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# CLEVER WAYS TO PREVENT LOWER BODY INJURIES IN THE HANDBALL GAME

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***Abstract:*** *As the primary goal of each athlete is to maximise his or her performance, preventive measures should be integrated into the daily sport-specific performance intensification programmes. Research and practice have shown that there is unfortunately not so much awareness about how to prevent injuries. Coaches still put the injuries in account of the lack of concentration, misfortune or unprofessional lifestyle of the injured player. That is why there is a need to identify appropriate approaches about how this kind of information can be promoted and enforced in the handball world. The aim of this study is to highlight clever ways to prevent the most common injuries that may appear to the lower body of a handball player.*

***Key words:*** *handball, prevention, lower body, injury.*

## 1. Introduction

Handball is a very complex game, characterized by exciting, intense and in the same time intermittent actions, held under a constant pressure exerted by active opponents. During a handball game, a player gets often in the position to accelerate, decelerate, turn around, sprint, jump and throw, as well as feint, land, change direction, push or being pushed. This kind of actions requires highly trained athletes when speaking about physical, technical, tactical and psychological parameters. How these particularities are brought to the level of mastery is the main concern of all the coaches around the world. In order to achieve the goals or to reach the highest performances for each individual, but most important for each team, they need to plan and implement multilateral training programs, in order to cover all the details.

But quite often coaches fall into the sin of forgetting a detail that can alter the process of training in terms of continuity, the injuries prevention.

An injury can occur in the most inappropriate moments and can keep an athlete apart from the training hall from a couple of days, to several months, depending on how bad the injury is. Long time injuries not only bring pain, frustration for a player, but can also jeopardize team's performance.

Unfortunately, there is still the idea that injuries ascribe to the lack of concentration, misfortune or unprofessional lifestyle of the injured player. And that is because many injuries come after a situation where there is no contact. Another reason can also be that

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the relation between high risk factors and increased injuries rates is not yet fully known, so preventing injuries can be a very difficult job for coaches.

More than that, "prevention is frequently seen as therapeutic intervention that needs extra efforts in terms of time, material and personnel" [4].

The aim of this study is to highlight clever ways to prevent the most common injuries that may appear to the lower body of a handball player.

## 2. Handball injuries

There is no doubt that handball is one of the sports with the highest injury rate. Luig and Henke [3], observed in a research with 170.000 athletes from Germany shows that only football (45,8%) surpassed handball (15,3%) in top sports with most injuries. In the same study contains also a classification of handball players' injuries.

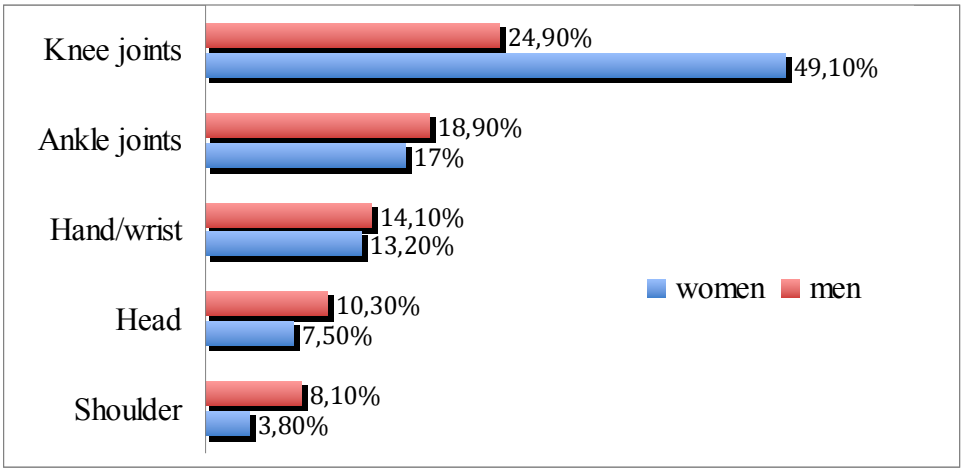



Fig. 1. *Injuries for male and female handball players* [2].

It can be easily seen that lower body injuries (knee and ankle) are the parts of body with the highest number of trauma. Researchers also claim that lower body injuries occur in situations without contact, in actions like landing, jumping or direction changing and are more severe. Most of the times, it requires surgery and 3-12 month rehabilitation.

In a similar research, Petersen et al. [5], concluded after studying ten female handball teams (134 players), that ankle sprain was the most frequent diagnosis in both experimental and control group (7, respectively 11), the knee was the second injury site, with 5 anterior cruciate ligament (ACL) ruptures in the control group and one in the experimental group.

"Although the injury may appear to have been caused by a single inciting event, it may result from a complex interaction between internal and external risk factors" [2].

## 3. Ways to prevent injuries

Injury prevention approaches are numerous and complex and can be classified into four large categories: training and physical preparation, political suggestions, equipment and accessories, medical support. The current paper will refer to training and physical preparation, which is also the most important part of the approaches.

Prevention injury inside of the training

has three distinct ways of approaches, outlined by the pursued objectives:

- Neuromuscular training;
- Physical preparation;
- Advanced technique training.

The question that rises is how and when during a training these objectives can be fulfilled. Because speaking about physical and advanced technique training which are anyway included in a daily program, regardless of the level of awareness of coaches about the beneficial effect of these on injury prevention.

Neuromuscular training is the part of the training, which is often forgotten to be included inside of the training program.

