

Master Coaches Theses – Part 2

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The counter-attack structured: an advantage for a Small-Nation

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Summary

This paper presents the development of counterattack and plays in a small country's game: Luxembourg. In the introduction, I list elements that contribute to the improvement of the fast break. The second section describes the policy and the respective methods used by the federation, the fundamental formation to reach a high level. The third section is dedicated to the actual development of fast break and its illustration. The fourth section reports the results of Luxembourgish Men teams regarding fast break, in a European context. In the last section, I propose a number of practical exercises in order to train fast break.

Keywords: Fast break, Scaling, Width, Small Nation, Counter attack.

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Luxembourg's National Team 2011

I. Introduction

In 2000/2001 the Luxembourg suffered from a lack of size in particular on the back base and our biggest opponents defended frequently in 6-0 and it was difficult to play for us. That's why we had to invest heavily in other areas: high recuperative defences (4-2 and 3-3) and the fast break.

Our purpose here is not to treat the fast break which is often a direct pass from the place of recovery of the ball to a player who took the defensive withdrawal speed, but to decry the fast break that can be implemented by the players who decided to play a game on the ground while collective and organized.

This organization is living the ball through the defensive withdrawal (early or late) in continuity. It should give to the team in possession of the ball to play approaching the area and seek solutions to score as long as the defence is not installed.

The factors that have contributed to the needs of the fast break value in the game of the Luxembourg handball are the French training to coaches. The training data since the 70's always gave room to the playing of the fast break. It was a way to play all over the field and not just approach the goal. It was a way of training.

In addition, my coaching club experience. This part of the game practiced by prepared players has always been used with happiness at different levels of competition.

Then in charge of the national team of Luxembourg, I continued to apply the principles of fast break but I had to adapt to a new population, which should learn quickly.

A document by the French federation on the analysis of women's world championship in Norway (1999) highlighted that the organized fast break was really practiced by only 3 of the 13 nations observed (1st, 2nd and 5th in the final).

According to the document of the French federation, we can see that the teams generally use fast break with low-risk; rapid field players who are skilful receive the ball from the goalkeeper. This is often a defined player who is responsible of starting quickly with sometimes a privileged relay.

For the fast break the point is surprising: Austria (3rd), Romania (4th), Denmark (6th), Macedonia (8th), the Netherlands (10th), Russia (12th), Ukraine (13th), Angola (15th), Côte d'Ivoire (20th) and Cuba (21th) have not offered any organized and structured fast break. Some nations do not play consistently (3 players change, team with old players...) and others favour the support player, but the vast majority of them don't seem to work this area. The only top worldwide women teams of 1999 proposing a rise in organized ball are Norway (1st), France (2nd) and Hungary (5th).

Eric Baradat (French national coach) shows that the 2009 World Women's final ranking is inversely proportional to the shots in 9m. Teams who defend and play the fast break effectively have less need to shoot at 9m conversely those that shoot more at 9 m and have more difficulties to win the match because they are exposed to have a lot of goals in fast break.

This analysis confirms a posteriori, 10 years after, my initial approach to invest in the succession defence/fast break and play on larger fields to create a time, space and organization stress at the opponents.

II. Method

1. Perspectives

Regarding these experiences and previous analyses, we wanted to quickly invest in this area to compete with the European nations located between the 17th and the 30th place in the ranking.

But be willing to play the fast break and to fight is not enough. Technical qualities and understanding of the game in the service of rational organization should allow us to be effective all over the field and approaching the goal.

Luxembourg players regularly show that they have acquired over the past decade a culture in this area. Play the fast break without excessive risks to allow a good attack. Dictate to the opponent, by this pressure, the rhythm of play to become a real skill.

In addition, combinations for amateur players being always problematic, it took streamline work and build around the same idea some identical phases games. That's why early engagement can be a weapon point especially against teams changing players. It will be the same structure as the fast break.

2. The fast break: apart of strategy of Luxembourg handball

2.1 The pyramid of performance

Luxembourg Handball Federation aims to develop handball in a small country, but also to improve its European ranking winning matches. Our federation has decided to participate in all international qualifications competitions knowing that victories are rare and difficult to obtain. Our policy is clear: just win the games against nations that have the same level than us with 1 goal of difference (or more) and not to lose them for 1 goal!

To do this, our approach could be read in the layers of a pyramid and to win we have to work these elements in a wanted time if we want to win.

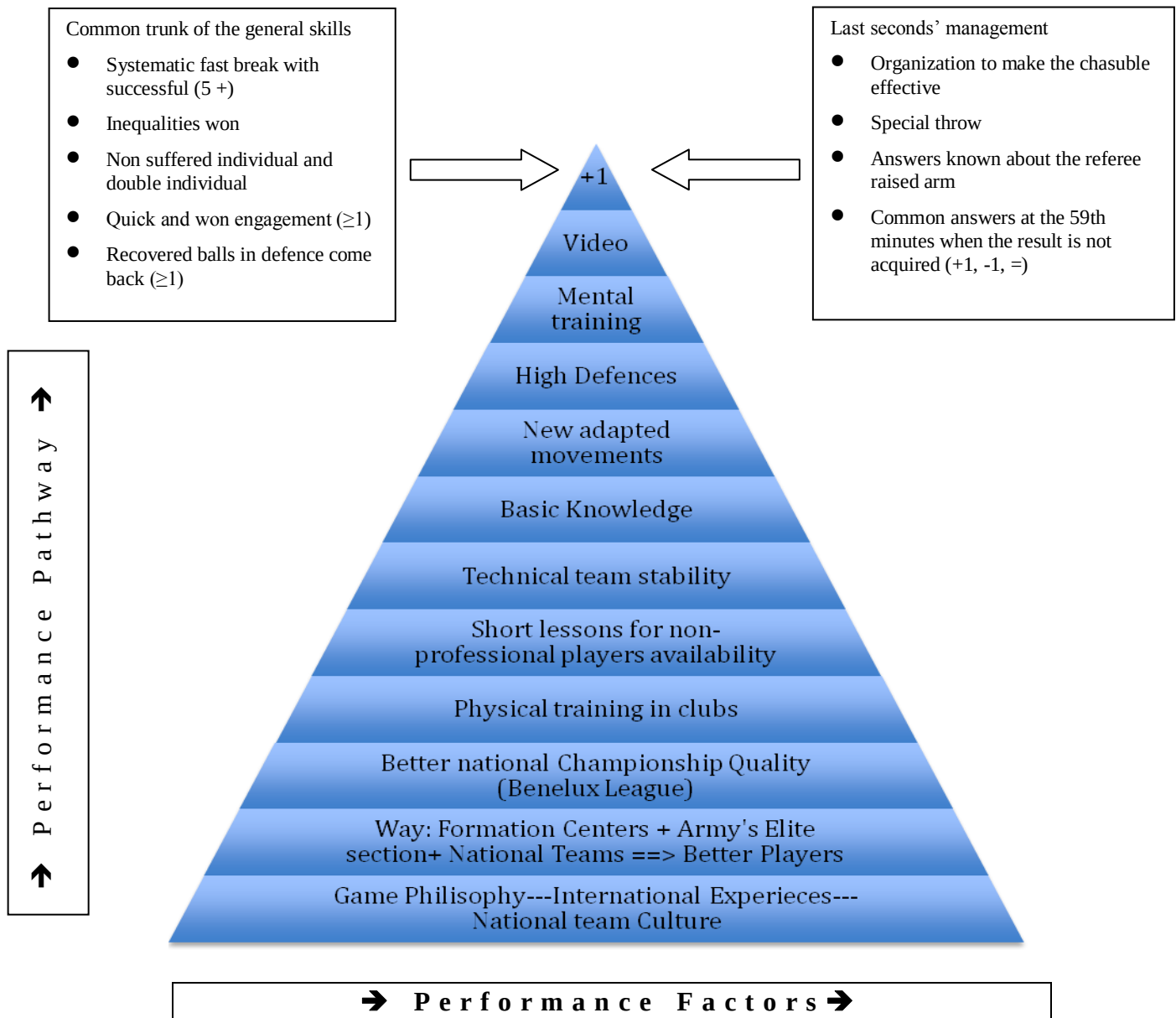


Figure 1: Performance pyramid

2.2 Policy of the Luxembourg Federation of Handball

To develop this fast break in Luxembourg, he had to:

- Communicate with clubs through the publication of a collection of principles (philosophies 2001)
- Building federal architecture training ahead of ministerial training in order to increase existing supply (2002)
- Increase training (190 trained officers for 3000 licensed people and 17 clubs from 2001 to 2012)

- Require clubs to have qualified coaches (2004)
- Establish rules of the game for young people and create a discussion group on the set of U10 and U12
- Create a training centre for the U14, U20 to play in international youth level.

2.3 Fundamental training

Almost all executives who support the U10, U12, U14 received training either short (20 hours) or long (90 hours) time. During this training we work about the fundamental phase of the game over whole field.

Why play over whole field?

A child under 10 who plays over the entire field keeps an intact motivation. He runs, he throws the ball, he stops, he takes information, he catches the ball, he decides ... he's in activity.

He develops technical skills (running, changing of direction, varied throwing) and dissociation (he is able to take information when he plays).

It develops the qualities of perception of the game to invest spaces (time commitment, overflows) and to replace to be available.

He develops basic and natural qualities. Muscle building is done in the context of running, jumping, starting, stopping ... This physiological difficulty of successive duels, loss and conquest of the ball on the large areas will have an impact over the psychological behaviour of the child. Indeed has to develop his fight spirit.

All these parameters developed throughout the field have an influence on the game in attack and are necessary to reach the highest level.

This initial training (U10, U12) will enable these young people, in the higher categories (U14, U16), to be prepared for their first international trade with our close neighbours (Germany, France)

Then our training will be more demanding. When you are 14 years old you can easily play the fast break even if the reaction of the changing status between attack and defence is still slow. We also observe difficulties for the player who starts in first in having speed, also in the speed control of three plans and transition game in approaching the goal.

In light of these findings, we can emphasize:

- The concept of support and assistance
- The desire to advance the ball forward quickly without dribble.
- The realization of current passes
- The position of the ball (away from defender)
- The possibility of seeing the ball, partner, opponent
- The futility of prolonged dribble that is suitable for the opponents
- The markdowns after transmission
- The availability of non-ball carrier
- The response time of fast break and the timing of departures.

III. Development

1. The fast break

1.1 The fast break must be systematic: why?

- It is a good way to score easily
- It forces opponents to run which is exhausting
- It prevents or interferes with the opponent's defensive changes
- It operates the fragile sectors of the opponent defence
- It imposes a high rhythm for opponents who do not have the culture of running to defence
- It interferes with the organization of the defence that takes a few seconds to reorganize
- It should provide in a secured way, in particular through the defensive imbalance, solutions (using for example 2 line players)
- It always allows to the ball carrier to have supports.

1.2 Collective organization over the field through the fast break when the opposing team is reorganizing its defence after losing the ball.

Use the time where the opposing team is not organized in going on the ball. This organization, whose the risk taking is limited by a tactical balance, can succeed if we respect the following things:

- Knowledge of the roles and tasks (prioritization and timing of departures during the fast break over three plans with permutations)
- Be aware that the ball can be intercepted
- Consider the location where the ball is lost and the future offensive position
- Occupy the field in width and depth to have the central area as large as possible
- Play using quick, systematic and short passes forward in the lateral parts of the field
- Be available to receive the ball within occupied areas to make it go forward
- Search the defensive imbalance at any time by an outside fixation point going on the ball
- Operate the defensive imbalance approaching the opposing area by the quality of offensive replacement and the opponent sub-number to surprise them
- Willingness to succeed

1.3 Main faults observed

- No immediate recognition of its chronological position in the fast break
- Non-respect of the roles and tasks of each defender from the ball recovery (where, how, when?)
- The player's extraction is too slow due to the lack of physical capacities or by a bad perception
- No desire to go on the ball quickly forward without dribbling
- Distance insufficient therefore a lack of awareness information (vision of the game in its entirety)
- Slow assistance without moving
- Bad speed between the different lines, the support player goes too fast
- Prolonged and unnecessary dribble (especially in the first part of the field that facilitates the activities of defenders)
- The player doesn't go toward the ball to catch it
- To get caught by a defender
- Bad analysis of the favourable situation at maximum speed
- The maximum speed is cherished by the change of rhythm
- There is no continuation in actions (the player who gives the ball stops playing after it)
- Lack of support from partners
- Taking risks (advantage/inconvenient, difficult passes, play too fast...)
- Player's choice to stop the fast break due to the defensive pressure
- The tired player who seeks to slow down the fast break

2. Illustrations

2.1 If the fast break is in the same time than the defensive comeback

2.1.1. Occupation of the field.

The occupation of the field is in width and depth; situation following a shot from the right wing and in the case of a high defence (5-1, 1-2-3). For convenience, the players have the same number: 1, 2, 3, 4, 5, 6, in defence, fast break and attack.

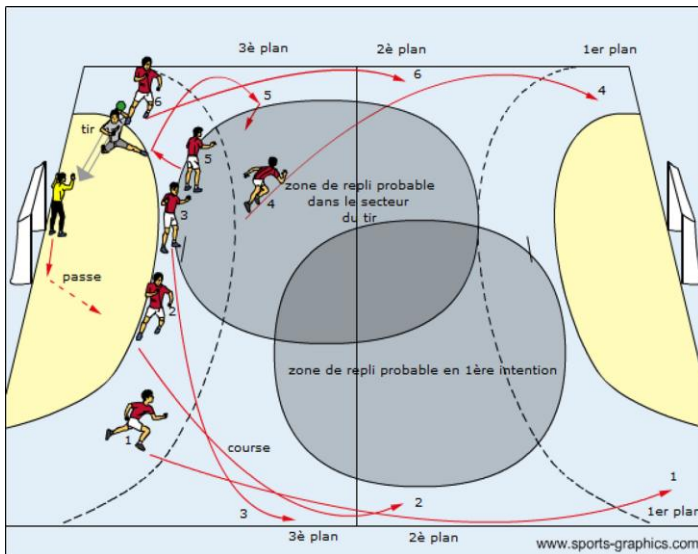


Figure 2: occupation of the field (1)

Particularity: to promote the start of the left back (5) in third left position, a tacit understanding between (5) and (6) may occur ; (6) can start in second position from the right wing shooting and (5) supports a possible recovery of the ball and will start in third position. This timeline allows the shooters to be in third position (left and right handed) but stays is not mandatory. (2) and (5) stay available for a ball recovery in the central area. (3) is on the opposite of (4). (4) runs at the lost ball side.



Figure 3: occupation of the field (2)

Back checking is often mad central zone (see black team). White team fast break has not enough scaling. A white player in the central zone tres to move aside.

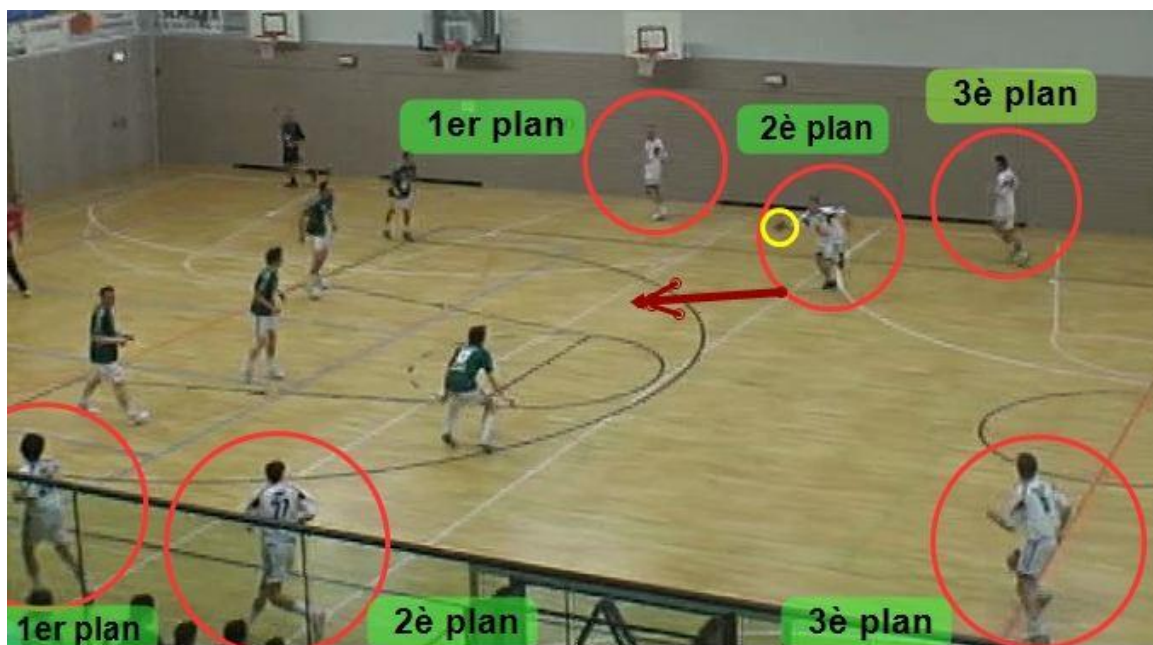


Figure 3a: occupation of the field (3)

2.1.2 Transfer of the ball forward to defeat quickly the defensive comeback

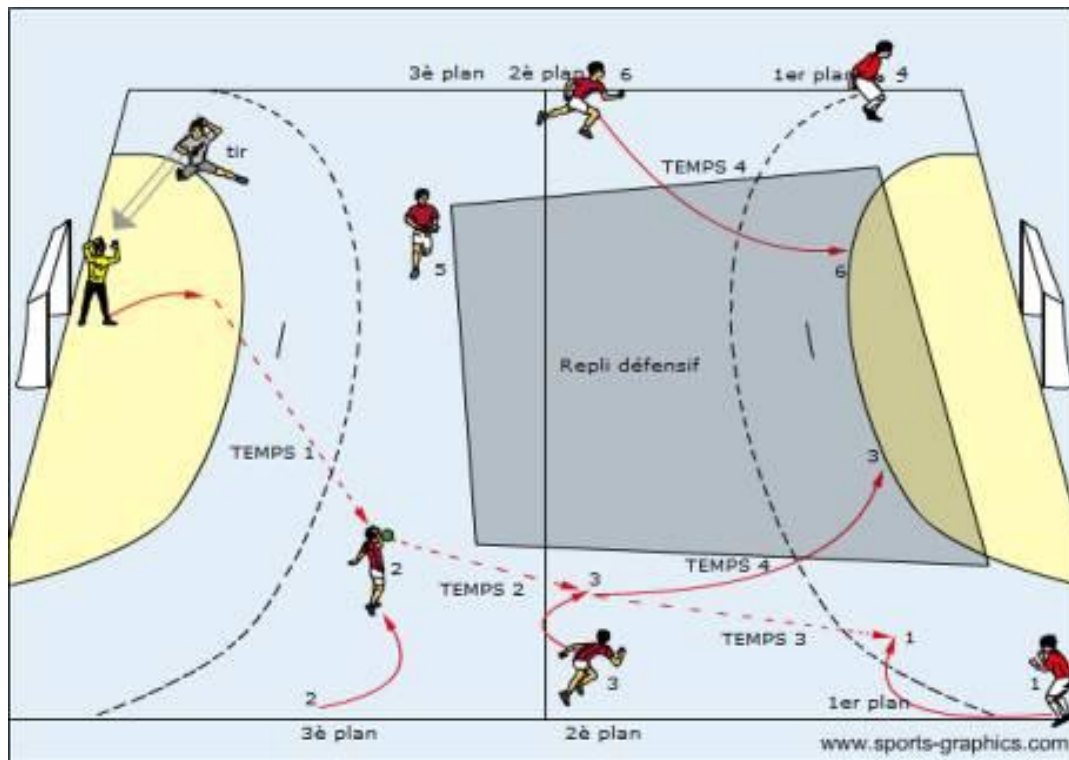


Figure 4: width and depth

The player in third position opposite of the shooting has to be available as soon as possible and give the ball to the player in 2nd position. If the central area is occupied by the defensive comeback, the player in 2nd position throws the ball to the player who is in first position in the wing and is going to play as a line player. On the opposite side the player in 2nd position does the same thing yet slightly later.

2.1.3 .Chain in the end of the fast break (transitional play)

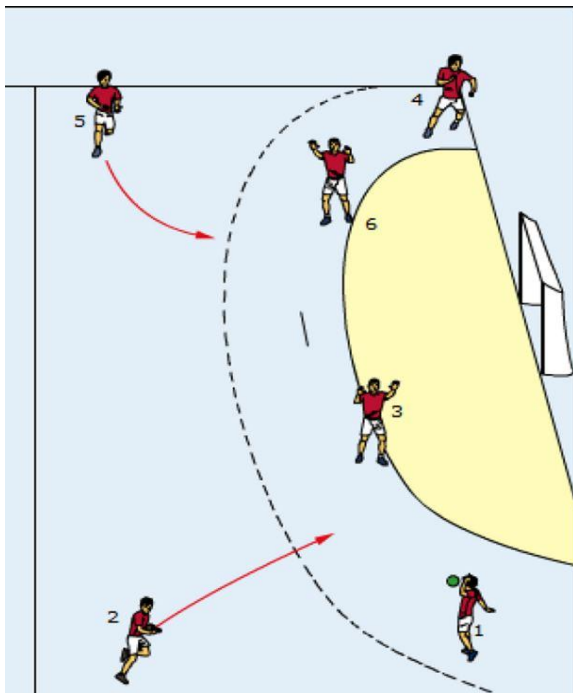


Figure 5: Main positions.

The two line players (6) and (3) are inside the defensive comeback. The four main roles are occupied (1), (2) (5), (4). The ball on external support (1) is given in to the player in third position (2).

2.1.4 Transfer of the ball forward if the outside lane is not available

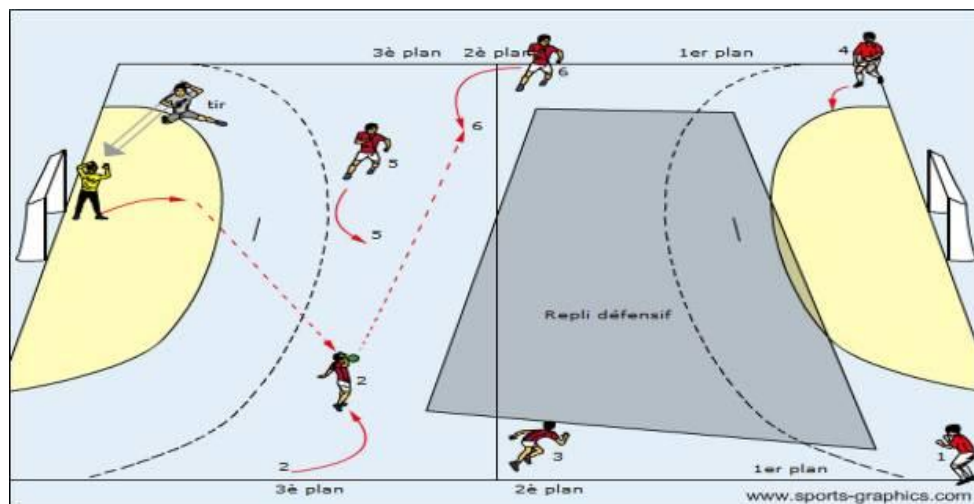


Figure 7: Play with the opposite side

In case where the defensive comeback discomforts transmissions in the outside lane so the ball holder tries to play at the opposite, even after a dribble. All with the idea of losing no time.

