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## Neuromuscular Coordination and Proprioceptive Training in Young Handball Players

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### Abstract

Specialized sensory receptors in the muscles, joints and connective tissues enable the body to process information from a variety of stimuli, and turn that information into action. The key to creating what specialists refer to as movement intelligence involves individuals becoming consciously aware of their movements, and of the information their body is absorbing. To do this, stimuli are created to elicit a movement reaction through a variety of tasks or exercises. As skill improves, more stimuli are needed to continue improvement. So, the aim of this study was to prove the utility of complex and specific drills using additional materials in young handball players. The study has been developed on a sample of 10 young female handball players from CSS. Bacău, aged between 13-14 years. The evaluation of the subjects has been performed using the “T – Test”, the “Slalom Test” and the “ZIGZAG Run Test”, taken from the book “Functional Testing in Human Performance”. The working protocol consisted in 8 coordinative and proprioceptive drills that were used during the training sessions and during warm-up, before official matches. An improvement in all values was recorded, as compared to the reference values.

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### 1. Introduction

It is well-known that contemporary handball is much tougher, faster and more complex than the one played in the 1990's. Compared to that period, body contact and time playing strength are far more powerful. It must be

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emphasized that these changes in the game dynamics (performance speed, attack development, technical complexity of the performance etc) have an effect on the body, by subjecting it to great physical stress (Acsinte, 2011). The frequency and severity of the injuries has increased according to the mentioned aspects. Then, the stress found in the ankle joint is not reduced to controlled and limited eversions and inversions, dorsiflexions and plantar flexions, but there are also tendencies to slide back and forward, and all of these movements are combined during specific techniques handball movements elements. The complexity of the exercises we should use during training sessions' in handball can be directed and controlled using different kinds of additional materials such as BalanceFit discs, Bossu, Balance board, Gym balls etc. Another great advantage of using BalanceFit discs is that many of the drills can be adapted for a multitude of athletic disciplines, from sportive playing games to winter sports (Acsinte, 2010).

Because an athlete may have deficient proprioception due to an injury, many Athletic Trainers believe that proprioception should be addressed in the early stages of a therapeutic exercise program, and thus many rehabilitation programs emphasize early proprioceptive training. Proprioception training can be started early in a therapeutic exercise program by doing such things as balance or coordination exercises (Cartwright and Pitney, 2005). At the same time physical rehabilitation of an injured athlete it is a very important process we must take in consideration (James, Harrelson and Wilk, 2012). During the training sessions the additional coaching staff should be preoccupied by the examinations, subacute management of concussion related symptoms in order to prevent major injures (Herring and Bell, 2011).

## 2. Hypothesis

Presumably, by using certain proprioceptive and neuro-muscular coordination drills during warm-up, in handball training, several dynamic balance skills markers will improve, thus increasing the technical skills of the handball players. We suppose that using some appropriate proprioceptive and neuro-muscular coordination drills during warming up in handball training, some markers of the dynamic balance skills in order to increase the technical behaviour of the handball players.

## 3. Material and methods

The study has been developed on a sample of 10 young girl handball players from CSS Bacău, aged between 13-14 years old. The evaluation of the subjects was performed using the "T – Test", "Slalom Test" and "ZIGZAG Run Test", from the book "Functional Testing in Human Performance" (Reiman and Manske, 2009). The working protocol consisted in 8 coordinative and proprioceptive drills (see Figures 1-8), used during training sessions and in the warm-up before official matches.



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