, the player uses mechanic of triple extension for jumps and short sprints. The mechanism of triple extension is crucial in applying force and propulsion of the body at the greatest possible speed. Understanding the triple extension mechanics on the sand is essential for development of efficient training programme for the beach handball. Besides, when designing the programme for the beach handball, one has to take in consideration how the body compensates and reacts to the changes in the environment, i.e. surface. Compensation mechanisms for movements in the sand lead to the increase in demands on the hamstrings as
the prime extensor of the hip. For players of sand sports, this means that the complete specific training programme should include special attention to the training of hip extension, through the function of the hamstrings, including the elements of instability.

**Injuries in the sand**

Beach handball, as other sand sports, is a relatively young sport and is practiced mostly during the summer time. In addition, still there are no professional leagues or regular competitions throughout the entire season, according to which one could make conclusions on the injuries specific for this sport. Although some research has been done, the number of samples and data is too small, which makes it impossible to talk of the characteristic injuries of the beach handball. From the available data, personal experience and information gained through conversations with the medical staff that worked at the beach handball games, a conclusion can be made that the very serious injuries are very rare (the ones that require operative medical care and long recovery), only few severe injuries have been recorded (which were followed by the conservative treatment and shorter absence from the sport field) as luxation of the shoulder or elbow, ankle sprains and similar injuries. Mostly, records show that only some smaller injuries occur as inflammation and tendinitis of an Achilles tendon. Such situations are quite expected, as in the beach handball, different to indoor handball, the physical contacts are minimal, which decreases the possible injuries caused by the outside force. As for the inflammations, of course, the thing is about the characteristics of the surface. The soft surfaces, such as sand, with its softness and permeability, overload the tendons and muscles which can cause inflammations and injuries, particularly of the Achilles tendon. Because of the constant adjustment to the surface, each step causes different pressure and forces on the foot, ankle, knee and hip. Beside that, the sand has the tendency to sink and incline which also causes a dangerous force, out of the centre of the body on to the feet and ankle, so, with time, running on the uneven surface can result with inflammations and tendinitis of joints and tendons. This means that it is necessary to adapt the muscle, ligament and tendon system, i.e. the soft tissue to the running in the sand. The sport medicine experts recommend to start with easier running in the shallow sand, even with footwear on, in order to adapt more easily and more successful.

**Short overview:**

As previously stated in this article, the “fear” of the beach handball is unjustified. When one considers all the advantages and disadvantages of this sport, its application, as part of the training programme for the indoor handball, is not only possible but also necessary. With the possibility of influence on developing abilities and a low injury risk, beach handball offers numerous other advantages as amusement, friendship, mental relaxation and leisure. In addition, it influences the “timing”, movement without the ball, teamwork, perception and many others, for the indoor handball, relevant features. Therefore, when you see the first ray of spring sun, without doubt or second thought grab a ball and together with your friends get on the sand, in order to meet charms and joys of this very interesting sport, in which everyone can participate, regardless of the age or gender.