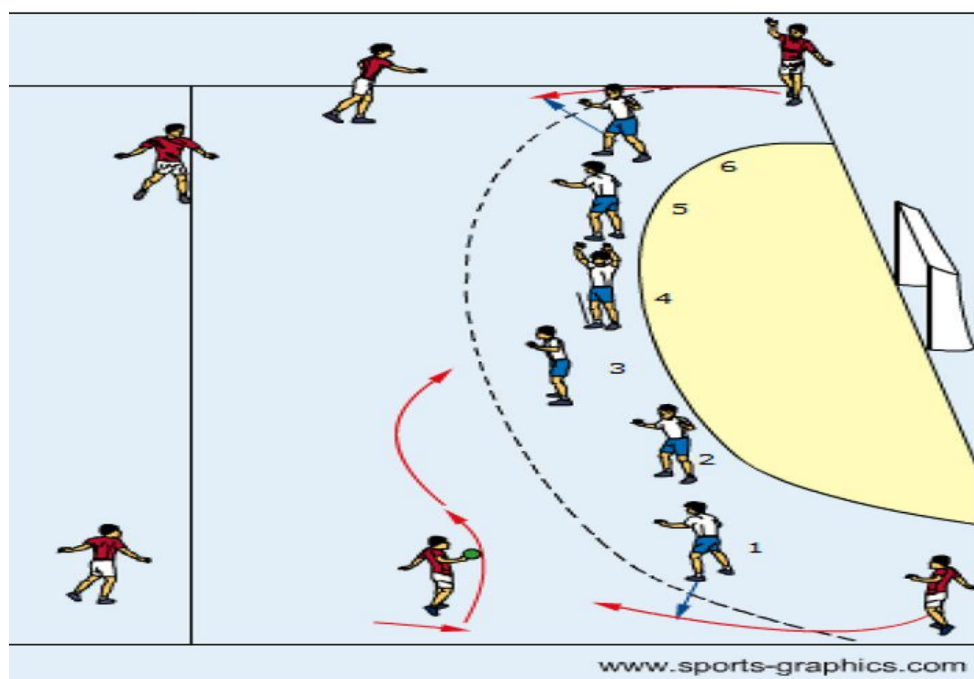


Figure 8: dissuasion on the 1st plans.

How is working
- Defenders (1) and (6) asked to deter on the fore ground to prevent the wingers from being fulcrums and to force the ball porter (2nd plan) to drive through the middle of the field.

2.1.5. Counter attack and plays

2.1.5.1 Defensive imbalance



Figure 9: open space 1



Figure 10: open space 2

2.1.5.2 Relation with the other third plan



Figure 11: the mirror playing



Figure 12: the back pass



Figure 13: going toward the throw



Figure 14: open space 3

2.1.5.3 Screen of the 2nd plan for the third plan

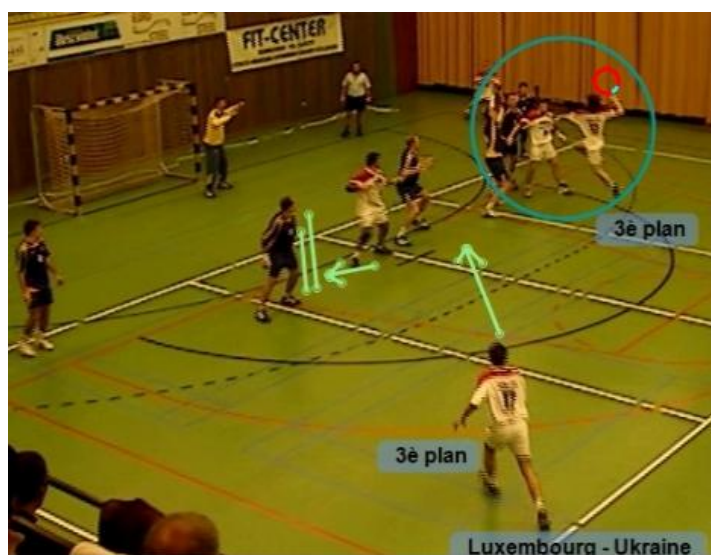


Figure 15: screen 1



Figure 16 : screen 2

2.1.5.4 Relations with the players inside



Figure 17: Post position of the pivot 1

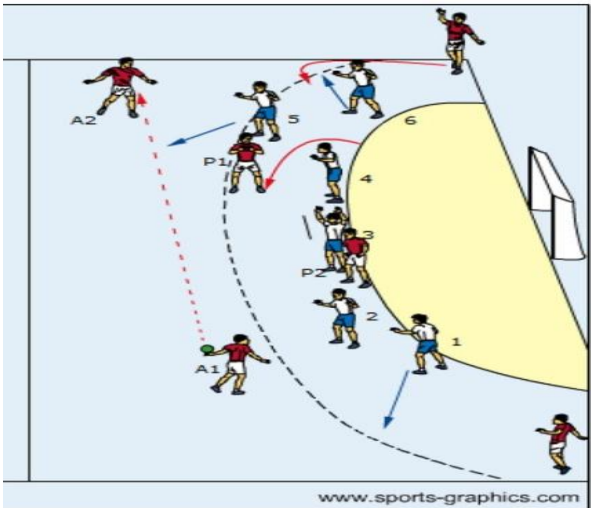


Figure 18: Post position of the pivot 2
The defender (5) perturbs the throw between number A1 and A2 attackers. The pass to the pivot P1 is possible

2.1.5.5 Play with the wing (back pass)

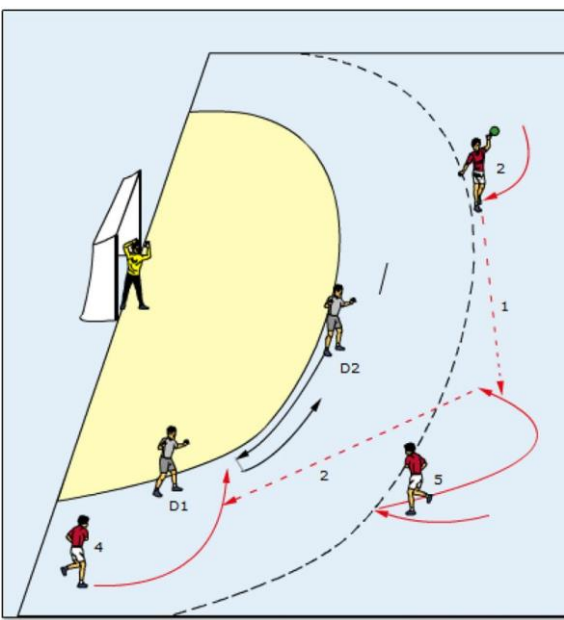
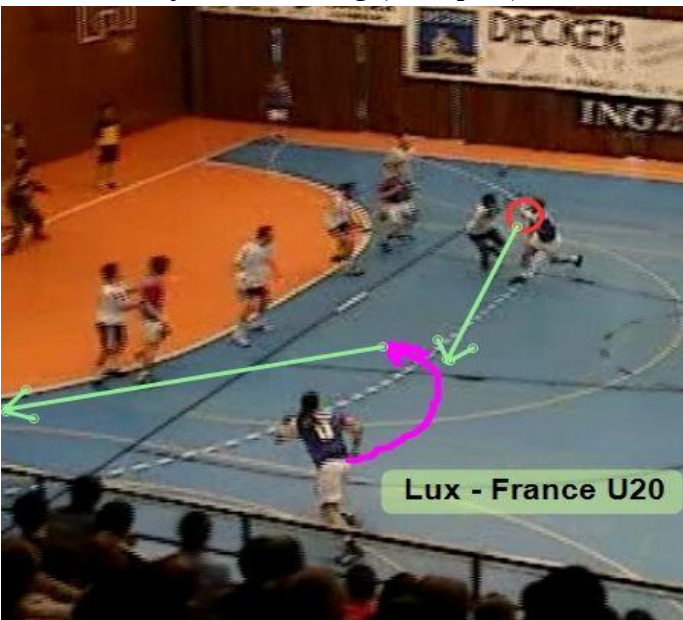


Figure 19:
Attack profitable for the wings

Figure 20:
Attack profitable for the wings (exercice)

2.2 If the fast break is slower than the defensive comeback

2.2.1 Occupation of the field. The situation is the result of a shot in the central area, which prohibits relationship with the players in 1st position.

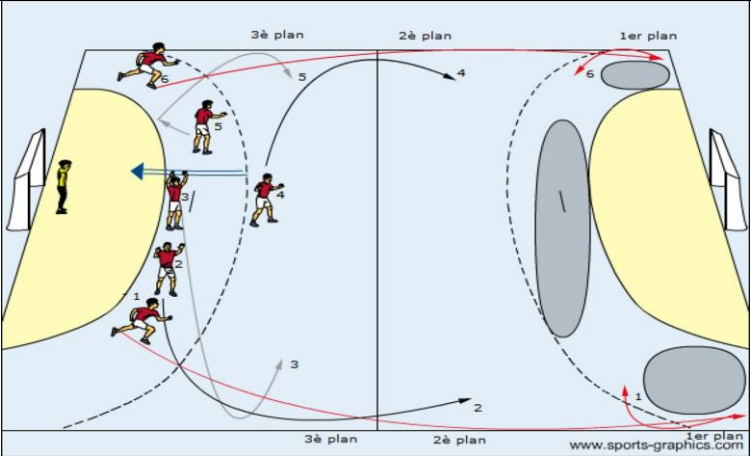


Figure 21: fast break in the making later

2.2.2 The ball holder uses the central area

The defensive comeback is already on its defensive zone. The first plans (1) and (6) are hampered by the comeback. The ball holder (2) must use the free central area. He can play with support and assistance.

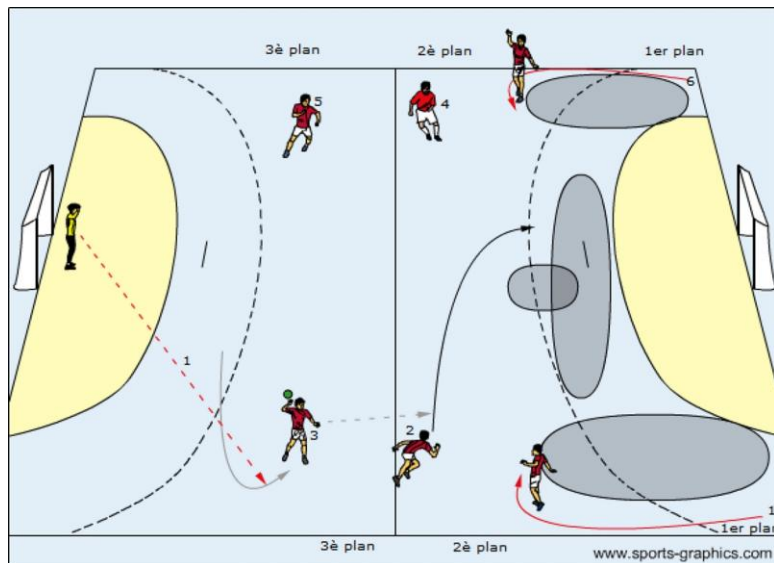


Figure 22: central area used by the 2nd plan



Figure 23: central area used by the 2nd plans

2.2.3 The end of the fast break (crossed play)

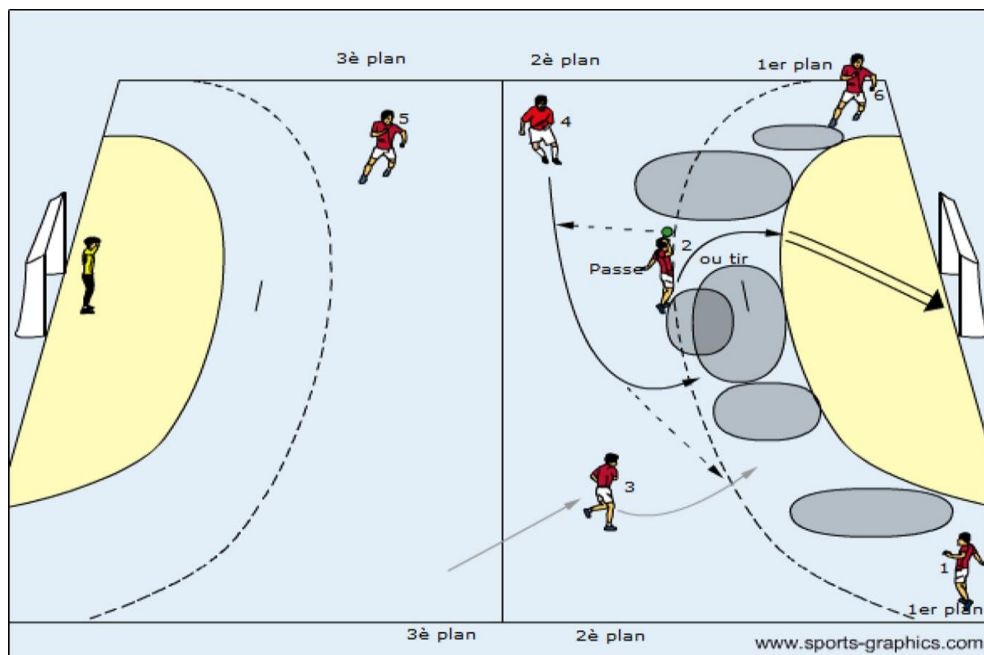


Figure 24: end of the fast break after crossed play

(2) dribbles toward the (4) area, looks for a solution toward the goal if not he gets in contact with his partners on the opposite side and cross with (4) who dribbles toward the goal or gives the ball to (3). (3) is on the 12-14 meters and wait to run in the ball. (2) and (4) play like pivot.

2.3 Types of operation from two different styles of defence

2.3.1 From a high defence (1-2-3 or 5-1).

The physiological state, the velocity, the skills of a position that will be the criteria to promote a particular position for the rise fast break and give specific tasks and roles to each player.

2.3.1.1 The ball is lost in the centre of the field.

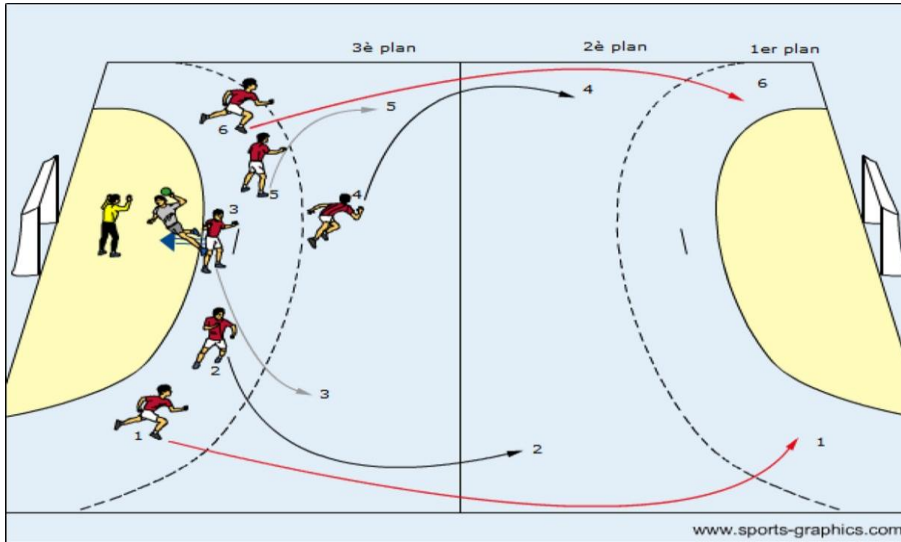


Figure 25: fast break from high defence

2.3.1.2 The ball is lost in the wing

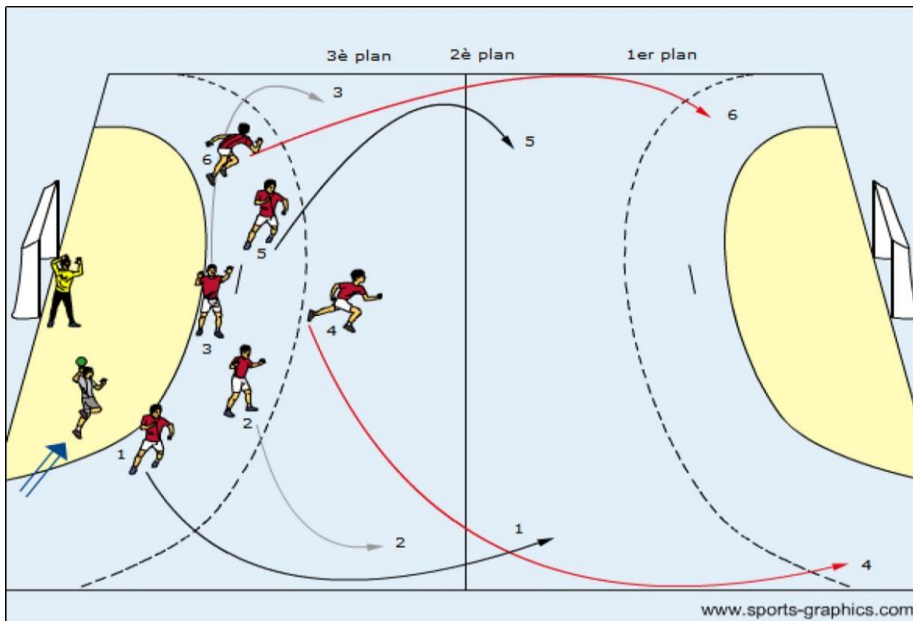


Figure 26: fast break after high defence

If (2) can help (1) to recover the ball, therefore (1) could be in the 2nd position and (2) in the 3rd

2.3.2 From an aligned 6-0 defence

2.3.2.1 The ball is lost in the centre of the field.

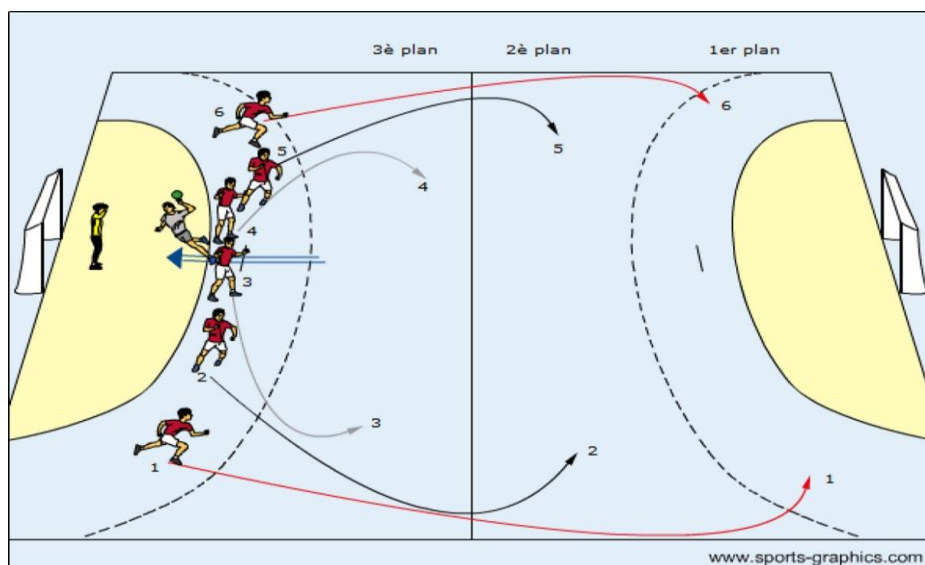


Figure 27: fast break from aligned defence

2.3.2.2 The ball is lost in the wing

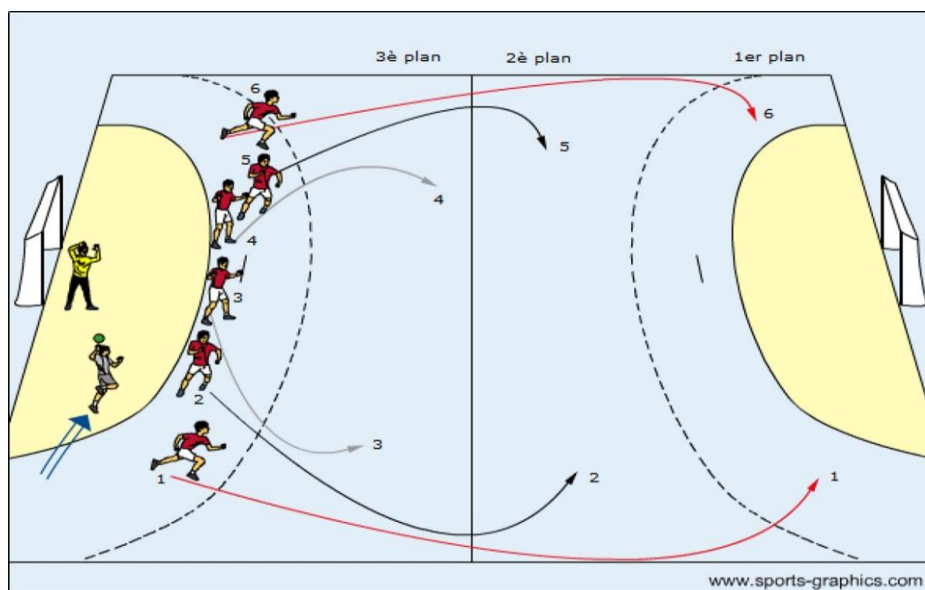


Figure 28: fast break from aligned defence

If (2) can help (1) to recover the ball therefore (1) could be in the 1st position and (2) in the 2nd

IV. Results

Results and analysis from 2001 to 2011 (17 matches of Luxembourgish team)

Counterattack Efficiency– Period 2001/2011 (-3 à +3)								
Matches	Dates	Results	Won	Lost	Fast Break (goal on shot)	Efficiency In fast break	Counter-attack + plays (goal on shot)	Efficiency Counter- attack + plays
Chypre-Lux	2001	24 – 23		- 1	1 on 2	50 %	0 on 1	0 %
Géorgie-Lux	2007	28 – 27		- 1	2 on 3	66 %	6 on 8	78 %
Lux-Belgique	2009	24 – 25		- 1	2 on 5	40 %	5 on 9	55 %
Lux-Belgique	2003	19 – 20		- 1	1 on 3	33 %	2 on 3	66 %
Lux-Belgique	2006	28 – 29		- 1	3 on 6	50 %	5 on 8	62 %
Lux-Israël	2007	25 – 26		- 1	2 on 5	40 %	4 on 7	57 %
Lettonie-Lux	2009	31 – 29		- 2	4 on 6	66 %	5 on 8	62 %
Lux-Lettonie	2002	21 – 23		- 2	2 on 3	33 %	1 on 3	33 %
Lux-Belgique	2002	29 – 31		- 2	3 on 6	50 %	2 on 4	50 %
Lux-Pays Bas	2007	24 – 27		- 3	2 on 3	66 %	1 on 2	50 %
		249 goals 46 %			22 on 42 goals 9 %*	52 %	31 on 52 goals 12%*	60 %
Lux-Lettonie	2006	31 – 30	+ 1		4 on 5	80 %	6 on 8	75 %
Lux-Belgique	2006	24 – 23	+ 1		3 on 5	60 %	6 on 9	66 %
Lux-Chypre	2001	22 – 21	+ 1		2 on 2	100 %	1 on 1	100 %
Féroé-Lux	2011	21 – 22	+ 1		1 on 2	50 %	5 on 6	83 %
Lux-Estonie	2009	25 – 23	+ 2		2 on 3	66 %	6 on 7	86 %
Lux-Autriche	2007	33 – 31	+ 2		4 on 4	100 %	8 on 11	73 %
Lux-Lettonie	2010	34 – 31	+ 3		5 on 6	83 %	6 on 9	66 %
		191 goals 56 %			21 on 27 11% goals*	78 %	38 on 51 20% goals***	75 %

Figure 29: Table 1

In the period between 2001 and 2011 Luxembourg played 17 games they won or lost with a difference of 3 goals. We analysed the counterattacks and play in the games that were won, and those that were lost. The findings showed a considerable evolution regarding the efficacy of the counterattacks, but the number of scored goals does not seem significant (it went from 9% to 11%). The efficiency of the successful counterattacks and plays, on the other hand, is much more significant with the number of scored goals increasing from 12% to 20%.

Luxembourgish players Efficiency– Period 2001/2011 games results (-3 à +3)			
Positions or situations		Efficacy of the positions	Average goals for each positions
Fast Break		62 %	10 %
Counter-Attack		66 %***	16 %***
In Play (excluding fast break and Counter-attack)	Back Player	35 %***	31 %
	Wing	53 %	12 %
	Pivots	67 %	18 %
	Penalties	70 %	13 %

Figure 30: Table 2

The analysis of the efficacy of the defenders shows the advantage of confronting them with counterattacking situations (more than 60%) compared to situations of standing attacks (35% of success). The defenders have more difficulties in the former situation. Lower level teams, like the Luxembourgish team, have only few opportunities to break the game through its defence in order to start a direct counterattack. It is more likely to score when playing good quality counterattacks and plays.