Also called by the domain experts as the proprioception training, and can be define as "the capacity of the body to determine where all of its parts are positioned at any given time. It triggers muscles to contract and relax to fit to the situation" [1].

Proprioception should be included one or twice a week in a 45 minutes separate training. For a better-structured weekly training program, this kind of exercises can also be easily included into warm up, besides general cardiovascular stimulation. In this case, the time needed doesn't last more than 15 minutes.

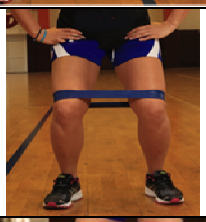
Warm up routine needs some improvements. Besides basic running exercises that help cardiovascular system to get activated, it is recommended to be implemented proprioceptive, balance, coordination, core stabilization, agility and plyometric drills in order to improve knee and ankle control during jumping, landing or changing of direction.

Exercises can be realized through the use of some material: fit balls, Bossu platforms, balance boards or discs, coordination ladders, elastic bands, cones.

Fig. 2. *Injury prevention exercises through the use of an unstable surface*

The circuit presented in Figure no. 2 contains exercises for maintaining the position, with one foot on the unstable surface; squat with both feet on the unstable surface; forward and side lounge with a foot on the unstable surface; stepping on 6 unstable surfaces.

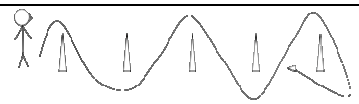
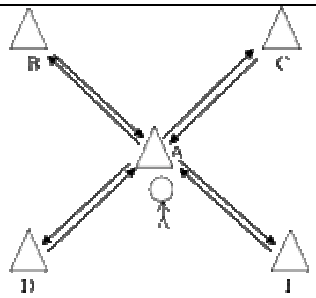
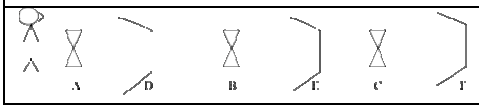
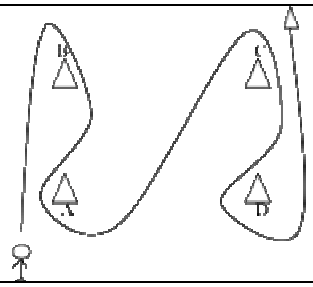
*Complex of injury prevention exercises using the elastic band* Table 1

| No | LOWER BODY | Muscle groups involved | Movement description |
|---|---|---|---|
| 1. |  | Ankle stabilizers, quadriceps. | Forward step, until the strap is fully extended. |
| 2. |  | Ankle stabilizers, abductors. | Side step, until the strap is fully extended. |
| 3. |   | Ankle stabilizers, hamsrings,gluteus maximus | Backward step, until the strap is fully extended. |
| 4. |  | Ankle stabilizers, abductors, adductors, vastus lateralis, hamstring, gluteus. | Lateral lunge while twisting the torso until the hand touches the opposite foot. |
| 5. |  | Knee stabilizers, quadriceps. | Knees flexion while putting pressure on the strap. |
| 6. |  | Knee stabilizers, abductors, adductors. | Side step, until the strap is fully extended. |
| 7. |  | Knee stabilizers, quadriceps, hamstrings, hip flexors. | Lifting up forwards the bent leg, until the strap is fully extended. |

| No | LOWER BODY | Muscle groups involved | Movement description |
|---|---|---|---|
| 8. |  | Knee stabilizers, hamstrings, gluteus. | Bottom lifting by pushing through the feet, until knees, hips and shoulders are in the same line. |

The exercises presented in Table no. 1 can be gathered in a circuit, with 30 seconds work at each station, followed by 10 seconds of break.

*Agility and coordination drills* Table 2

| Exercises | Description |
|---|---|
|  | 5 cones placed in a 15 meters line, the player will sprint between cones. |
|  | 2 cones (A and B) placed in a 7 meters line; the player will jump over cones and use sideways movement between cones. |
|  | 4 cones places in a square shape, 5 meters between cones, and another cone (A) placed in the middle of the square. The player situated near cone A, will sprint and touch each with the hand each cone, and always return in the middle. |
|  | 6 obstacles placed in a 10 meters line, the player will jump over obstacles A, B, C and go under obstacles D, E, F. |
|  | A 9 meters coordination ladder, with 2 obstacles at the beginning and at the end of the ladder, the player will jump over the first obstacle, than step with each leg alternatively inside of the coordination ladder, than jump over the second obstacle. |
|  | 4 cones in a square shape, 3 meters between cones, the players will sprint from A to B, go round cone B, run backwards between cone B and A, sprint to cone C, go round cone C, run backwards between cone C and cone D. |

Exercises presented in Table no. 2 can be gathered in a circuit with 30 seconds of work at each station, followed by a 10 second break.

## 4. Conclusions

The above-mentioned training drills can be seen as modern ways, approved by domain's specialists in matter of preventing handball injuries. However, research and practice have shown that there is unfortunately not so much awareness about how to prevent injuries, and that is why there is a need to identify appropriate approaches about how this kind of information can be promoted and enforced in the handball world.

As the primary goal of each athlete is to maximize his or her performance, preventive measures should be integrated into the daily sport-specific performance intensification programs.

Injuries cannot be fully avoided, if all the prevention aspects are respected. But even a small reduction of the injuries can lead to an optimization inside of the professional life of a handball team, meaning better chances in reaching the wanted performances.

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