IV Discussion

Following the above-mentioned results and our analysis, we will propose several situations either with or without opposition, with reduced number of players. Each exercise will give opportunity to the third « plan » many passing or shooting opportunities.

1. Analytical exercises to automate the desire to occupy the field
Run, no dribble, exchange, taking information.

1.1 Exercise 1: 2 vs. 0

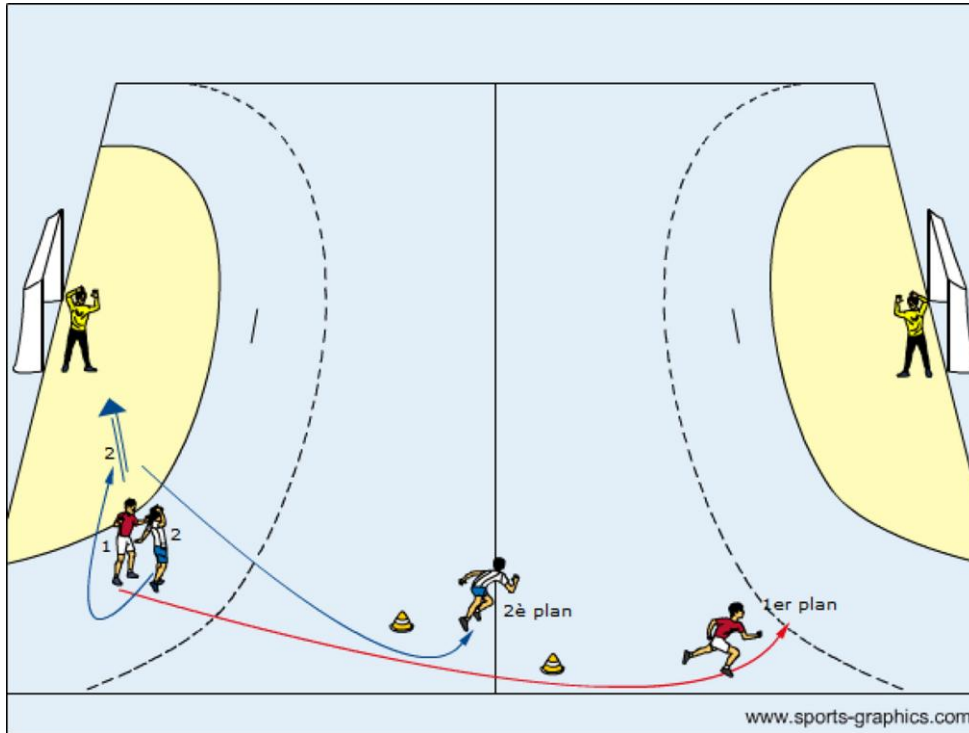


Figure 31a. Sequence 1

How it is working:

- 1 GK in each goal
- 1 attacker, 1 defender, 1 ball
- 1 vs. 1 and shooting fast break
- 2 vs. 0

After the shooting both players begin attackers

(1) goes on in 1st position very quickly.

(2) goes on 2nd position at the same speed

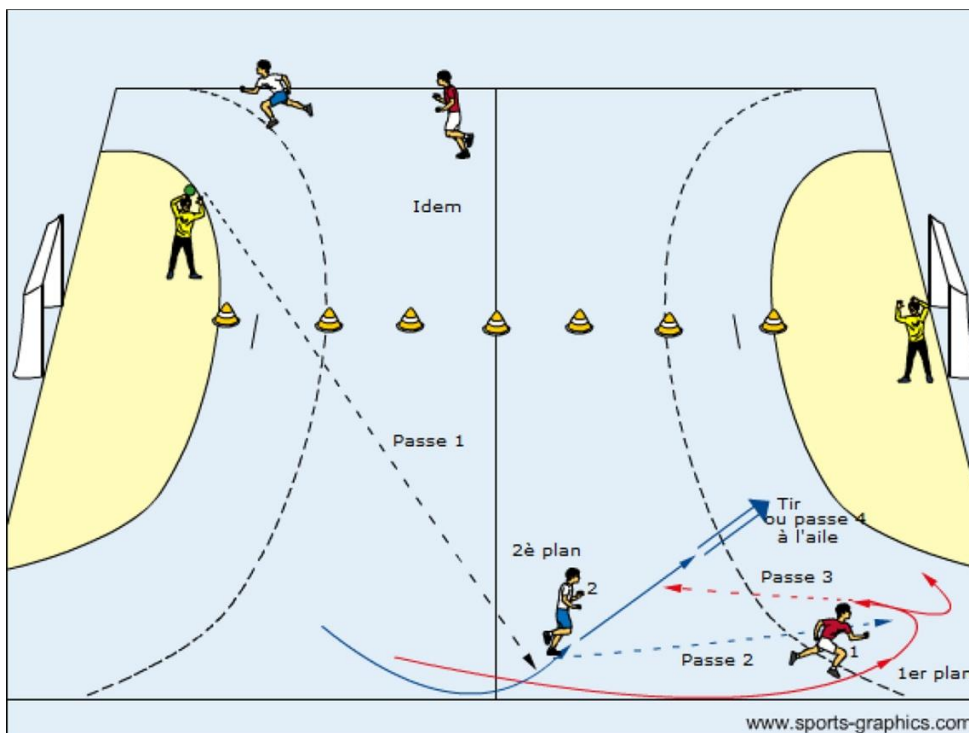


Figure 31b. Sequence 2

The GK gives the ball to the 2nd position who gives to the 1st

The 1st gives back to the 2nd who can shoot

This throw is difficult so it has been worked

1.2 Exercice 2 : 3 vs 0

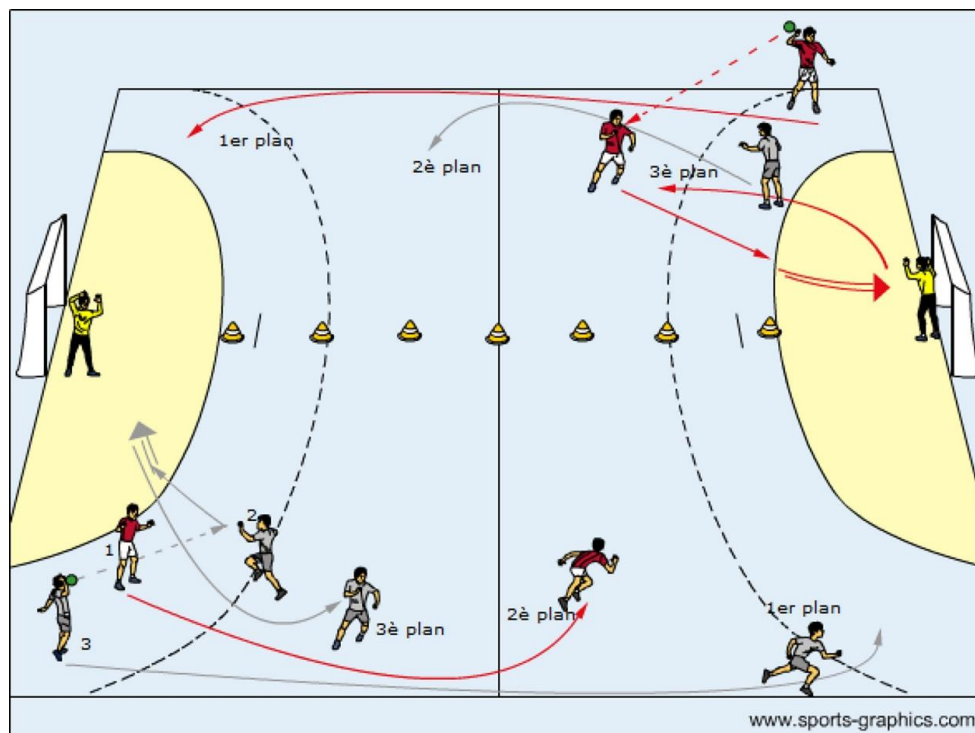


Figure 32a: Sequence 1

How it is working;

- 1 GK in each goal
- 1 attacker, 1 defender, 1 ball
- 2 vs. 1 and shooting fast
- break 3 vs. 0

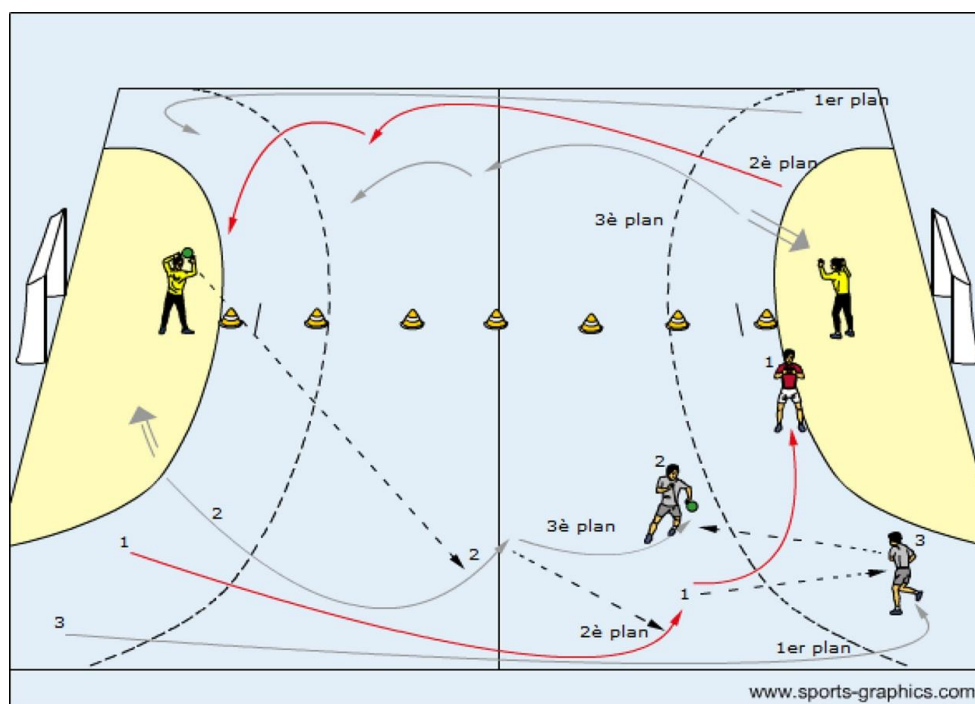


Figure 32b : Sequence 2

After the shooting of (2) or (3) the 3 players begin attackers.

We have to automate the desire to occupy the field according to:

- where the ball is lost
- the future attack organization

Instructions:

When the depth is obtained so the players in two first positions search speed. The player who is in the 3rd position has to modulate his speed according to solutions available to him. Be aware to the fact that he has not to be too close of the opponent's area

1.3 Exercise 3: 6 vs. 0

How it is working:

- 6 players in the 6 meters area, 3 vs. 3
- At the top signal they give the ball to the GK and play a fast break

Goals to reach:

- A quickly balance of 3 players in each outside lane of the field maximum width, depth
- Playing together; the 2 quicker players start in 1st position
- The 2 players in 3rd position wait the ball from the GK
- The ball has to be as fast as possible to the other side of the field

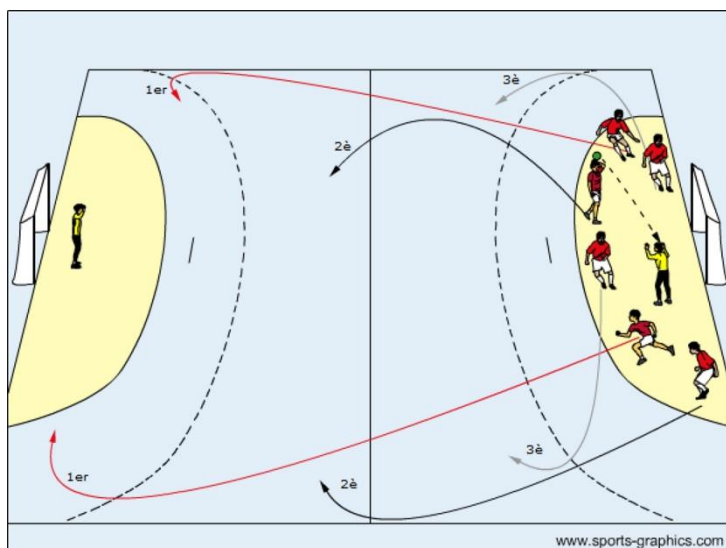


Figure 33a: Sequence 1

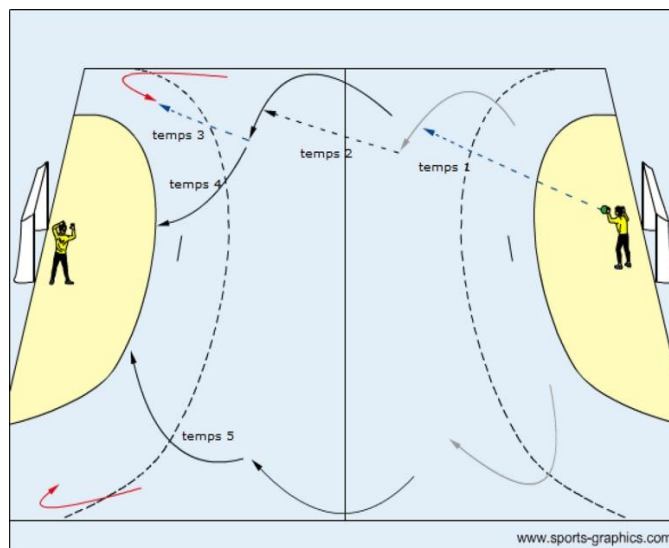


Figure 33b: Sequence 2

When the player in 1st position (1) has the ball so the one in 2nd position (3) as well as the one in the opposite (1) go to play like line players. This player's movement will cause a defensive imbalance.

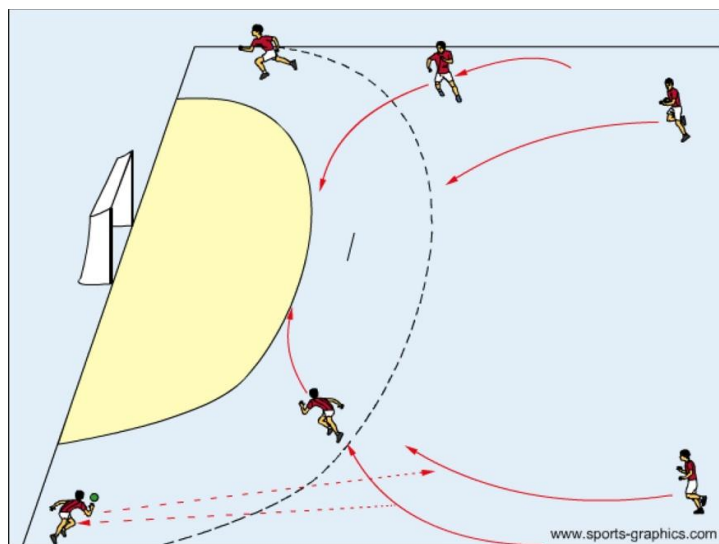


Figure 33c: Sequence 3

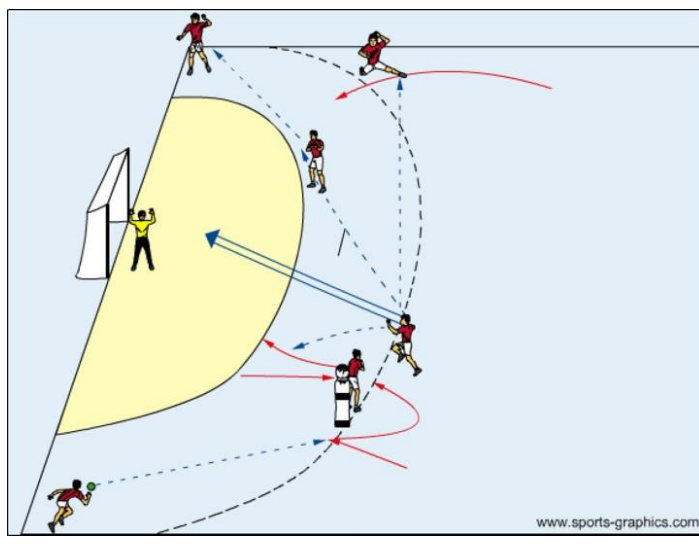


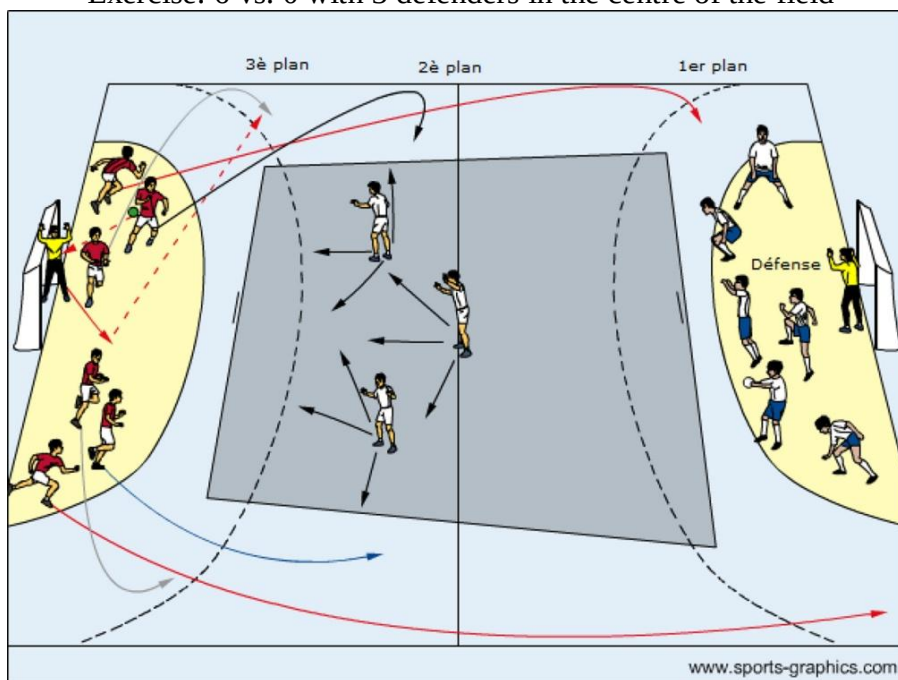
Figure 33d: Sequence 4

In this kind of tactical scheme we can finish the fast break using related actions.

2. Improved individual and collective performance exercises

2.1 Width, depth and attack of the ball in a corridor

Exercise: 6 vs. 0 with 3 defenders in the centre of the field



How it is working:

- 3 defenders in the centre of the field
- 3 vs. 3 inside the 6 meters area
- At the top signal the 6 players play the fast break with or without dribble

- The 3 defenders stay in the central area and discourage the throw

Guidance:

- Try to keep depth and width
- The attackers have to ask the ball outside the centre area

Variation:

- We can play with 4 defenders
- We can play with x defenders and another team in attack at the other side of the field

Figure 34: exercise with defenders in the central of the field

2.2 Complete teams exercise (6 vs. 6 + 2 GK)

To produce more easy the fast break we require (1) or (2) defenders (shooter, line player) to touch the bottom line to be delayed.

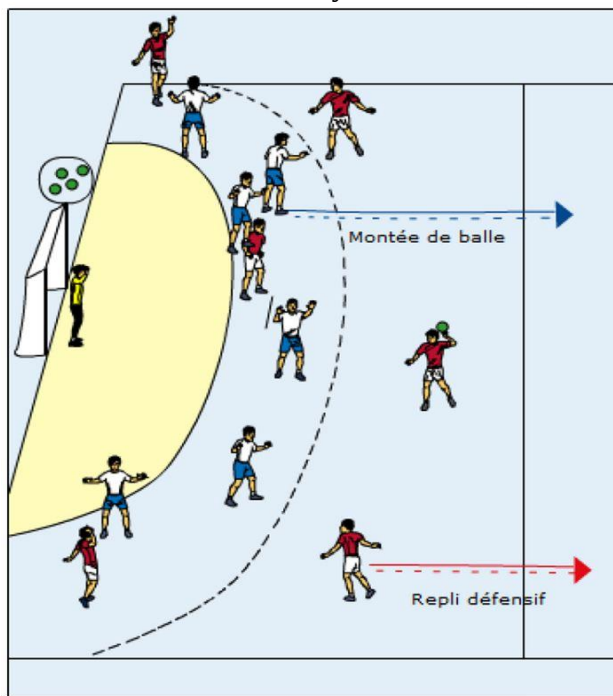


Figure 35a: The plan session 1

Goal or no-goal, loss of ball or interception, the goal keeper is doing the recovery. The red team comes back in the defence.

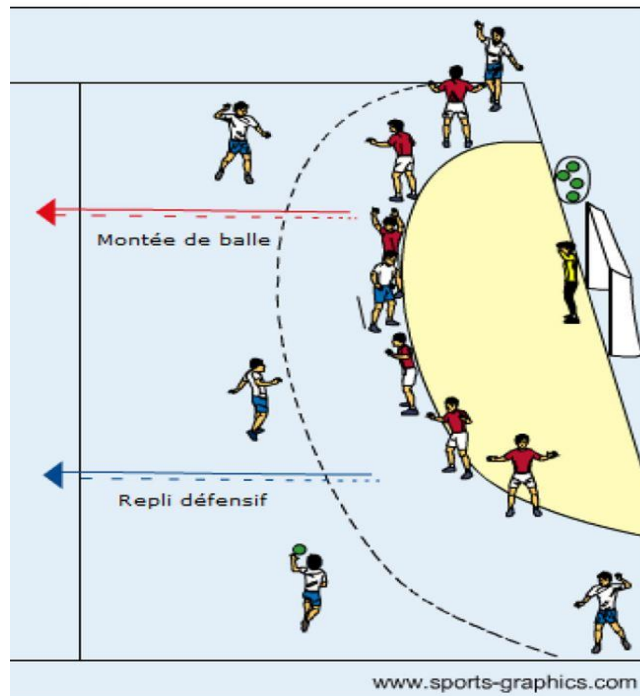


Figure 35b: The plan session 2

At the end of the white fast break, a white player shoot and the red team play a fast break. The white team comes back in the defence.

3.Exercises to improve the fast break's skills

3.1 Exercise: 3 vs. 3

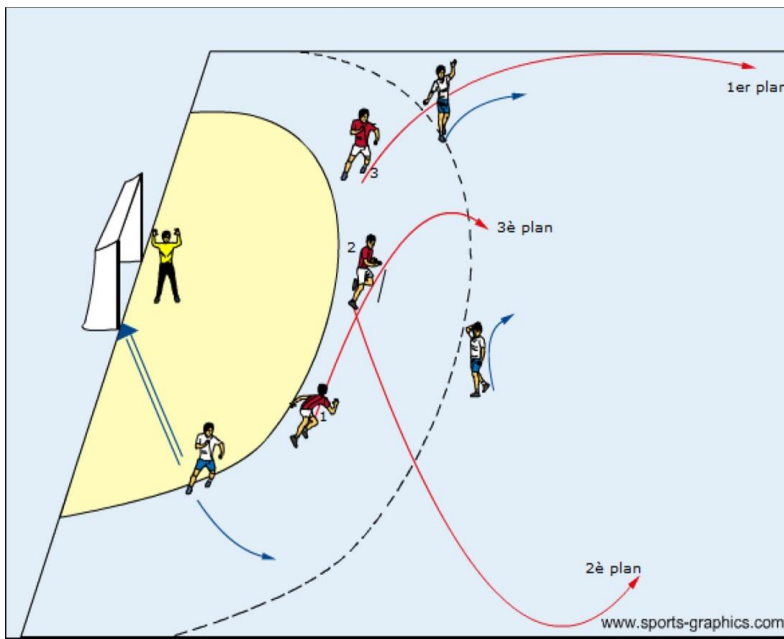


Figure 36 : 3 vs. 3

The ball is loosed. The (3) starts from the opposite of the loosing ball
The (2) starts from the same side of the loosing ball watching if the GK has the ball

The (1) from the same side runs as quick as possible in his lateral lane

Adjustment: the player who shot can touch the 6 meters line to be late regarding the opponents fast break. Be aware to adapt his throw

Goals to reach:

- Quick play forward using all the field
- Think to be available for those who have not the ball

3.2 Exercise: 5 vs. 5

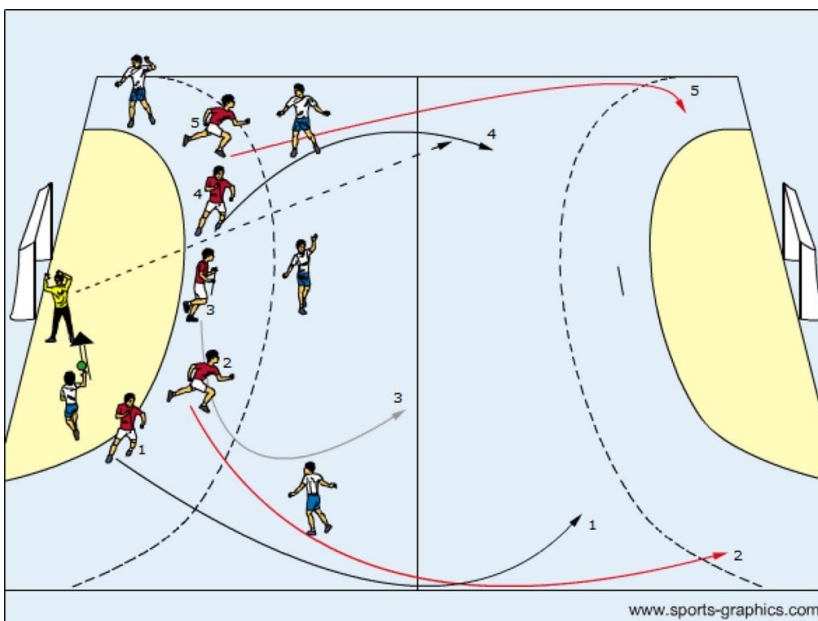


Figure 36: occupation of the field 5 vs. 5

How it is working:

The left wing player looses the ball. The opposite (5) starts in 1st position. The (4) in 2nd position and stays in his lane but (2) helps to recover the ball while the (3) starts in 1st position on the side where the shooting is done. The (1) starts in 2nd position.(2) plays like support.

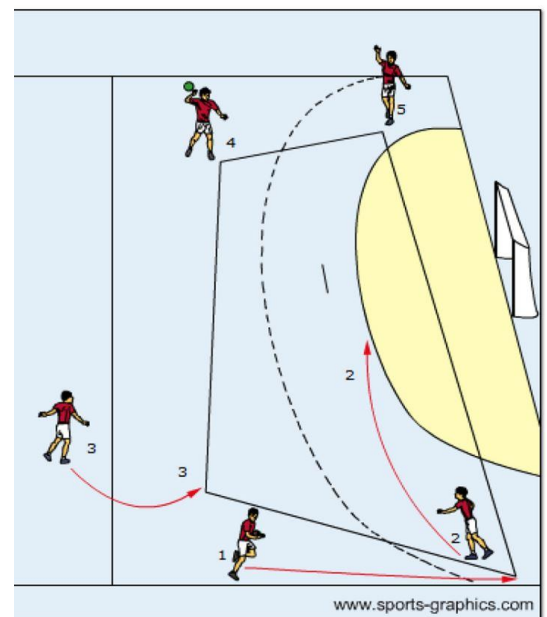


Figure 37: trapeze 5 vs. 5

For the end of the fast break (3) is going to play as a line player from the opposite of the ball when (1) is coming to compensate the first plan. (1), (2), (4) and (5) hold the principal position (the trapeze).

Conclusion:

Our purpose was not to demonstrate that at the highest international level fast break is insufficiently exploited because it is the case for the best Nations, but to prove that if the game over all the field becomes a real culture in the initial training therefore small countries have in this area a significant improvement to make the difference between them.

We have seen that the impact of fast break are undeniable for:

- The defensive comeback which have to invest to return to his camp
- The defence which still has a late time to solidify its system
- The same defence when the fast break continues with the same philosophy than in organized attack with two line players.

With this philosophy these two line players promote the 2 backs game in 3rd position, running toward the ball with intentions of perforation, using defensive imbalance or trying to pass on the ball at 6 meters. The throw between the 2 backs has all the ingredients of knowledge worked in the initial training.

This strategy was adopted in consideration of the means of a small nation. Indeed as we can't play "strong" we have to play right inside our fundamentals.

To succeed we have to continue in the rigorous application of our principles without robotics behavior. So we have to federate all players around this game plan at all levels of training.

The positive or encouraging Luxembourg results for 12 years are due to a set of parameters (see the pyramid of success). But we know that the games have been won, among other things, by an organized fast break.

Glossary:

- Back pass: Pass giving a direction change of the ball. Often done against a zone defence.
- Going toward the ball: Defensive movement in the ball circulation direction. The receiver attacks in inverse movement.
- Mirror playing: the free player is front positioned of a gap according to the player carrying the ball. If the player carrying the ball changes of gap the free player changes also of position in parallel.
- Post position: Player who goes out of the defensive the alignment. In general the post position player often serves as support.
- Scaling: to take up the field in depth during the fast break.
- Width: to take up the largest space of the field during the fast break.

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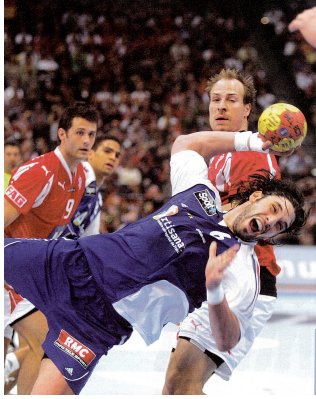


Figure 38 : Luxembourg's National Team 2011 (+1)

THE PIVOT PLAYER – EVOLUTION AND DEVELOPMENT

ADRIAN STOT

LUXEMBURG HANDBALL FEDERATION



“The position of pivot is a very particular one. You play back oriented to the goal all along the game, you rarely touch the ball and when you do it’s always for score” (Bertrand Gille).

SUMMARY

This study intends to show the importance of the pivot player position, the complexity of his tasks from two points of view: the qualitative aspect and the quantitative aspect. In the context of the European Championships, with the observation methodology I have tried to get as much information as possible about the entire activity of the pivot player in order to be capable to establish patterns, playing systems that allow finding good solutions, patterns that demand an active participation of the pivot player – qualitative dimension. Starting from two basic situations I have tried to put in evidence the importance of the pivot position along these patterns.

Based on statistic data provides by the EHF site, the quantitative aspect was put in evidence. The observation was made on the eight teams that participated in every Europe Championship since 2000 until 2012: Croatia, Denmark, France, Germany, Iceland, Slovenia, Spain and Russia.

Key words: handball, pivot, playing system, patterns

INTRODUCTION

For many years almost all the defenses were very closed, generally from type 6 : 0 and so, for many years, we used to see the pivots placed between the 2nd and the 3rd defenders or in the center of the defense between the two numbers 3 of the defense. His main tasks were to delay the lateral moves of the defenders by screening in order to give opportunities for the back players, create – with his screenings – spaces for the back players or create spaces for himself and to receive balls for scoring. In time the back players became more and more efficient, capable to make shot from 9, 10, 11 meters or more with good percentage and so the coaches were forced to look for solutions, strategies, new defense systems in order to confront the back players with unusual new situations, to push them further away from the goal and not to let them have clear shot. These defense systems are well-known : Yugoslavian 3 : 2 : 1, the Russian 5 : 1, the Algerian 3 : 3 or the famous French 4 : 2 of Daniel Costantini. These are defense systems that gave to the pivot more opportunities and also more responsibilities. With more and larger spaces between the defenders and between the lines of the defense, his role became a very important one.

The position of the pivot is a special and privileged one by its very nature. If we compare the pivot with the other positions – back player or wing player – we can say that:

1. His movements are almost unlimited. At a given moment, according to the playing system of the team he can be placed in different position all along the 6 meters.
2. Most of the time he is in physical contact with the defenders by his placement in the heart of the defense.
3. His role is to play mostly for the back players, to facilitate their scoring chances and from time to time to receive the ball in order to score.

The aim of this paper is to analyze the importance and the development of this position. I will try to demonstrate that the position of the pivot plays a key role.

THE PIVOT'S PLAY – TASKS

At the beginning of the attack play we can often see the center back showing to the pivot the place to take. This is necessary because most playing systems are based on the pivot's actions. Finding a good solution to make a shot, by a back player or a wing, is the fruit of an surplus of players created thanks to a screening or a sliding of the pivot who succeeds in keeping two defenders occupied and so, somewhere else, the attacking team can take advantage of this and so have a good opportunity to shoot and score.

In handball literature the approaches concerning the pivot's play are almost the same. In the French magazine "Former l'élite de demain" from April 2002, Pierre Alba says:

" This is the badly used player by the back players even though it should be their privileged relation.

His formation includes:

- a definition of his main tasks
- a static aspect
- a dynamic aspect

Main tasks

Break all defensive relations between defenders

With his placement related to the lateral moves of the defense, his screening and sliding, he must break the communication between different defenders and define the spaces for the attackers(...). Generally when the pivot is on the ball side, the player with the ball will try to put himself in a relation with the latter.

To succeed, it is obvious that the pivot must not run with the ball and must not occupy the center place between two defenders.

Allow the continuity in attack play

His in-and-out movements and the fact that he represents a support inside the defense should allow the back players to disturb the distribution for the defenders and to make the most of this situation.

The static aspect

Essentially it is about gaining a good position in the first place and in the second place about his placement related to the opponent and to the player with the ball. When the back

player goes towards the goal the pivot must be capable of putting himself into a direct relation with him by positioning in the following manner:

- by profile related to a defender and on the side of the back player
- with spread feet (one on the 6 m) in order to block the defender's passage
- an upright position with bent knees allows him to resist
- the arms must be free and prepared to catch the ball

The dynamic aspect

It is about the explosive part of his shake-off (taking advantage of free spaces) or to shoot'' (ALBA, 2002, p. 53).

In the German magazine ''Handball Training'' from April 2007, Klaus Feldmann made an analysis of the pivots of the 10 top teams of the World Championship in Germany. He said that ''the pivots are rarely in ball possession – usually they can't realize a play advantage but only a position advantage. They depend on passes that they receive. Nevertheless, they have a main role in attack of the WCH's teams''(FELDMANN, 2007, p. 4)

To define the pivot's play Klaus Feldmann continues:

''The pivot's tasks can be very clearly defined. With the ball he must:

- Try to score
- Try to make a pass to another player (for example a back player who goes towards the goal, like give-and-go relation)
- Try to play the ball back to the back player before the attack is interrupted by the defense

The description of the pivot's tasks without the ball is not so easy.

On the one hand the pivot must open the central space of the defense in order to clear the way to the goal for the back players. In this action the pivot must not block the access towards the goal, so he must move in the opposite direction of the ball circulation so that the back players have more space.

On the other hand the pivot can move in the direction of the ball circulation and use the space created behind the defenders who go out to touch the back players.

Alternatively, the pivot can also act in a static way by his positioning. In this case his role will be to impede the lateral movements of the defenders.

The pivot can also create space for himself and receive balls''(FELDMANN, 2007, p. 4).

To complete these tasks the pivot player requires different qualities like:

1. Good physical condition

Most of the time he is in physical contact with the defenders, so his physical condition must be at high level.

2. Good skills of catching the ball.

The so-called ''Specialist defender'' does not allow any more to the pivot to catch the ball in comfortable situation. Being capable to catch the ball with two hands is not enough anymore, he must catch the ball with one hand or catch the low passes, high passes, difficult badly orientated passes...

3. Good intuition when he receives the ball so as to know which is the best solution to turn and shoot

4. Explosive qualities

With or without the ball he must be capable of getting rid of his defender, turn and shoot in a very dynamic way

5. Very good motoric skills

The characteristics of this position demand good joints and muscle stability and flexibility. Catching and shooting are actions made almost all the time under the pressure of one or more defenders being pushed, pulled or in an unbalanced position.

6. Speed of movement/reaction/execution

Move fast and open up, turn around and try to beat the goalkeeper, make a decision in a very short time regarding the shot impact, all of this must be done in the shortest time.

7. Mental qualities

Generally he must play for his teammates. 80 % of the time he doesn't even touch the ball.

2 x 2 – The basic situation

The observation made during games shows that the playing situation of 2 x 2 – which involves the pivot – is one of the most difficult ones to treat and solve by the defenders. The reason is that in this situation one of the attack players, the pivot is usually out of the visual camp of one defender. To solve this situation the defenders must be very strong in communication and collaboration and even if they are, the attackers have many chances to score or to obtain a penalty throw. Another reason for the efficiency of the situation is its simplicity, only two players being involved. Two basic situations have been identified:

- a) Playing against a lined-up defense system (for example 6 : 0). Two defenders are lined up with the pivot placed between them (fig. 1 and 2)



Fig. 1

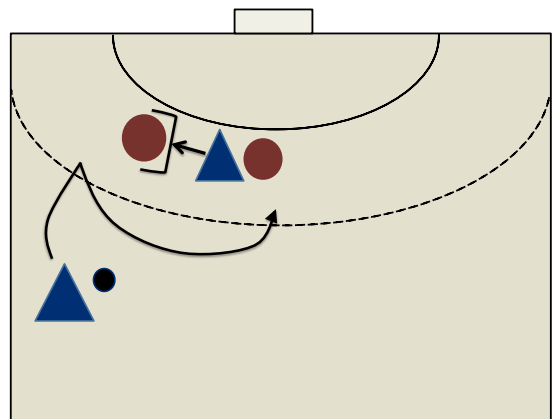


Fig. 2

This playing situation allows to play (for a short moment like a few seconds) at 2 x 2, often by using a large space. The attacking team can cause this situation at all levels. That means that the pivot can be placed in the middle of the defense between the two numbers 3, between the numbers 2 and 3 or even between the numbers 1 and 2. The latter is more and more researched because in this case the pivot often has an advantage related to the weight imbalance (pivot – wing).

- b) Playing against a defense system built on 2 or 3 lines (for example 3 : 2 : 1 or 3 : 3)



Fig. 3

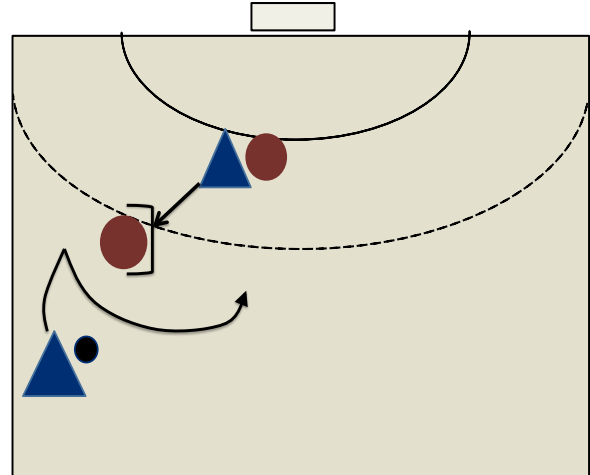


Fig. 4

This situation allows also playing at 2 x 2 on important spaces. For the advanced defender it is difficult to defend because he doesn't see the pivot coming from behind.

DEVELOPMENT

Based on these two basic situations the coaches have developed different playing systems, adapted to different defense systems in order to benefit to the maximum. Thus we are able to identify the movements of different players and the ball circulation (patterns) that conduct the attacking team towards a 2 x 2 situation in a large space. The pivot's behavior is adapted according to different defense systems. The characteristics of the different defenses system were described in the French magazine "Approches du handball".

I. Defense 6 : 0 CHARACTERISTICS

'Strong points

- Good cover of the 6-meter line which often allows to cut the passes through the wingers
- Its density offers the chance to have a block of 2 or 3 players on a back player's shots
- Little space for the pivot player

Weak points

- No pressure on the ball circulation
- The system becomes vulnerable when two defenders are placed in the same sector'' (Approches du handball, 1994, p.12)

Mains tasks for the pivot:

- With his screens he must protect the back players when he shoots
- His screens are made in order to delay the lateral movements of the defenders
- Being capable of placing himself between two defenders and of creating enough space to receive the ball

Solutions:

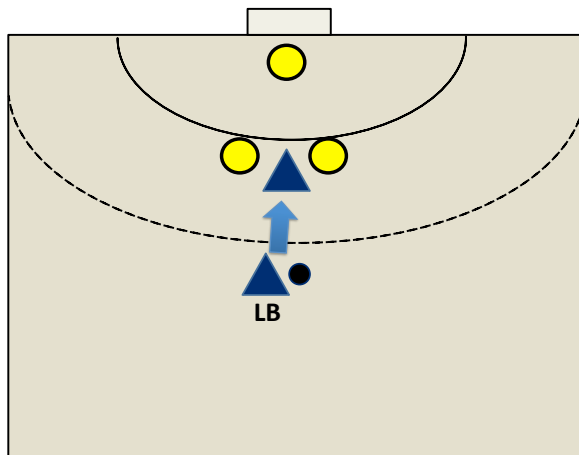


Fig. 5

If the defenders stay at 6 meters, the back player will take advantage of the screening of the pivot and take a shot.

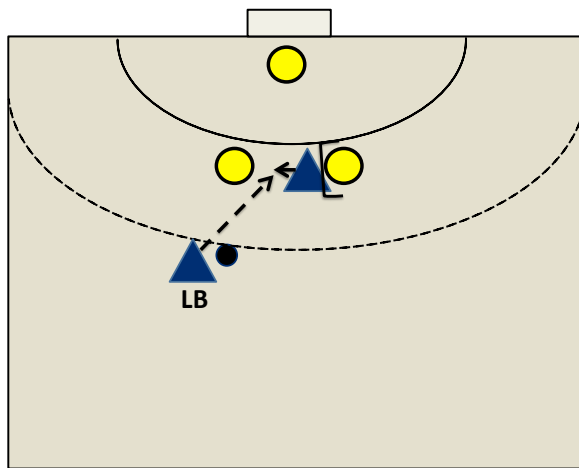


Fig. 6

If one defender moves laterally, the back player can pass the ball to the pivot.

If one defender goes out to touch the back player, then there are two different solutions:

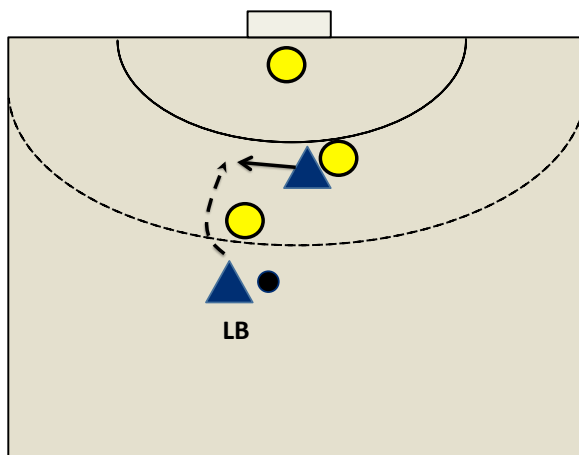


Fig. 7

The pivot slides behind this defender and the back player passes him the ball.

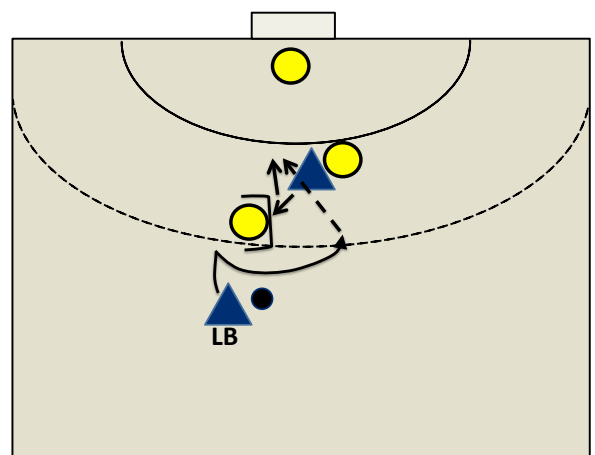


Fig. 8

Pick-and-roll

Examples of playing systems that lead to the situation of 2 x 2

1. The pivot is placed between the two numbers 3 of the defense

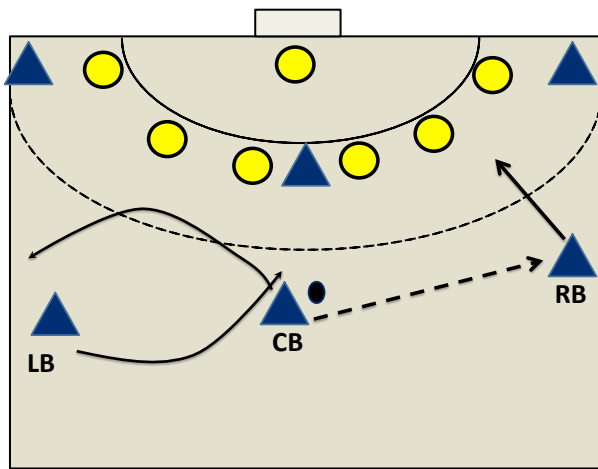


Fig. 9

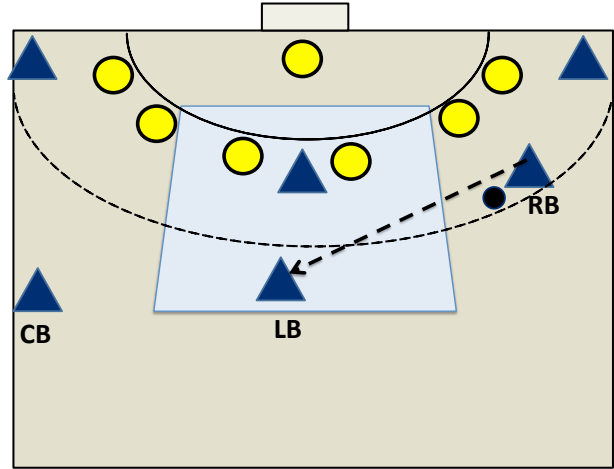


Fig. 10

The center back gives the ball to the right back and changes position with the left back. With their movements, with or without ball, the center back and the right back try to keep the two numbers 2 from defense as far as possible from the center of the field (fig. 9). The right back attacks between 1 and 2 and gives the ball to the left back (fig. 10). And so the left back will receive the ball in the pivot's sector and try to take advantage of this 2 x 2 situation.

2. The pivot is placed between the number 2 and number 3 of the defense.

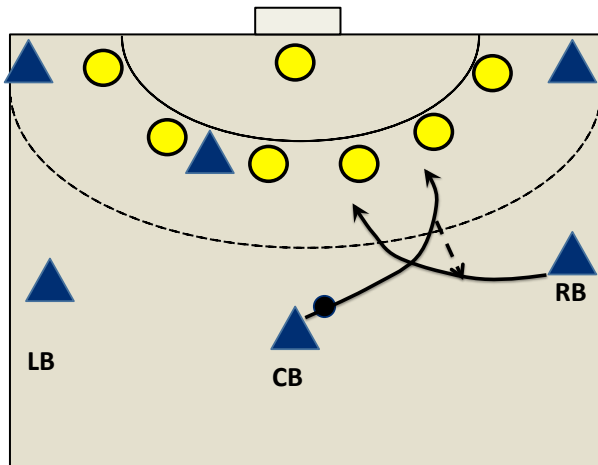


Fig. 11

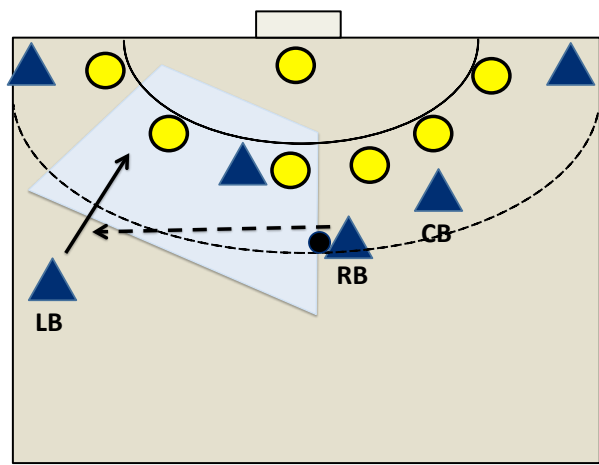


Fig. 12

The center back changes position with the right back with a crossing movement (fig. 11). The right back goes towards the goal either to shoot or to mobilize the two defenders number 3. Then he passes the ball to the left back (fig. 12).

3. The pivot is placed between the number 1 and number 2 of the defense

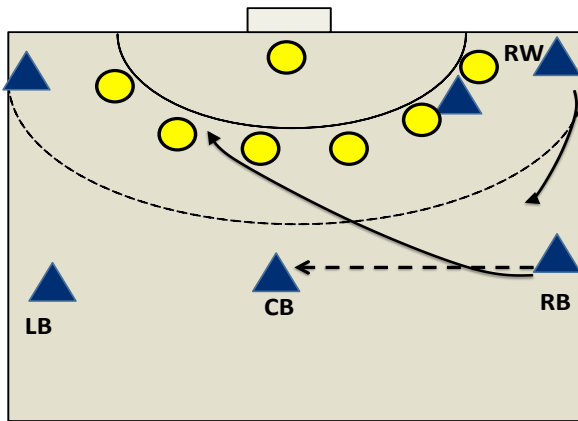


Fig. 13

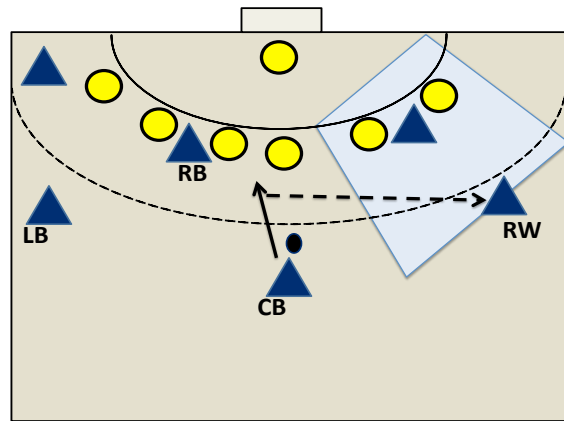


Fig. 14

The playing system starts with the transition of the right back after passing the ball to the center back. The right wing moves farther from the goal to catch the ball (fig. 13). The center back returns the ball to the right wing in a 2 x 2 situation on a large space (fig. 14). This situation is more and more researched because, in this case, the pivot often has an advantage related to the weight imbalance (pivot – wing).

This situation is presented step by step in the magazine “WHM TECH” in the WCh final game where France played against Denmark (Sweden-2011).



Fig. 15



Fig. 16



Fig. 17



Fig. 18

We can see that the transition of the right back and the parallel thrust of the center back (fig. 15) free a large space for the right wing and the pivot (fig. 16). "The right wing receives the ball in the direction of the defender number two, creates a dangerous situation in front of the goal by taking up a frontal basic position and by making a bounce pass to the pivot (fig. 17). The pivot catches the ball with one hand and immediately turns outside to the throwing arm side. The defender cannot prevent the successful dive shot" (fig. 18) (WHM TECH, 2011, p. 12-13).

II. Defense systems on 2 or 3 lines (3:2:1, 5:1, 3:3) CHARACTERISTICS

'Strong points

- The first line, which consists of 1, 2 or 3 players, disturbs the ball circulation between the back players
- The first line can also reduce the solutions for the back players
- Good protection in the center of the defense
- The position of the players in the first line is ideal in case of a fast brake

Weak points

- Weak coverage of the 6 meters line
- The space between the defenders is larger
- Difficult distribution in case of players circulation
- High energy consumption" (Approches du handball, 1994, p. 14)

Mains tasks for the pivot:

- He must use the free space behind the players in order to receive balls
- Try to put himself in a relation (type pick-and-roll) with a back player or a winger
- He must allow the continuity of the attack play by playing between the defenses lines, demanding the ball in case of a very aggressive defense

Causing situations of 2 x 2 on large spaces is based on the same principle. By different movements, with or without the ball, the back players or the wingers try to liberate a big sector where the pivot can have a relation like pick-and-roll with a back player or with a winger.

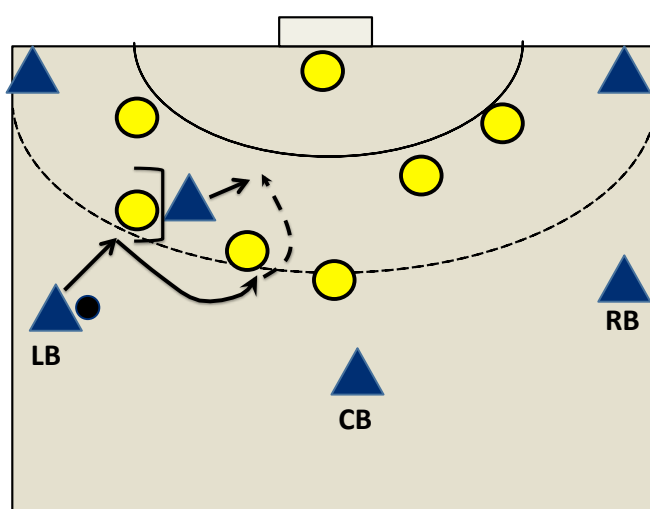


Figure 19
Example of pick-and-roll situation
pivot – back player.

Fig.19

As we have seen before, one of the weak points of defense systems on 2 or 3 lines is the difficulty of the distribution in case of player circulation.

The coach of Montpellier (France) Patrice Canayer has been asked to tell his opinion about the importance of the pivot position. He said that "...his role is more and more important. The back players are bigger and stronger and with their volume of play, they cover an important area. Sometimes they give the impression that there are too many players at the 9 meters and they are bothering each other. So today, playing with two players inside the defense in order to disturb the good functioning of the system seems to me an interesting field to explore and this is done more and more by many nations...

That's why it is very important to teach all the young players, no matter which position they play, the principles of the inside play: blocking, open up, sliding... I think that it is very important to spend a lot of time doing this with the young players; at some point, each player will find himself in a pivot position trying to establish a relation with a back player and it is important for him to know what to do".

(Patrice Canayer, www.handzone.net)

The basic idea is that, with different types of transition (of one back player or one wing), the attacking team starts playing with two pivots. In this way the defense is split into two and there are solutions to be found on 2 x 2 on each side of the field. Below you can see an example of transition made by the right back.

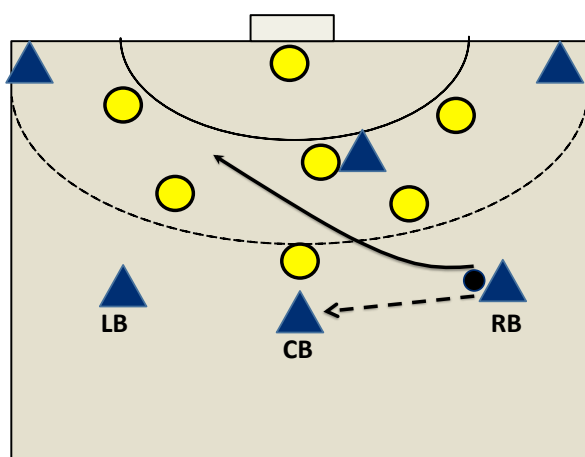


Fig. 20

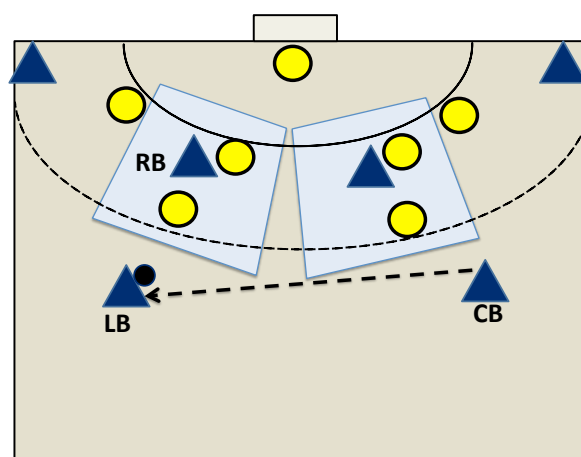


Fig. 21

The right back passes the ball to the center back and makes a transition to the opposite side on the 6 meters (fig. 20). The center back passes the ball to the left back and changes his position by taking the place of the right back (fig. 21).

In the same way the wing player or the center back can make transitions.

STATISTICS

In order to establish the quantitative dimension of the pivot position, based on the statistics data offered by the EHF on its internet site, in table 1 I have calculated the percentage of the goals scored by the pivots from the total number of the goals scored by their team during the last 6 final tournaments of the European Championships (from 2000 to 2012). The observation was made on the eight teams that participated in every championship. With very few exceptions the teams played 6 to 8 games in each tournament.

TABLE 1
EUROPE CHAMPIONSHIPS 2000 – 2012
PIVOT'S CONTRIBUTION

	CROATIA	DENMARK	FRANCE	GERMANY	ICELAND	SLOVENIA	SPAIN	RUSSIA
2000	11%	9%	17%	8%	10%	14%	13%	9%
2002	4%	7%	14%	14%	12%	23%	9%	7%
2004	11%	16%	11%	11%	9%	15%	6%	10%
2006	16%	18%	14%	18%	13%	4%	11%	7%
2008	13%	15%	7%	13%	9%	11%	18%	12%
2010	8%	10%	13%	8%	12%	13%	13%	14%
2012	8%	11%	12%	10%	10%	7%	7%	15%

COMMENTS

- 17 times the percentage are below 10%
- 31 times the percentage are between 10% and 15%
- 6 times the percentage are above 15%

Generally the pivots score 10 to 15 percent of the total numbers of the goals scored by the team.

In table 2 I have calculated the personal performance of the pivots.

TABLE 2
EUROPE CHAMPIONSHIPS 2000 – 2012
PIVOT'S PERSONAL PERFORMANCE

	CROATIA	DENMARK	FRANCE	GERMANY	ICELAND	SLOVENIA	SPAIN	RUSSIA
2000	56%	87%	65%	68%	80%	79%	71%	81%
2002	50%	50%	78%	58%	71%	72%	53%	58%
2004	61%	81%	55%	64%	61%	71%	68%	68%
2006	57%	75%	64%	85%	89%	75%	82%	76%
2008	75%	70%	85%	69%	68%	74%	79%	52%
2010	64%	66%	75%	82%	76%	65%	73%	81%
2012	66%	78%	74%	70%	82%	71%	74%	76%

COMMENTS

- There are no percentages below 50%
- Only 4 times the percentage is between 50% and 60%

- 22 times the percentage is above 75% sometimes even 85% (!)
- Generally the pivot has the best percentage of all positions.

These statistics show the concrete contribution in terms of pivot's goals. But during the game there are also other aspects, maybe less obvious, but with the same importance that we have to talk about.

1. Penalties

Usually the most exposed position where the penalties are obtained is the pivot position. The pivot obtains more than 25% of the penalties of a team. In table 3 the numbers represent:

- * goals from penalty throws / ** total goals of the team / *** percentage

TABLE 3
Goals scored by penalty throws

	CROATIA	DENMARK	FRANCE
2000	21*/146**/14,3%***	22/143/15,3%	14/173/8%
2002	15/70/21,4%	13/212/6,1%	26/180/14,4%
2004	26/222/11,7%	17/240/7%	21/189/11,1%
2006	35/229/15,2%	29/253/11,4%	22/243/9%
2008	22/212/10,3%	25/233/10,7%	20/231/10,8%
2010	34/207/16,4%	21/198/10,6%	23/225/10,2%
2012	26/216/12%	20/216/9,2%	19/156/12,1%

For the three teams the percentage of the goals scored by penalty throws ranges from 6% (Denmark-2002) to 21% (Croatia-2002).

This means that even if the pivot doesn't score we can say that he assists the goal by obtaining most of the penalty throws of his team.

2. 6X5, 6X4 (superiority play)

When we are talking about this situation the objective of each team is to score 1 or 2 goals and not to take any. The important thing is that all the strategies, the playing systems focus on the pivot and even if he doesn't always score, his team will take advantage of his actions: screens, open up... Success or failure depends on how well the pivot realizes his task.

3. 5X6, 4X6, 4X6 (inferiority play)

In this situation the attacking team try to save time, to keep the ball possession as long as possible despite being dangerous at the same time (if not there is a risk of passive play).

And so, after a first attempt, which includes a playing system, the easiest and most efficient way to save time is to find solutions to give the ball to the pivot and obtain free throws.

4. Defense

Last but not least, we must not forget the defense. Due to the specific qualities of the pivots, they are the perfect candidates to occupy key positions in the defense.

DISCUSSION

First of all, today, the teams have more time to practise. This fact gives them the possibility to train more than one system of defense.

Secondly, it is known that different defense systems require different approaches in order to find solutions. As mentioned above, the pivot has different tasks.

Moreover the handball of our days is faster and more physical.

Based on these these statements we ask ourselves: is that possible to have one pivot capable to fulfill all the required tasks?

To find an answer to this question, let's take a look at Klaus Feldmann's analysis of the pivots of the 10 top teams after the World Championship of 2007 in Germany. He put in a chart statistics data showing the average of the time played per game and also morphological data.

TABLE 4

PLAYER	PLAYING TIME/MATCH	SIZE/WEIGHT
SCHWARZER (GER)	24 min	1,96/100
JURECKI (POL)	28 min	1,93/100
KNUDSEN (DEN)	57 min	1,89/95
GILLE (FRA)	44 min	1,87/98
VORI (CRO)	41 min	2,02/102
CIPURIN (RUS)	34 min	1,90/110
URIOS (ESP)	28 min	1,93/105
GUNNARSSON (ISL)	22 min	1,92/100
GAL (HUN)	47 min	1,93/115
LUBEJ (SLO)	37 min	1,94/95

(FELDMANN, 2007, p. 6)

We can see in the middle column that only 4 pivots played more than 40 minutes. This is understandable because the main characteristics of the position are: the pivot plays in physical contact with the defenders almost all the time (exocentric-isometric-concentric muscle work more than in any other position) and in defense he usually has a key position.

Maybe it is more interesting to look at the right column (size/weight). We can see some important differences in the morphological data of the pivots going from 187cm/98kg (Bertrand Gille, France) to 202cm/102kg (Igor Vori, Croatia). Let's analyze the two "extremes":

Bertrand Gille

- Physically very strong
- Good mobility, very efficient in the play between the lines of the defense
- With his screens he helps a lot the back players
- Good capacity of catching the ball, especially the bound passes
- Very good motor skill, capable of taking shots from any position, pushed or pulled
- In most cases, when he has the ball either he scores or he obtains a penalty throw
- In defense he plays in the middle

Igor Vori

- Impressive size/weight measure – very difficult to defend against him
- Capable to catch the very high passes
- Often he takes advantage of the weight imbalance
- The back players take profit of his screens, especially when 2 defenders are forced to be near to him
- When he has the ball he usually obtains a penalty throw but he also scores
- In some situations he is also capable of making shots from 8 or 9 meters
- In defense he plays in the middle

If we compare the qualities of Bertrand Gille and Igor Vori it isn't difficult to say that we have two different morphological profiles with two different styles. The personal qualities recommend Gille as a very efficient pivot against the defenses on 2 or 3 lines and Vori against the lined-up defenses type 6 : 0. But we can say that both of them are highly important in their team.

Talking about the two great pivots, Bertrand Gille was elected the best player in the world in 2006 and Igor Vori was elected the best player of the World Championship in Croatia in 2009. The interesting thing is that they started to play for the same club – HSV Hamburg – in 2009.

This fact could provide an answer to our question: in a team, it is more efficient to have two pivots with different qualities that complement each other. Thus, no matter which defense system the opponent has chosen, we can always find a solution to beat it.

CONCLUSIONS

The pivot scores between 10 to 15 percent of the goals and he obtains most of the penalty throws.

His scoring percentage is the best of all players.

Even if he doesn't have the ball he must accomplish important tasks in every situation: equal number, superiority play, inferiority play.

His actions – screens, open-ups – are useful for the back players and the wingers.

He is one of the best defenders and he is usually placed in a key position.

Based on these statements we can say that the pivot position is one of the most important ones.

During practices the coaches must spend enough time to develop the relation between the pivot and the back players and wingers. Every player must understand the role of the pivot in order to be capable of taking profit of his work.

All players must have a minimum knowledge about the individual techniques of the pivot position.

The position of the pivot plays a key role.

Before the European Championship of 2012 in Serbia, the former player Stefan Kretschmar said in an interview that “The teams that win titles are those who have an outstanding center back and an outstanding pivot like France, Croatia and Denmark”. (Kretschmar, 2012).

Three weeks later Denmark became European Champion.

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MATCH ANALYSIS OF THE MAN'S HANDBALL TEAM OF
MONTENEGRO VS SWEDEN IN THE QUALIFICATIONS FOR
THE WORLD CHAMPIONSHIP IN SPAIN 2013

ZORAN KASTRATOVIĆ

HANDBALL FEDERATION OF MONTENEGRO
MONTENEGRO

INTRODUCTION

After two unsuccessful attempts in the qualifications for the World Championship, Croatia 2009 and Sweden 2011, Montenegro has, for the first time since the restoration of its independence, earned the right to participate in a Men's Handball World Championship.

The men's national team of Montenegro achieved victories in the matches of the first qualification round against the national teams of Belgium (04.01.2012 and 07.01.2012) and Latvia (11.04.2012), and also in the two matches against Sweden (10.06.2012 and 16.06.2012) in the second qualification round, to qualify for the World Championship in Spain, January 2013.

In the matches of Group 3 in the first round of qualifications, the Montenegrin national team achieved the following results:

Teams	Full Time	Half Time
Montenegro vs. Belgium	35 : 27	(18 : 13)
Belgium vs. Montenegro	33 : 37	(13 : 21)
Latvia vs. Montenegro	30 : 31	(14 : 17)
Montenegro vs. Latvia	32 : 28	(15 : 14)

19 players performed for the national team of Montenegro in the first qualification round:

Mijatović R. Rakčević M. Pejović M. Milašević M. Melić F. Osmajić V. Marković I. Rajković M. Grbović N. Pejović Ž. Majić M. Vujović S. Ševaljević V. Peršić I. Roganović Z. Lasica M. Mrvaljević D. Marković Ž. Simić N.

In the draw held during the European Championship in Serbia, January 2012, Montenegro was drawn against Sweden – who were placed 4th in the last World Championship held in Sweden in 2011 – as the opponent in the second round of qualifications – Play off.

The Swedish team has been the opponent of the handball team of Montenegro in the past two European Championship qualifications as well. The total score in the past four played games was 4:0 in favor of Sweden.

In the games between these two opponents held in Stockholm (SWE) 10.06.2012 and Podgorica (MNE) 16.06.2012, the Swedish national team stood as the absolute favorite.

However the national team of Montenegro achieved a total score of 41:40 ((21:22) and (20:18)) in the duel between these two teams and with this made the biggest surprise in these qualifications, considering the strength and quality of the opponent.

The achievement of the handball team of Montenegro gained special weight after the Olympic Games in London, where the Swedish national team qualified 2nd and won the silver medal.

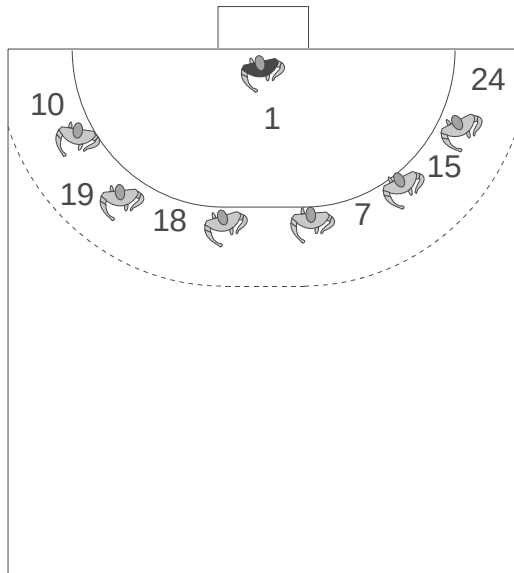
By winning against Sweden, the Montenegrin handball national team achieved a historic sport result in Montenegro, considering the size of this nation, the amount of men's handball teams and the total amount of registered players.

The national team of Montenegro will have the following national teams as opponents in group A in Granollers (Spain), in January 2013: France, Germany, Tunis, Argentina and Brazil.

In this analysis, we will present in what way this historic result has been accomplished.

FIRST MATCH IN STOCKHOLM (SWE) 10. 06 2012

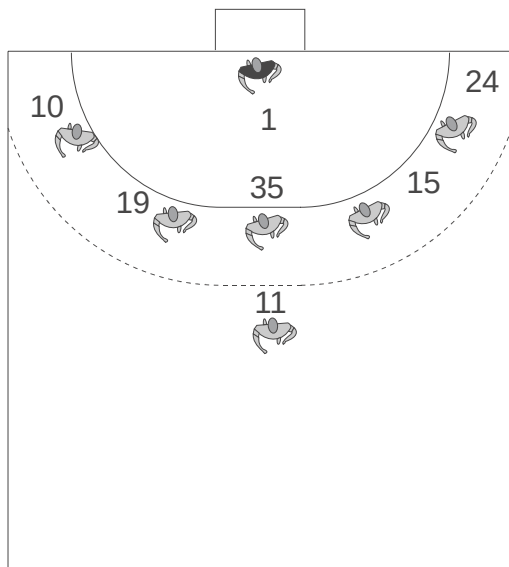
DEFENCE SET-UP OF SWEDISH TEAM



Swedish 6 – 0 zone defense although the two backs will go more especially on non – ball side.

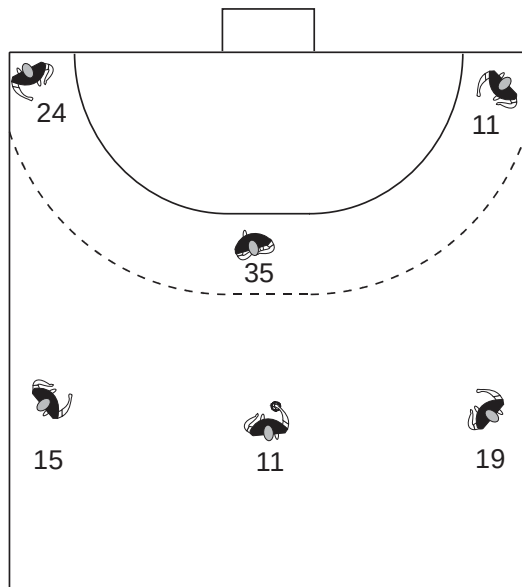
They will go deep anticipating diagonal passes.

IL and IR are two specialists who will switch with the CB and the LP respectively.



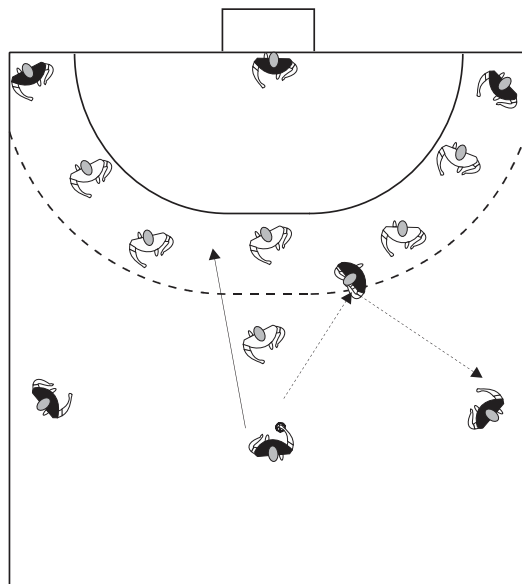
If the Swedish team fails to substitute the CB and LP the zone formations transforms to 5 – 1 until the first substitute possibility.

OFFENCE SET-UP

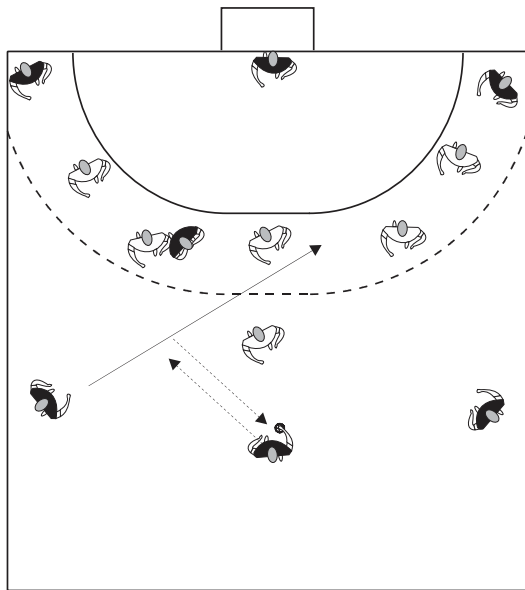


For the attack play the Swedish team changes two central players in the defense – changed by CB and LP. Wing players play all the time.

OFFENCE MOVES



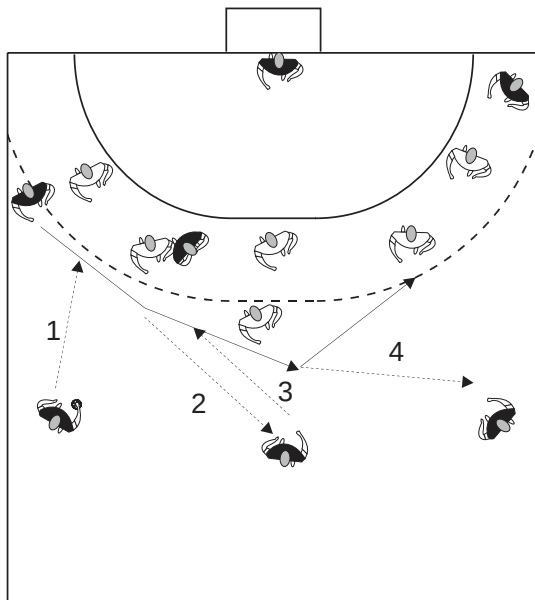
CB passes to LP who plays to the RB
 CB goes to the 6m line as another LP
 The play continues with two players on the line



The LB joining on the position as the second LP

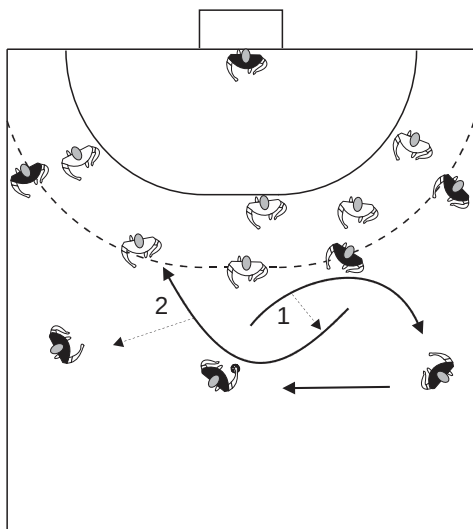
In most cases it's the player with the number 15

Playing with two LP's they attempt to play the player on the line.



LW enters the position of the second player on the line after a double-pass with the CB. Variants of this movement in the attack are:

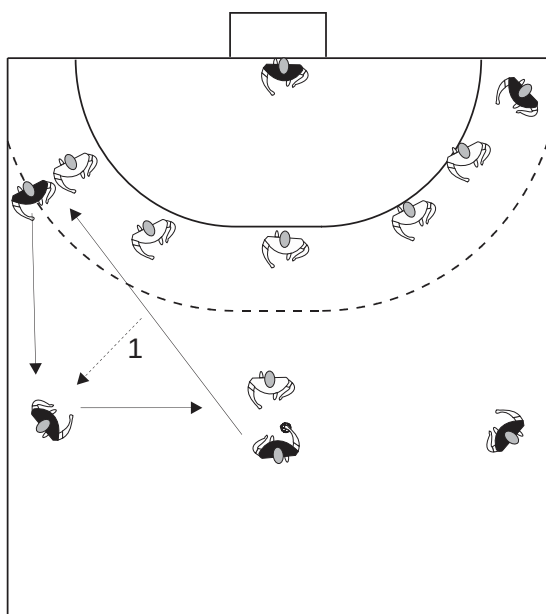
- Creating a surplus player on the opposite side
- Through balls to LP



CB number 11, Doder, receives the ball from LB and plays a pass to LP by intercrossing, after which comes a substitution positions with RB (CB never goes on the 6m line)

On the position of the left or right back player number 11 in 1:1 play try's to pass through or make a surplus player

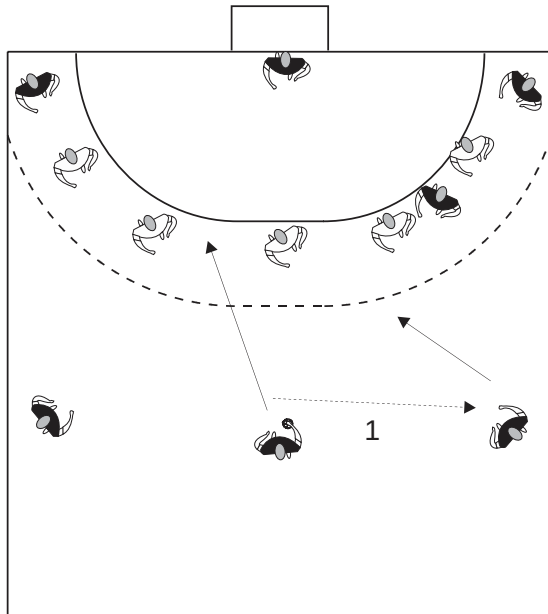
PLAY 5 – 6



In a situation when the Swedish team is in the numerical inferiority, the Montenegrin team plays pressing on the player number 11.

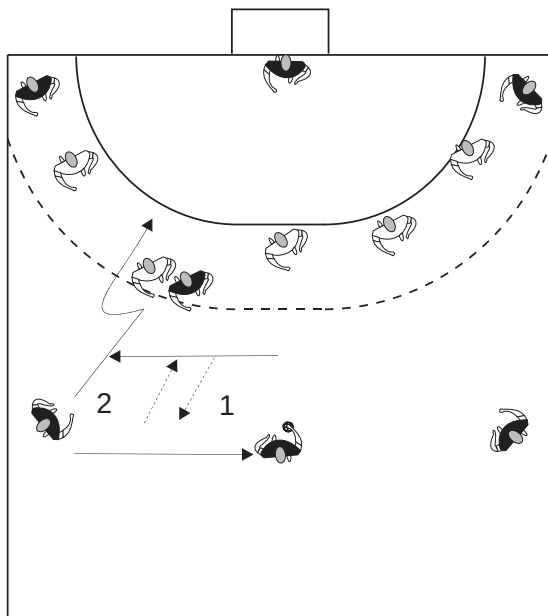
Player number 11 switches position with the LW following with player intersections.

PLAY 6 – 5



In a situation of numerical superiority – surplus player number 11 after dragging plays the DB and goes to the line.

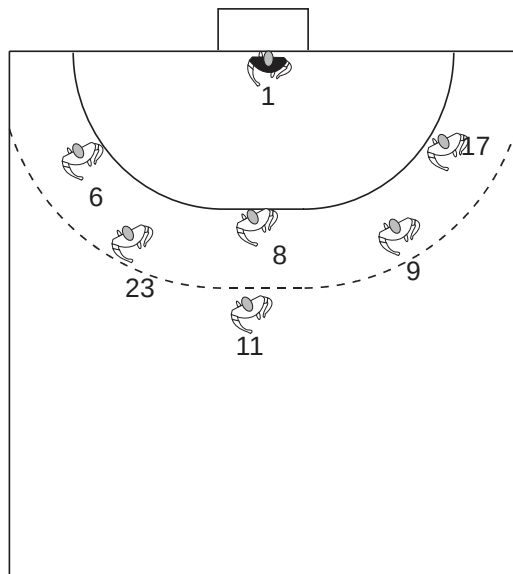
LP is widely placed between the first and the second defense player.



After a change in position CB – LB follows a back-pass.

Then using a pivot block, Doder makes a surplus in the game 1:1

DEFENCE SET-UP OF MONTENEGRIAN TEAM

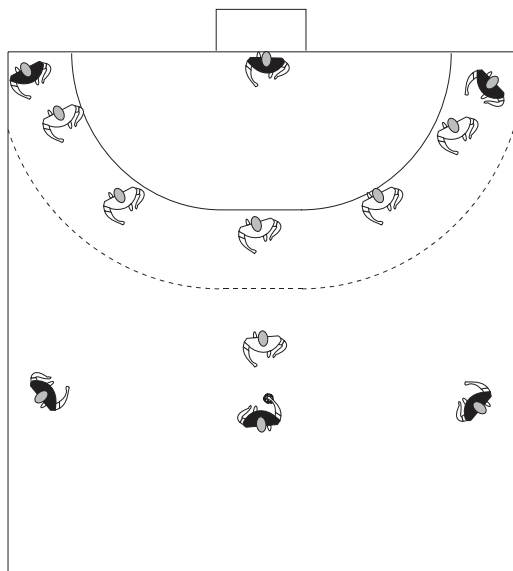


Montenegrin team played 3:2:1 zone formation with transition to 4:2 without switching RH or LH together with no.11.

The defense requires a high level of physical fitness so the rotation of players that play both directions is more often.

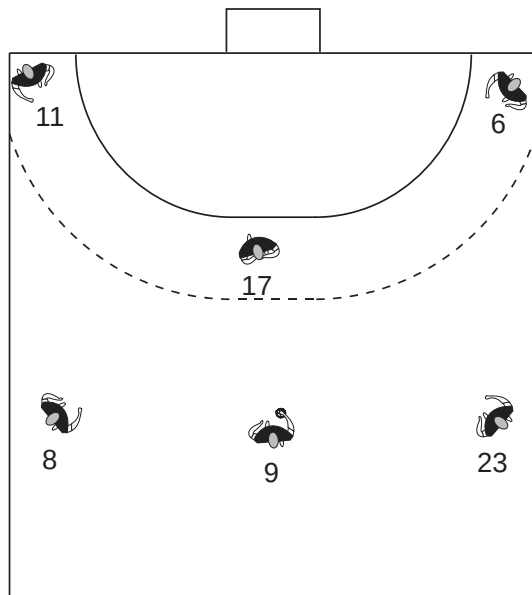
Depending on the quality of opposing team individuals the anticipation of the front three players was deeper.

DEFENCE 6 – 5



In situations with a surplus player the Montenegrin team played pressing (5+1) on player number 11.

MONTENEGRO OFFENCE SET-UP



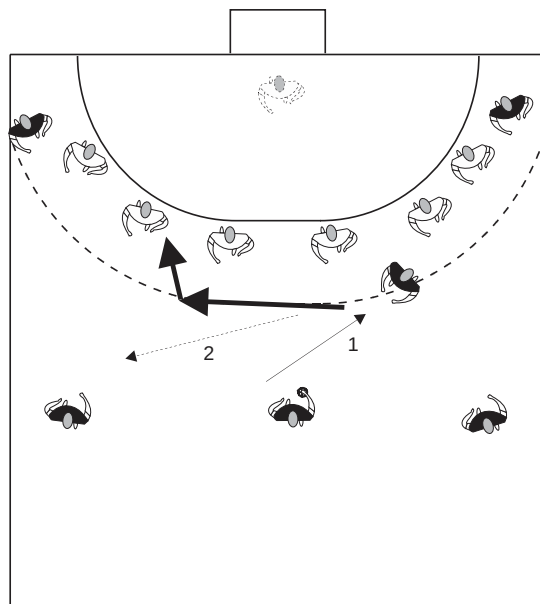
Playing the position attack at the start of the game, the Montenegrin team played with the same players that played in both directions.

- Changes in the attack and defense play players with numbers 8 and 21.

Changing for the play in both directions LP's and CB's.

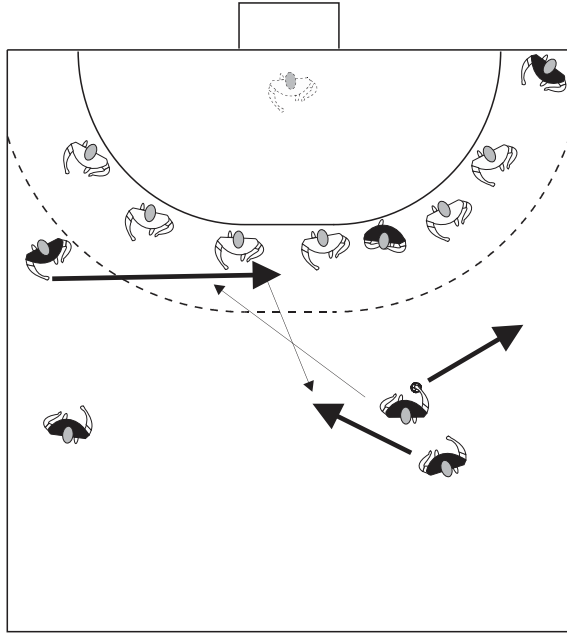
RW Melić spent 60 minutes in-game.

OFFENCE MOVES



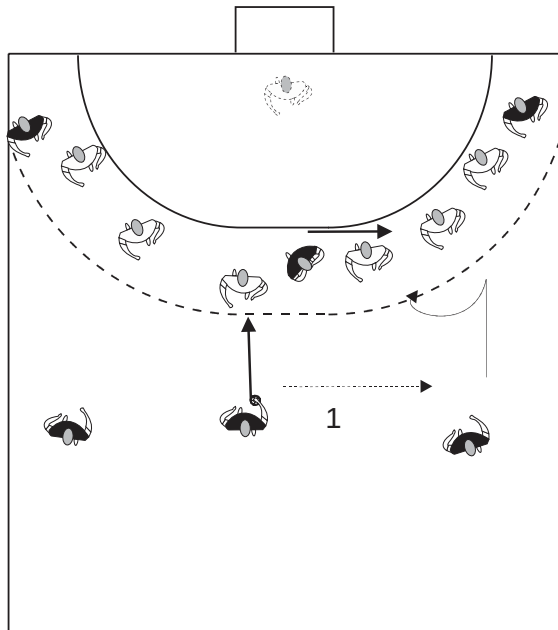
Intercrossing the CB with the LP followed by the entry of the LP on the line and the CB going on the RB or LB position.

This is followed by a 1:1 game and creating surpluses or intercrossing the guards.



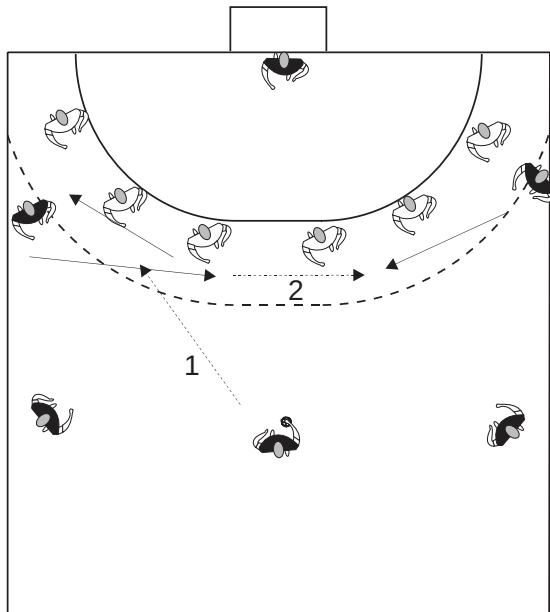
LW receives the ball from CB who changes position with RB.

After the back-pass to RB follows the intersection of two guards.



CB passes to RB who attacks the space. After a change in the direction towards the center players a pass to LP that runs behind the back of the defense players 2 and 3.

PLAY 5 – 6

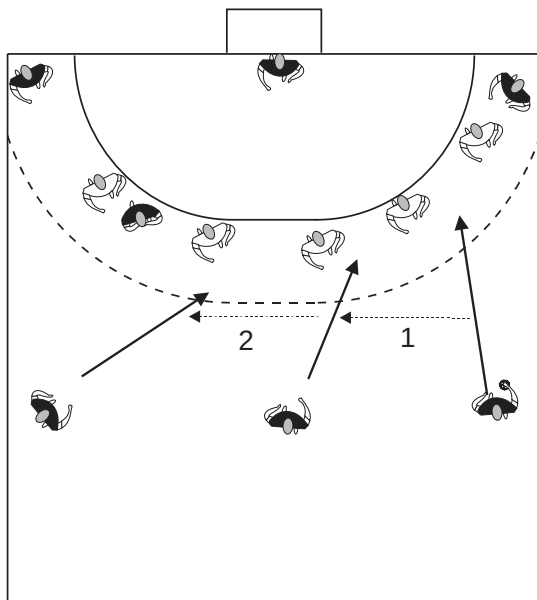


LW receives the ball from CB and intersects with RW.
LW pulls out on his position and the RW stays on the LP position.

Possible solutions:

- Intercrossing of the guards
- Surplus for LW

PLAY 6 – 5



RB attacks space between defenders 1 and 2 and plays a pass to CB.

CB plays a pass to LB who has more solutions.

Shoot, through-balls to the widely set LP between defense players 3 and 4.

Through-balls to the LW.

REMATCH GAME IN PODGORICA (MNE) 16. 06 2012

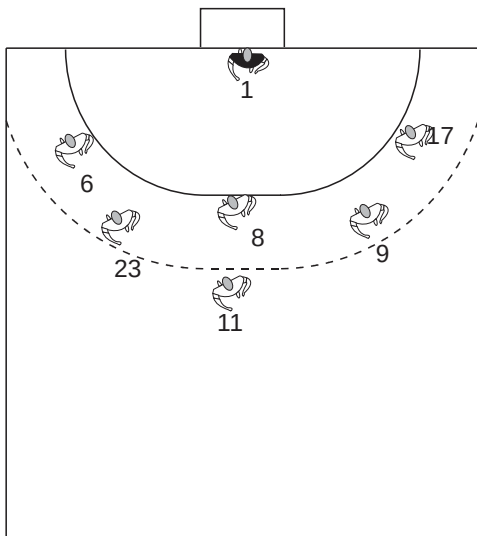
For the rematch game in Podgorica the Swedish national team coach tandem subsequently invited their best player and one of the best right fullbacks today – Kim Andersson.

The playing concept of the Montenegrin team in both directions experienced a number of significant changes.

One of the tactical ideas was that after misses or technical mistakes in attack, the left wing immediately plays pressing on the player number 5, Andersson, who is the major ball distributor in the Swedish teams' counter-attacks.

MNE SET – DEFENCE

Deep and very open 3:2:1 zone defense



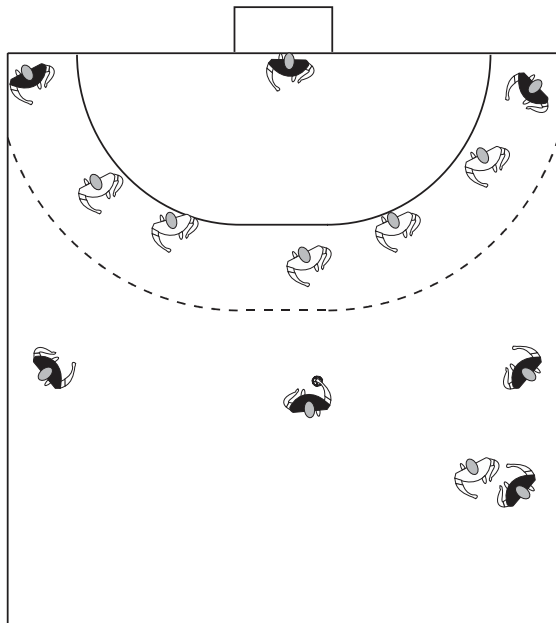
The Montenegrin team with its defense game phase engagement prevented the Swedish team scoring, the usual – for them – number of goals.

Defensive movements were subordinated to that Andersson doesn't through-play his squad.

LH and PC had strict orders, in situations when player number 5 has the ball, to play extremely deep.

All this has resulted in a large number of technical mistakes by the Swedish team.

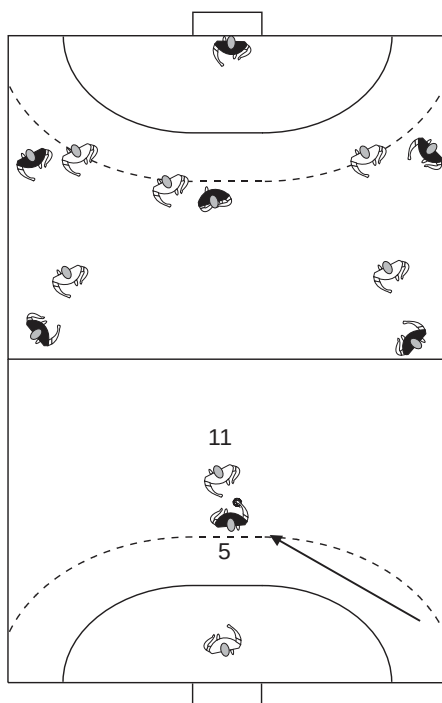
Second zone defense system - 5+1



The biggest problem of the Swedish team was that the greatest danger comes from RB Andersson and when he's isolated the offensive game is almost clueless.

This resulted to a small number of goals in the Montenegrin net.

Defense of counter-attacks

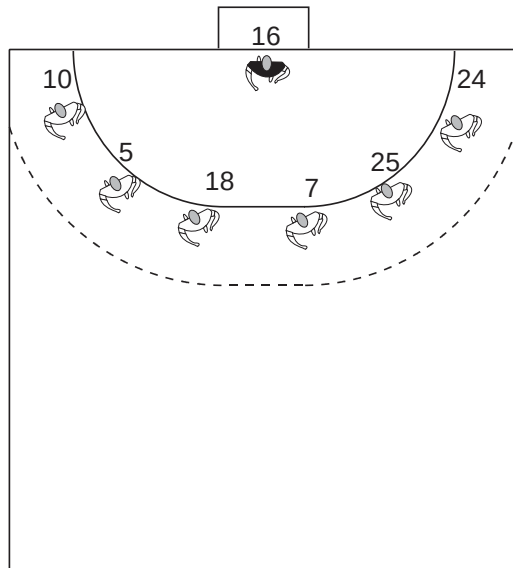


The task of the wing players on the left side of the attack is to play pressing on number 5 immediately after a missed attack or a lost ball.

This is how the flow of quality through balls from the Swedish team was stopped.

DEFENCE SET-UP (SWE)

6:0 ZONE DEFFENCE



During the match in Podgorica, the Swedish line up started with zone defense 6:0

Change in this part of the game, depending on the one in Stockholm:

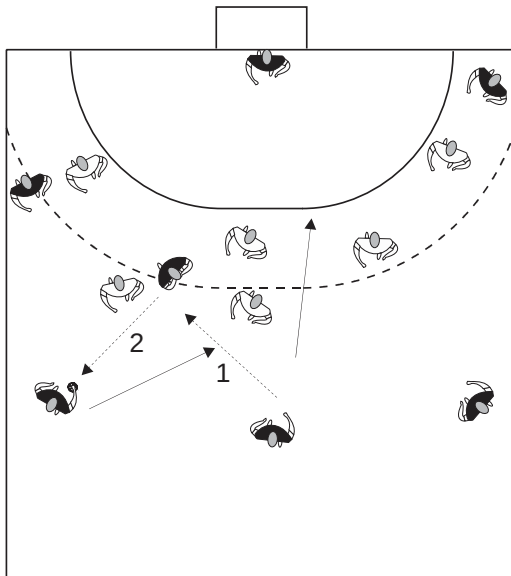
- Player number 5 Anderson instead of player number 19 Jakobson
- Player number 25 Du Rietz instead of player 15 Larhom
- Change of play in attack/defence player number 11 and 35 (attack) with players number 7 and 18 (defence)
- Instead of the goalkeeper Anderssona number 1 was Sjostrand number 22

SWE OFFENCE SET-UP

Playing attack for both teams came down to the game shown in Stockholm in the first match.

Except intercrossoes from the player number 11 with the player number 5 of the Swedish team it was evident that in the second half of the rematch they implement the attack with pass-game LP-LB.

SWE MOVE IN OFFENCE



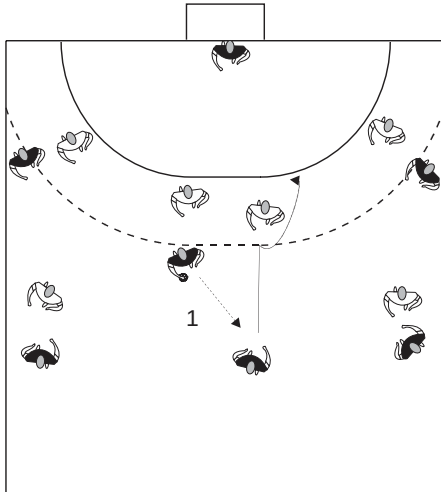
Different moves in attack on deep and open defense in the rematch.

CB plays the LP who passes to LB. He widely bypasses DH and plays the CB who went to the line or shoots uninterrupted.

With this the Swedish player realized three attacks.

MNE OFFENCE

It is worth mentioning the last attack of the Montenegrin team, which settled all the concerns regarding the overall winner.



On 12 seconds before the end the referee awards a free-throw from 9 meters for the Montenegrin team with a threat of taking the ball due to passive attack.

Playing 1:1 player number 23 Sevaljevic outplayed player number 7 Jernemyr and scored a goal for the final 20:18

Cumulative Statistics After 2 Games

MNE – Montenegro

Coach: Zoran Kastratovic

No	Name	MP	Total			All Goals / Shots							Punishments				Offence			Defense		
			Goals	Shots	%	7mP	7m%	6mC	Wing	BT	FB	9m	YC	RC	2M	2+2M	AS	R7	TO/TF	ST	BS	P7
3	PEJOVIJ MARKO	2	3	3	100			3/3														1
5	MILA[EVI] MIRKO	2																2				
6	MELIJ FAHRUDIN	2	5	14	35	-	-		3/12		2/2									1		
8	OSMAJI VLADIMIR	2	0	4	0							0/4	2		1		1			2		1
9	MRVALJEVI] DRA[KO	2	5	13	38					2/5		3/8			3		4	3	3			1
11	MARKOVIJ IGOR	2	2	6	33				2/5		0/1		1		1		1			2		1
15	KAPISODA PETAR	2																1				
17	GRBOVIJ NEMANJA	2	2	5	40			2/5							1		2					
20	VUJOVIJ STEVAN	2	1	3	33						1/2	0/1							1	2		
21	[EVALJEVI] VASKO	2	16	20	80	6/6	100			3/3		7/11					2		3			
23	ROGANOVIJ ZORAN	2	6	19	31					2/3		4/16	1				5		2	3		1
24	SIMOVIJ MARKO	2													1				1			
25	LASICA MARKO	2	1	1	100					1/1										1		
29	LASICA GORAN	2																				

No	Name	MP	Total			All Saves / Shots							
			Saves	Shots	%	7mP	7m%	6mC	Wing	BT	FB	9m	9m%
1	MIJATOVIJ RADE	2	20	60	33	4/5	0	3/5	6/14	1/9	2/7	8/17	47
12	RAJKOVIJ MARKO	1	0										
16	SIMI] NEBOJ[A	1	0										

Legend:

MP-Matches played % - Efficiency 7Mp -7 m Shot s 7m% - Efficiency 6mC – 6m Shots BT - Breakthroughs FB – Fast Breaks 9m – 9m Shots YC – Yellow Cards RC – Red Cards

2M – 2 Minute susp. 2+2 M - AS - Assists R7 – 7 m in Offence TO/TF - Tec.Fau. ST - Steals BS – Blocked Sh. P7 – 7m in Defence

Cumulative Statistics After 2 Games

SWE – Sweden

Coach: LINDGREN Ola

No	Name	MP	Total			All Goals / Shots							Punishments				Offence			Defense		
			Goals	Shots	%	7mP	7m%	6mC	Wing	BT	FB	9m	YC	RC	2M	2+2M	AS	R7	TO/TF	ST	BS	PT
2	AREN Tobias	1																				
3	GUSTAVSSON Mattias	2													1							
7	JERNEMYR Magnus	2													2					1	1	1
8	KARLSSON Lukas	2																				
10	EKBERG Niclas	2	14	20	70	4/5			9/13	0/1	1/1								1			
11	DODER Dalibor	2	4	11	36			0/1		3/4	1/1	0/5					4	2	6			
15	LARHOLM Jonas Erik	2	2	6	33				0/1			2/5	1		1				5		1	
18	KARLSSON Tobias	2	0	2	0			0/1			0/1		2		1				1		2	2
19	JAKOBSSON Johan	2	4	8	50					1/2		3/6			1		4	1	3			1
24	PETERSEN Fredrik Raahauge	2	7	10	70			1/1	3/4	1/1	2/4						2		1	1		
25	EKDAHL DU RIETZ Kim	2	5	9	55					2/2		3/7										
28	JOHANSSON Robert	2																				
32	ZAKRISSON Mattias	2	1	2	50							1/2										
35	NILSSON Andreas	2	2	2	100			2/2														
5	ANDERSSON Kim	1	1	2	50					1/1		0/1	1		1		2	2	3			2

No	Name	MP	Total			All Saves / Shots							
			Saves	Shots	%	7mP	7m%	6mC	Wing	BT	FB	9m	9m%
1	ANDERSSON Erik Mattias	2	15	36	41	0/2	0	1/4	4/9	2/6	1/3	7/11	63
22	SJÖSTRAND Johan	2	16	36	44	0/4	0	1/2	5/8	2/6	1/2	7/18	38

Legend:

MP-Matches played % - Efficiency 7Mp -7 m Shot s 7m% - Efficiency 6mC – 6m Shots BT - Breakthroughs FB – Fast Breaks 9m – 9m Shots YC – Yellow Cards RC – Red Cards

2M – 2 Minute susp. 2+2 M - AS - Assists R7 – 7 m in Offence TO/TF - Tec.Fau. ST - Steals BS – Blocked Sh. P7 – 7m in Defence

CONCLUSION:

The men's handball team of Montenegro has been – thanks to a disciplined and organized play in both directions – a better rival than the Swedish national team.

A deep defense 3:2:1 in the first game in Stockholm and a very deep and open defense in the rematch in Podgorica also applying the 5+1 defense forced the Swedish players to commit a lot of technical mistakes, which is atypical for this team.

The application of tactical ideas was fully successful, even with the Swedish team organizing counter-attacks in the game in Podgorica (pressing on Kim Andersson in the first phase of attack). The opposing team was reduced to only 40 scored goals in both games.

A small amount of shoots above the opponents' zonal defensive formation 6:0 prevented a large number of counter-attacks.

Psychological stability, desire and tremendous effort from the Montenegrin players were on a great level, which contributed to the achievement of the final goal: placement in a World Championship in Spain 2013.

**TECHNIQUE AND METHODICS OF GOALKEEPERS TRAINING - SHOTS IN
FRONT OF THE GOALKEEPERS AREA**

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Ljubljana, 8th October, 2012

Abstract

Goalkeepers in handball have, because of his specific role in the team, specific demands for developing their abilities which are proving their successes. Goalkeepers trainings needs to be adjusted to different situations for every playing position of the shooter in a handball match. Therefore goalkeepers training needs to be determined through methodic process developed on goalkeepers technique, which depends on the shooters position and faze of the game in which the shot was taken. Due to guideline of the modern handball where attackers like to finish their shot from the six meter line and achieve easy goals from fast breaks, it is a big importance to develop goalkeepers technique and ability in these situations where the shooter is close to the goalkeeper.

Keywords: Goalkeepers, goalkeepers' techniques, line player, counter attack

Introduction

Handball goalkeeper has a specific role in the team he must carrie out completely different tasks than the other players in the team. Goalkeepers in modern handball have a significant role in the team in the process of reaching top result. The role of handball goalkeepers inside the team, technique and methods of a practice, as well as the approach to training are specific to their positions in the team therefore they deserve a special attention. The contents of goalkeepers training must be carefully selected and represent a coherent set of key areas which influence the overall goalkeepers performance. In addition to specific techniques and tactics for defending and specific morphological requirements for playing position of the goalkeepers, their performance is also influenced by other factors in the area of physical preparation, psychology, sociology, ...

Shooters in the finishing attacking phase come in certain situations that are specific to each phase of the game (attack on fully set defense, counter-attack and extended counter-attack) and for certain specific playing positions (wings, back players, line player-pivot). Handball goalkeepers in various situations react differently depending on the above factors. There are certain models of defending, which depend on position of the shooter, but they differ in terms of the school (Scandinavian, Russian, area of the former Yugoslavia). Regardless of the school today's top goalkeepers are looking for solutions from all three schools in order to be successful.

Technique is one of the most important factors for goalkeeper's success. Techniques vary depending on the phase of the game and the position of the shooter: defending Technique from wing positions, defending technique from back positions, defending technique from position of line players, defending technique from shots fired after penetrating defense and defending technique of shots from seven meters.

Subject and problem

In this task we will focus on defending technique and training methodology to specific game situations, which occur when a shot is taken from the line position and shots from individual counter-attacks. Goalkeepers' technique is relevant also to the specific positions of the shooter.

Line player position is among defensive players at the line of goalkeeper's area. Result to that their shots are taken from the immediate vicinity - the distance between the shooter and the player is smaller than by shots from other positions. Very often line players are forced to shot from contact with defensive players or while falling on the ground. Similar specific situations occur in the ending shots from individual counter-attacks, where the shooter with high speed runs towards the six-meter line and by jumping reduces the distance between him and the goalkeeper.

If goalkeepers in above situations want to be successful they should adjust their technique to the shooters position. Goalkeepers save success from the six-meter line and from individual counter-attacks is a result of their technique. Goalkeeper needs to recognize many elements in very short time and his reaction must be fast and explosive. We must be aware that every goalkeepers' technique is different, because it depends on their individual morphological characteristics and motoric abilities.

Main part

In order to achieve success of defending shots in front of the six-meter line, we must prepare goalkeepers an appropriate training. This training has to be oriented to develop the elements when shots appear in front of the goalkeeper's line, which include shots from line player and counter-attacks.

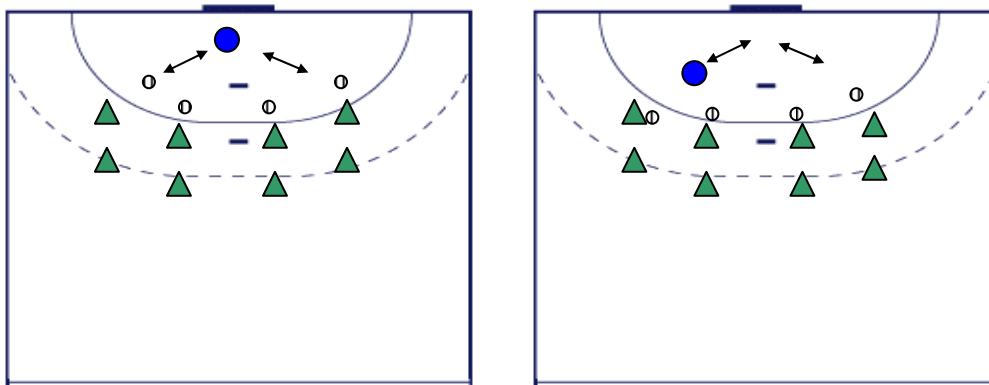
These elements are:

- Goalkeeper attack: reducing the angle;
 - Technique of setting on the ball: the ball on his chest;
 - Copy the attacker's hands: the implementation of the goalkeeper's opening technique
- split in the air;
- Anticipating attackers shot depending on his position.

When goalkeeper learns all of these elements and synchronize it into a single movement, he needs also timing, what is the most difficult task.

Defending technique from line players

1. Exercise:



Description:

Players put the ball on the floor to six-meter line space. Goalkeeper runs, touches the ball with his hand and he is immediately placed in a position perpendicular to the ball (ball on the chest). After touching the ball player immediately picks up the ball and throws the elbow shot towards the goal. After defending the goalkeeper returns to the goal post, and then switches to the next player and the exercise is repeated.

Methods:

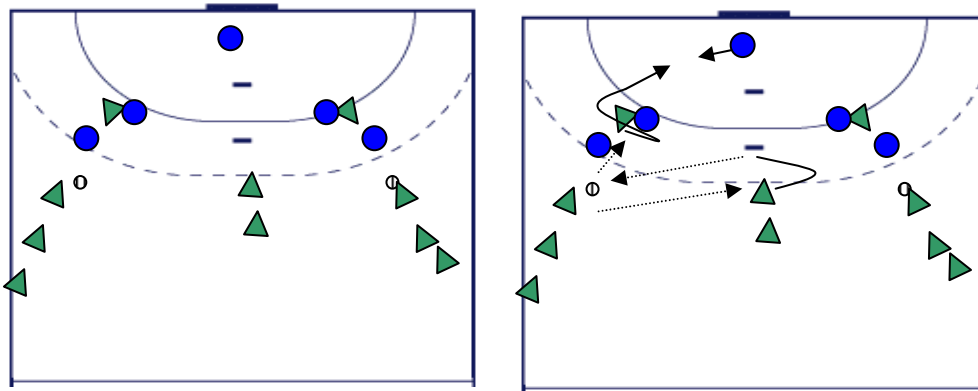
Goalkeeper exercise is carried out quickly only when he is attacking the ball and the player defending the shot. He gently returns back to the goal posts.

Target:

- Goalkeeper acquires a sense of player closeness;
- Goalkeeper synchronized work of arms and legs;
- All of the above elements.

Implementation exercises:

The exercise is carried out depending on the stage of training. In the preparatory period of 8 to 10 times, during the competitive period between 4 to 6

2. Exercise:**Description:**

Line player plays in front of defensive player, turned with his back towards the goal, where he gets free with pivoting technique from the defensive player.

A. Left or right back player passes the ball to the middle back, which makes a dribble and returns the ball to left or right back. They pass the ball to the line player, which makes pivoting on right or left side, opens and indicates a shot on goal. The goalkeeper at the stage of back player pass to the line player attacks him and moves left or right, depending on which side the line player got free from the defensive player, then copies the shot, which the line player indicated.

B. Exercise is upgraded to the point where line players shoot on goal, and goalkeepers try to save their shot.

Methods:

As soon as the goalkeeper copies or saves the line players shot, attacking back player passes the ball to the middle back, where he returns it back, the external actor is continuing the pass toward the line player. Exercise is performed so fast that the goalkeeper has just enough time to readjust to attacking backs, the attack on the line player and the save.

Target:

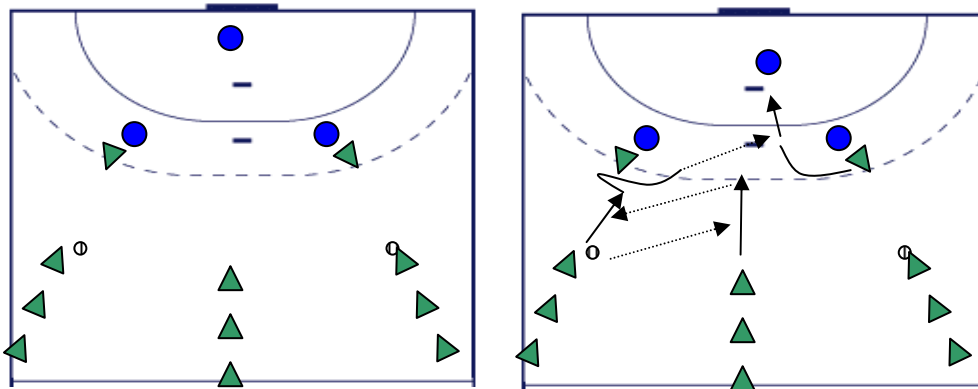
- Moving with the line player;
- All of the above elements

Implementation exercises:

This exercise is carried out depending on the stage of training. In the preparatory period of 10 to 12 times, during the competitive period from 6 to 8 times

3. exercise:

Line player plays behind the defensive players, with face turned towards the goal and he's getting the ball inside the six-meter space.

**Description:**

- One of back players passes the ball to the middle back, which attacks the defense, returns the ball to the back player, and he passes ball to the diagonal line player in space. Line player opens and indicates a shot on goal. Goalkeeper in this case has to both attack the line player and copy his shot, which the line player indicated.
- Exercise is upgraded with the line players shot at the goal, and goalkeepers try to save their shot.

Methods:

As soon as the goalkeeper save or copies the line players shot, back player passes the ball to the middle, where he returns it, back player continues the exercise and passes to the line player. Exercise is performed so fast that the goalkeeper has just enough time for readjust to back players, the attack on the line player and the save.

Target:

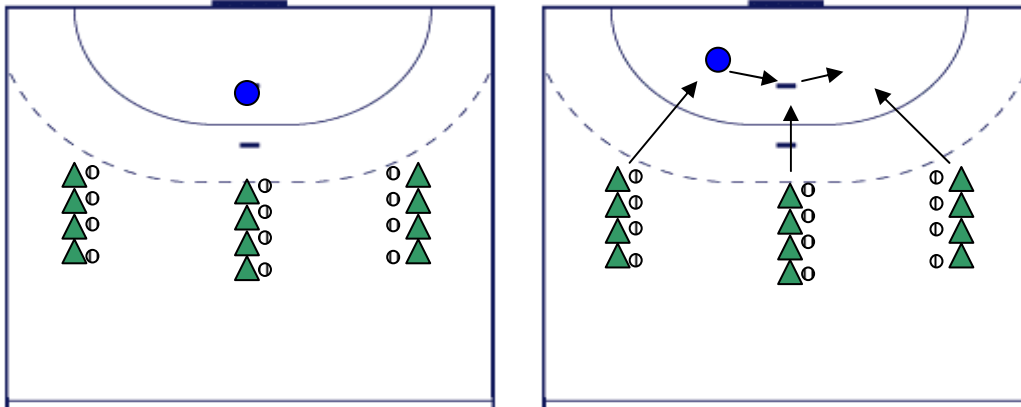
- Attack on the line player and immediate reaction so called “entering in the shot”;
- Prediction, which depends on the attackers pass to the line player;
- All of the above elements.

Implementation exercises:

This exercise is carried out depending on the stage of training. In the preparatory period of 10 to 12 times, during the competitive period from 6 to 8 times

Technique defending shots from counter-attacks

1. exercise:



Description:

Players are in line on six-meters, goalkeeper on four meters. One after another they shot the ball left and right half high, and goalie saves with hand-foot rhythmically. The shooters can shoot only from center back position or we can put the shooters on all three outside position. The goalkeeper than first saves all the shot to left backs, afterwards to center back and at the end to right backs.

Methods:

Players throw the ball to the goalkeeper in high rhythm one after the other from 6-meters.

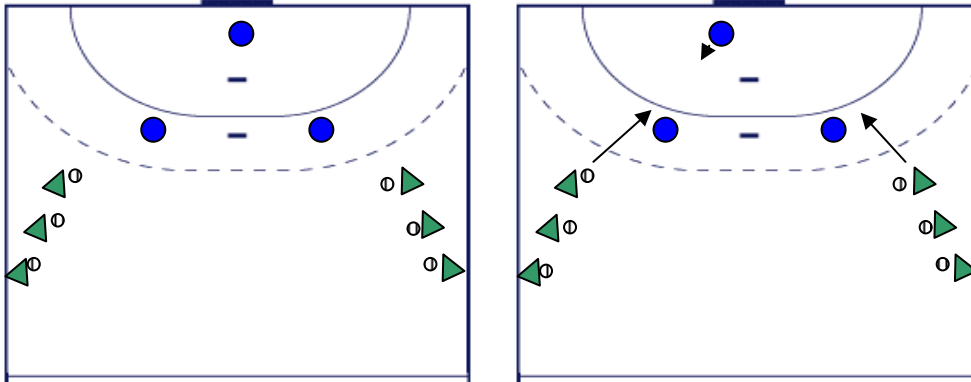
Target:

- With high speed shots on goal we closer goalkeepers speed of counter-attack;
- Reaction rate of hand-foot;
- Motorick functions and coordination.

Implementation exercises:

This exercise is carried out during the competitive period from 10 to 15 times

2. exercise:



Description:

Players are on the left and right back positions. With three steps towards the middle to 6-meter line and with high jump shoot high left or right. Goalkeeper attacks the player, and escorts him to find the right timing to jump and split in the air to defend high shots. Thus, repeats rhythmically to the left and right side.

Methods:

Each player waits until the goalkeeper manages to put himself on an external player.

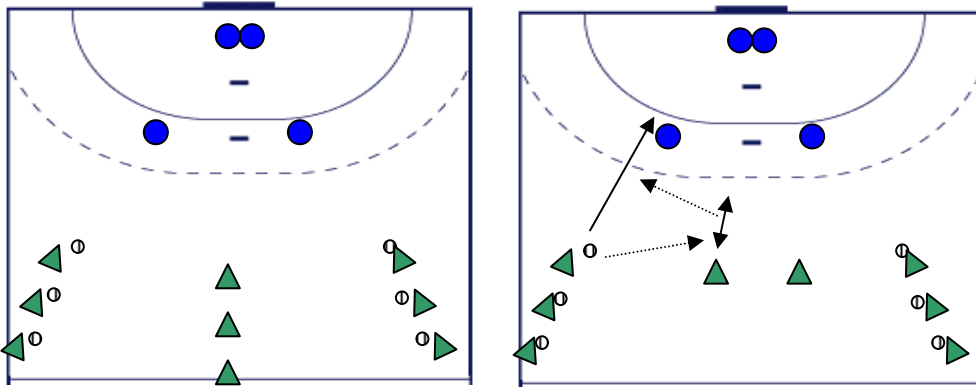
Target:

- All of the above elements.

Implementation exercises:

This exercise is carried out in the preparatory period of 10 to 12 times, during the competitive period from 6 to 8 times

3. exercise:



Description:

The exercise is carried out with two goalies. We tie a rope in the middle of the goal, so that it will be divided into two parts and each goalkeeper defends his half. The task of the players is to score a goal from the post to the rope. The backs pass the ball to the middle back, they receive it back and shoot from 6 meter line.

Methods:

The exercise is carried out simultaneously, as the single column of players does not depend on the other.

Target:

- A large number of saves and possibility of competing with the attacker;
- Reaction rate and jump with split in the air.

Implementation exercises:

This exercise is carried out during the competitive period 2 x 10 times

Conclusion

The achievement of the goalkeepers can bring the team to a higher level. The score in the EHF Champions League semi-final match between the teams Barcelona and Kiel was 44:37. This game was absolutely played in highest level. The goalkeepers of both teams saved 21 balls each. And saving 21 shots is a very good achievement. If we compare the number of the shots, we get the following results: Barcelona vs Kiel 65:58 = 123 shots in 60 minutes. This means one of the best players in the world takes a shot at goal approximately every 30 seconds and the goalkeepers have to save these balls. In my opinion only one goalkeeper is not enough for this high tempo game. So you need two good goalkeepers. (Kovacs, 2009)

Handball game has gained in speed in recent years, increased the number of attacks and by that the number of shots at goal. Attackers try to create more opportunities for the shot from the line player position. Back players are trying to end more attacks after breaking through the defence. The desire of every team in the modern handball is to score these "easy goals" from counter-attacks.

Following the reasons listed above you will see that, more emphasis on work with the goalkeepers should be given to the technique and save performance shots coming from the six-meter line and individual counterattack. If goalies want to be successful in the upper situations, part of the training should focus exclusively on this element of saving.

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**THE COMPARISON OF SOME PERFORMANCE INDICATORS
OBTAINED AT THE MEN'S EUROPEAN HANDBALL
CHAMPIONSHIPS FROM 2002 TO 2012 AND THEIR INFLUENCE
ON MATCH OUTCOME**

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Ljubljana, 8th October, 2012

Summary

All playing performance indicators were selected from six consecutive Men's European Championships held during the years 2002 and 2012. We have calculated descriptive statistics and differences among all European Championships for each individual playing performance indicator. Afterwards we calculated statistic differences between the performance indicators of the national teams which won the match and those that lost it. From the obtained results we can conclude that there are many statistically significant differences in the performance indicators and many differences between the performance indicators of the winning and losing teams among the present European Championships. Those reveal some developing trends in contemporary Handball.

Key Words: handball, European championships, playing performance, match outcome.

Introduction

Based on the system idea, sport performance is described as an issue of the "athlete system". In addition, playing performance in team handball is a special kind of the player behaviour derived from the specific conditions found in a competitive match. We understand playing performance as the sum of the realised action of a player, a group of players or a team in the course of a match, which is characterised by the degree of the game task being fulfilled. We distinguish between the individual and the team playing performances (Taborsky, 2001). The most important conclusion from the previous research dealing with a similar problem is that the performance and the success in the contact team sports depend on many different factors, and that situation efficiency models are different for each team and almost every single match (Gruić, 2006). In top senior competitions, the teams act 60-70 times in attack and 60-70 times in defence on average. The average number of goals per match is increasing. In matches played by the top eight teams at the ECh 1994, the total average number of goals per match was 47.5, whereas at the ECh 2006 it already reached 60.5. On the other hand, in matches played by the top teams, the difference between the winners and losers in terms of the number of goals is decreasing – at the ECh 2004 it was 15.9% (4.1 goals), while at the ECh 2006 it was only 9.7% (3.1 goals) (Taborsky, 2007). In attack, double pivot plays and wing crossings were used very frequently instead of a static game (Sevim, & Taborsky, 2004). Mostly at ECh 2004 the attacks did not take more than 25-30 seconds. In defence the most frequently used defence system was 6:0 performed in an aggressive and cooperative style. Besides this 5:1 and 3:2:1 zone defences were applied. Other, unconventional zone systems were used very seldom during the EChs. One of such exceptions is 4:2 zone defence applied by the Czech national team (Sevim, & Taborsky, 2004). In our contribution we wish to identify the developing trends in certain playing performance indicators in handball and identify the differences of playing performance indicators between the teams that win the match and those that lost it. The basic idea was to determine the performance indicators that are changing during each European championship and the performance indicators that influence the end result of the match. For this purpose we selected all the official statistics data from six consecutive Men's European Championships held in 2002, 2004, 2006, 2008, 2010 and 2012.

Methods

The sample of units contained 284 Men's European Championship matches (ECh 2002 – 50 matches, ECh 2004 – 47 matches, ECh 2008 – 46 matches, ECh 2010 – 47 matches, ECh 2012 – 47 matches). The data were gathered by official monitoring and recording during the matches at the Championships with the EHF/Swiss Timing Handball EURO Scouting Manual software package. We selected all the parameters collected by the official monitoring service. The SPSS statistical package (IBM SPSS 20.0) was used for the statistical data analyses. The descriptive statistics for the variables were computed with their fundamental measures of central tendency, dispersive parameters and homogeneity. The Shapiro - Wilk test was used to verify the normality of the distribution. The differences in the performance indicators among all the competitions and between the winning and the losing teams were established by Kruskal-Wallis test, which is non-parametric alternative for one-way ANOVA. To determine the differences among the individual championships, we have applied a series of post-hoc Mann-Whitney tests.

Results

Tables 1, 2 and 3 presents the basic statistical characteristics of the playing performance parameters gathered by the official statistics service at the EChs. The table shows the average values, the standard deviations, the minimum and the maximum values and the significance of the Shapiro - Wilk test for the variables distribution normality. All 51 performance indicators obtained at the 284 matches were included in the statistical analysis. None of the variables have normal distribution, therefore we have to use Kruskal-Wallis test with post-hoc Mann-Whitney test to obtain eventual differences among the variables.

Table 1: Basic statistical characteristics of offence parameters

	Descriptive statistics					Shapiro-Wilk Test of Normality		
	N	Minimum	Maximum	Mean	Std. Deviation			
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	df	Sig.
All attack	568	41	81	56,60	5,453	,990	568	,001
All goal	568	15	41	27,91	4,680	,991	568	,002
Pl. majority att.	568	0	26	8,11	3,807	,975	568	,000
Pl. majority g.	568	0	16	4,81	2,622	,958	568	,000
Pl. minority att.	568	0	23	6,20	3,182	,960	568	,000
Pl. minority g.	568	0	11	2,45	1,725	,924	568	,000
Position att.	568	37	69	50,04	4,956	,993	568	,010
Position att. g.	568	11	36	23,62	4,318	,994	568	,022
FB	568	0	23	6,57	3,470	,958	568	,000
FB G.	568	0	17	4,27	2,562	,938	568	,000
Ind. FB	568	0	9	1,48	1,771	,792	568	,000
Ind. FB g.	568	0	7	1,20	1,502	,779	568	,000
Team FB	568	0	23	5,07	3,179	,939	568	,000
Team FB g.	568	0	17	3,09	2,250	,910	568	,000

R7	568	0	12	4,29	2,216	,963	568	,000
P7	568	0	12	4,23	2,177	,961	568	,000
Shot 6mC	568	0	23	6,62	3,299	,955	568	,000
Goal 6mC	568	0	15	4,67	2,537	,964	568	,000
Shot wing	568	1	19	7,56	3,353	,972	568	,000
Goal wing	568	0	13	4,23	2,440	,957	568	,000
Shot 9m	568	5	45	22,27	6,351	,994	568	,016
Goal 9m	568	0	28	8,78	3,420	,975	568	,000
Shot 7m	568	0	12	4,30	2,208	,959	568	,000
Goal 7m	568	0	11	3,09	1,855	,945	568	,000
Shot FB	568	0	21	5,77	3,271	,944	568	,000
Goal FB	568	0	17	4,26	2,570	,939	568	,000
Shot BT	568	0	17	3,69	2,885	,911	568	,000
Goal BT	568	0	12	2,86	2,244	,914	568	,000
All shots	568	35	73	50,45	5,874	,993	568	,008
All goals	568	15	41	27,91	4,680	,991	568	,002
AS	568	2	36	13,32	5,618	,980	568	,000
TO/TF	568	1	24	11,06	4,158	,986	568	,000

Table 2: Basic statistical characteristics of deffence parameters

	Descriptive statistics					Shapiro-Wilk Test of Normality		
	N	Minimum	Maximum	Mean	Std. Deviation			
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	df	Sig.
ST	568	0	16	3,87	2,637	,929	568	,000
BS	568	0	18	3,33	2,481	,904	568	,000
YC	568	0	4	2,99	,549	,710	568	,000
2min	568	0	11	4,53	1,950	,963	568	,000
RC	568	0	3	,16	,405	,423	568	,000

Table 3: Basic statistical characteristics of goalkeepers performance indicators

	Descriptive statistics					Shapiro-Wilk Test of Normality		
	N	Minimum	Maximum	Mean	Std. Deviation			
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	df	Sig.
GK 6mC shot	568	0	20	6,13	3,013	,968	568	,000
GK 6mC save	568	0	8	1,45	1,288	,878	568	,000
GK wing shot	568	0	17	6,65	3,122	,973	568	,000
GK wing save	568	0	8	2,42	1,723	,924	568	,000
GK 9m shot	568	3	37	15,88	4,815	,990	568	,001
GK 9m save	568	0	19	7,09	3,005	,972	568	,000
GK 7m shot	568	0	11	4,00	2,166	,952	568	,000
GK 7m save	568	0	5	,92	,979	,811	568	,000
GK FB shot	568	0	20	5,34	3,031	,946	568	,000
GK FB save	568	0	5	1,07	1,114	,827	568	,000
GK BT shot	568	0	16	3,47	2,718	,910	568	,000
GK BT save	568	0	6	,61	,988	,647	568	,000
GK all shots	568	26	58	41,45	5,442	,995	568	,047
GK all saves	568	3	29	13,55	3,862	,986	568	,000

Differences in playing performance parameters

The following tables show the parameters in which significant differences among six consecutive EChs have established.

Statistically significant differences appear among the 39 performance indicators.

Table 4: Differences in all performance parameters among six different EChs

Parameter	All attack*	All goal*	Pl. majority att.*	Pl. majority g.*	Pl. minority att.*
ECh 2002	53,73	26,11	7,95	4,47	6,15
ECh 2004	58,78	28,5	9,43	5,54	7,35
ECh 2006	58,56	29,62	8,7	5,16	6,72
ECh 2008	58,07	28,08	7,74	4,71	5,85
ECh 2010	56,82	28,62	7,82	4,76	5,82
ECh 2012	53,87	26,68	7,01	4,22	5,31
Parameter	Position att.*	Position att. g.*	FB*	Ind. FB*	Ind. FB g.*
ECh 2002	46,92	21,87	6,85	1,62	1,4
ECh 2004	52,11	24,31	6,74	0,9	0,79
ECh 2006	52,2	25,11	6,36	2,35	1,82
ECh 2008	50,24	23,26	7,84	1,38	1,13
ECh 2010	51,62	24,79	5,19	1,13	0,95
ECh 2012	47,37	22,49	6,43	1,47	1,13
Parameter	Team FB*	Team FB g.*	R7*	P7*	Shot 6mC*
ECh 2002	5,23	2,83	4,24	4,17	6,53
ECh 2004	5,71	3,56	4,1	4,11	6,97
ECh 2006	4,01	2,69	4,86	4,66	6,85
ECh 2008	6,47	3,7	4,37	4,34	5,66
ECh 2010	4,07	2,69	4,46	4,44	6,28
ECh 2012	4,95	3,09	3,72	3,68	7,44
Parameter	Goal 6mC*	Shot wing*	Goal wing*	Shot 9m*	Goal 9m*
ECh 2002	4,19	7,22	3,89	21,93	8,24
ECh 2004	5,01	8,24	4,47	22,72	8,55
ECh 2006	5,15	7,04	3,85	23,93	9,88
ECh 2008	4,03	6,86	3,77	23,93	9,58
ECh 2010	4,68	7,68	4,51	23,29	9,54
ECh 2012	4,99	8,32	4,91	17,87	6,95
Parameter	Shot 7m*	Shot FB*	Goal FB*	Shot BT*	All shots*
ECh 2002	4,25	5,61	4,24	3,17	48,92
ECh 2004	4,16	5,78	4,23	4,5	52,14
ECh 2006	4,83	6,21	4,51	3,57	52,39
ECh 2008	4,39	6,49	4,82	3,41	50,85
ECh 2010	4,46	4,89	3,63	3,95	50,55
ECh 2012	3,71	5,65	4,12	3,55	47,97
Parameter	AS*	TO/TF*	ST*	BS*	YC*
ECh 2002	15,92	11,33	4,2	3,81	2,78
ECh 2004	13,91	12,62	4,87	3,73	2,9

ECh 2006	12,97	12,1	4,19	3,06	3,12
ECh 2008	13,89	7,15	4,07	3,28	2,96
ECh 2010	10,96	11,55	3,12	3,29	3,05
ECh 2012	12,13	11,49	2,78	2,74	3,17
Parameter	2min*	GK 6mC shot*	GK6mC save*	GK wing shot*	GK 9m shot*
ECh 2002	4,66	5,96	1,77	6,21	15,19
ECh 2004	5,19	6,36	1,35	7,27	15,63
ECh 2006	4,84	6,45	1,3	6,17	17,54
ECh 2008	4,29	5,21	1,17	6,14	17,3
ECh 2010	4,45	5,95	1,27	6,8	16,91
ECh 2012	3,76	6,82	1,81	7,31	12,78
Parameter	GK 9m save*	GK BT shot*	GK all shot*		
ECh 2002	6,93	2,96	39,69		
ECh 2004	7,13	4,15	42,26		
ECh 2006	7,66	3,37	43,62		
ECh 2008	7,64	3,22	41,8		
ECh 2010	7,37	3,76	42,31		
ECh 2012	5,81	3,4	39,13		

“*” Differences significant at $p < 0.05$

Table 5: Differences in some attack parameters among six different EChs

Parameter	Num. of attacks^a	Num. of shots^b	Num. of goals^c	Goals in positional attack^d	Goals in counter attack^e
ECh 2002	53,73*	48,92*	26,11*	21,87*	4,24
ECh 2004	58,78*	52,14*	28,50*	24,31*	4,22
ECh 2006	58,56*	52,39*	29,62*	25,11*	4,51
ECh 2008	58,07*	50,85*	28,08*	23,26*	4,82*
ECh 2010	56,82*	50,55*	28,62*	24,79*	3,64*
ECh 2012	53,87*	47,97*	26,68*	22,49*	4,19
Parameter	Assistances^f	Turn over / Technical foul^g			
ECh 2002	15,92*	11,33*			
ECh 2004	13,91*	12,62*			
ECh 2006	12,97*	12,1*			
ECh 2008	13,89*	7,15*			
ECh 2010	10,96*	11,55*			
ECh 2012	12,13*	11,49*			

“*” Differences significant at $p < 0.05$

^a 2002 and 2012 < 2004, 2006, 2008 and 2010; 2010 < 2004 and 2006.

^b 2002 < 2004 and 2006, 2012 < 2004, 2006, 2008 and 2010.

^c 2002 < 2004, 2006, 2008 and 2010; 2012 < 2004, 2006 and 2010.

^d 2002 and 2012 < 2004, 2006 and 2010; 2008 < 2006.

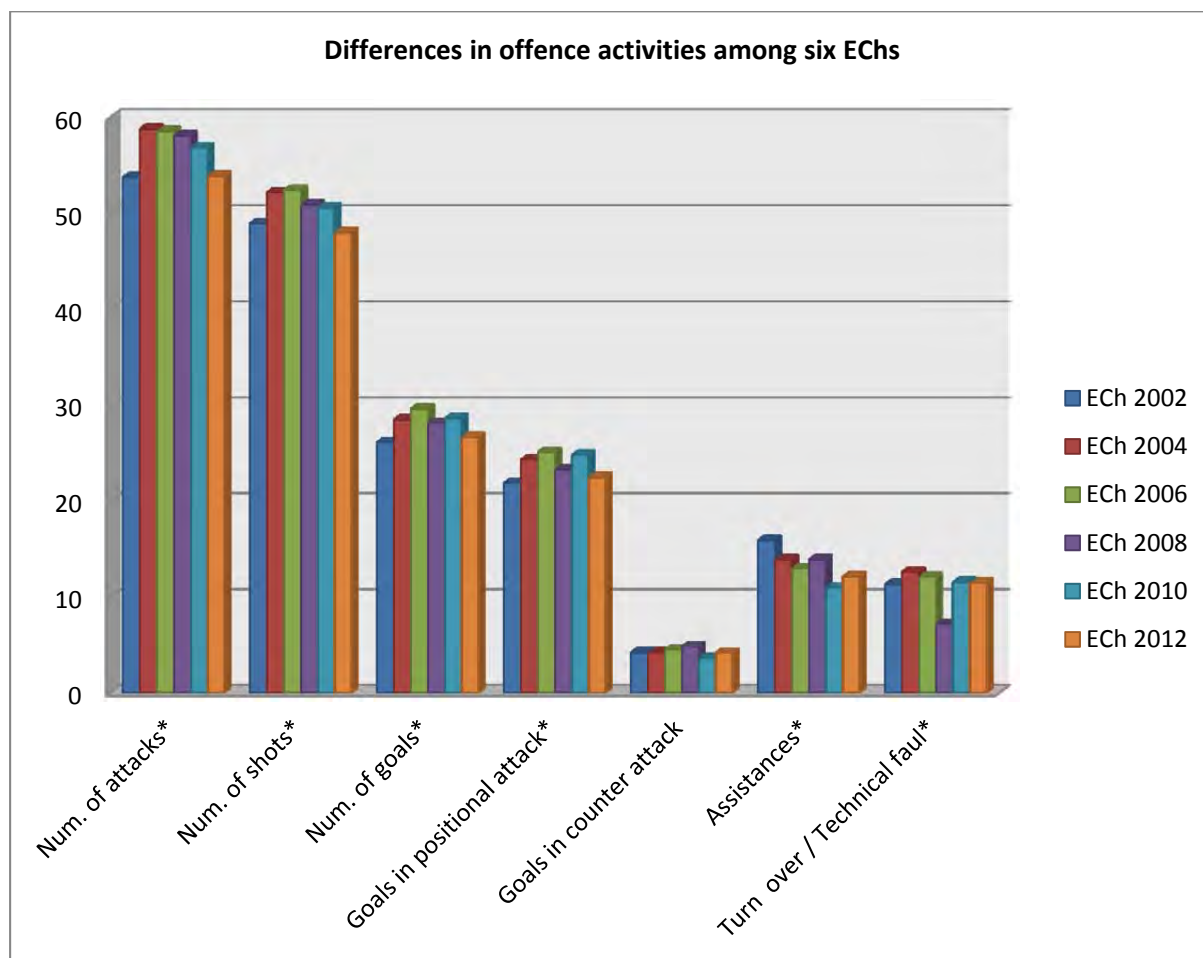
^e 2010 < 2008.

^f 2010 < 2002, 2004 and 2008; 2002 > 2006, 2010 and 2012.

^g 2008 < 2002, 2004, 2006, 2010 and 2012.

In offensive parameters, the differences have arisen among championships in all analysed parameters (Table 5). At the EChs 2002 and 2012 significantly fewer attacks were played if compared to other championships. It is also interesting that there were significantly fewer attacks played at the ECh 2010 than at the EChs 2004 and 2006. It is surprising that the parametre showing the scored goals was significantly lower at the ECh 2002 as well as at the ECh 2012. There were also significantly fewer goals scored at the ECh 2012 than at the EChs 2004, 2006 and 2010.

Most results were obtained at the European Championship 2006 and significantly more than at the EChs 2002, 2004 and 2008. Even the number of goals scored in the positional attacks are characterised by significant differences between the ECh 2002, ECh 2012 and other championships. But it was at the European Championship 2008 that significantly fewer hits were achieved in this way if compared to the EChs 2006 and 2010. Significantly fewer goals were scored in the counterattack at the European Championship 2010 than at the ECh 2008. Significantly fewer assists were recorded at the ECh 2010 than at EChs 2002, 2004 and 2008. Concerning this parameter, it's interesting that significantly more assists were performed at the 2002 ECh than at EChs 2006, 2010 and 2012. Significantly fewer turnovers/technical faults were recorded at the ECh2008 than at all the other EChs.



“*” Differences significant at $p < 0.05$

Figure 1: Differences in certain offence activities among six EChs: Number of attacks, number of shots, number of goals, goals in positional attacks, goals in counter attacks, assistances and turnovers / technical faults

Table 6: Differences in certain defence and disciplinary parameters among six different EChs

Parameter	Steal balls ^a	Blocked shots ^b	Yellow card ^c	2 min. suspension ^d	RC ^e
ECh 2002	4,20*	3,81*	2,78*	4,66*	0,19
ECh 2004	4,87*	3,73*	2,90*	5,19*	0,15
ECh 2006	4,19*	3,06	3,12*	4,84*	0,16
ECh 2008	4,07*	3,28	2,96	4,29*	0,20
ECh 2010	3,12*	3,29	3,05*	4,45	0,14
ECh 2012	2,78*	2,74*	3,17*	3,76*	0,11

“*” Differences significant at $p < 0.05$

^a 2002 and 2004 > 2010 and 2012; 2012 < 2006 and 2008.

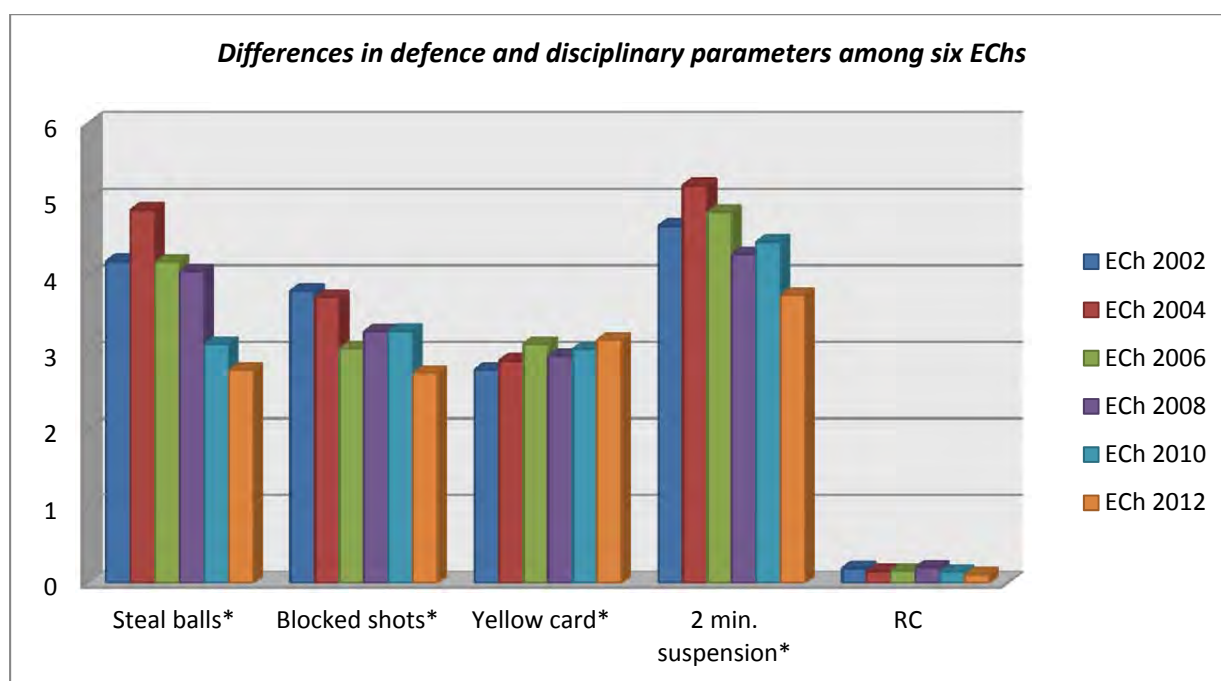
^b 2012 < 2002 and 2004.

^c 2002 < 2006, 2010 and 2012; 2004 < 2012.

^d 2012 < 2002, 2004 and 2006; 2004 > 2008.

^e no statistically significant differences.

From Table 6 we can see that the defenders at the ECh 2002 and ECh 2004 had significantly more stolen balls than at the EChs 2010 and 2012. Also the defenders had significantly more stolen balls at the EChs 2006 and 2008 than at the ECh 2012. The defenders at the ECh 2012 managed to block significantly fewer shots than at the EChs 2002 and 2004. Misconduct penalty notice - yellow card - was shown significantly fewer times at the 2002 ECh than at the EChs 2006, 2010 and 2012. We see that at the championships 2006, 2010 and 2012, the number of yellow cards rise above number 3 per match. The number of 2-min. exclusion is statistically speaking significantly lower at the ECh 2012 than at all the EChs 2002, 2004 and 2006. There are no significant changes in the number of red cards shown during the championships.



“*” Differences significant at $p < 0.05$

Figure 2: Differences in certain defence and disciplinary parameters among six EChs: Number of stolen balls, blocked shots, yellow cards, 2 minute suspensions and red cards

Table 7: Differences in certain goal keepers' performance among six different EChs

Parameter	Goalkeeper saves ^a	Goalkeeper 6mC save ^b	Goalkeeper wing save ^c	Goalkeeper 9m save ^d	Goalkeeper 7m save ^e
ECh 2002	13,58	1,77*	2,32	6,93	1,03
ECh 2004	13,77	1,35	2,8	7,13*	0,83
ECh 2006	14,00	1,3	2,32	7,66*	1,01
ECh 2008	13,77	1,17*	2,39	7,64*	0,88
ECh 2010	13,9	1,27	2,29	7,37*	0,93
ECh 2012	12,47	1,81*	2,38	5,81*	0,82
Parameter	Goalkeeper FB save ^f	Goalkeeper BT save ^g			
ECh 2002	0,97	0,46			
ECh 2004	1,09	0,67			
ECh 2006	1,12	0,6			
ECh 2008	1,13	0,55			
ECh 2010	1,05	0,79			
ECh 2012	1,05	0,61			

“*” Differences significant at $p < 0.05$

^a no statistically significant differences.

^b 2002 and 2012 > 2008.

^c no statistically significant differences.

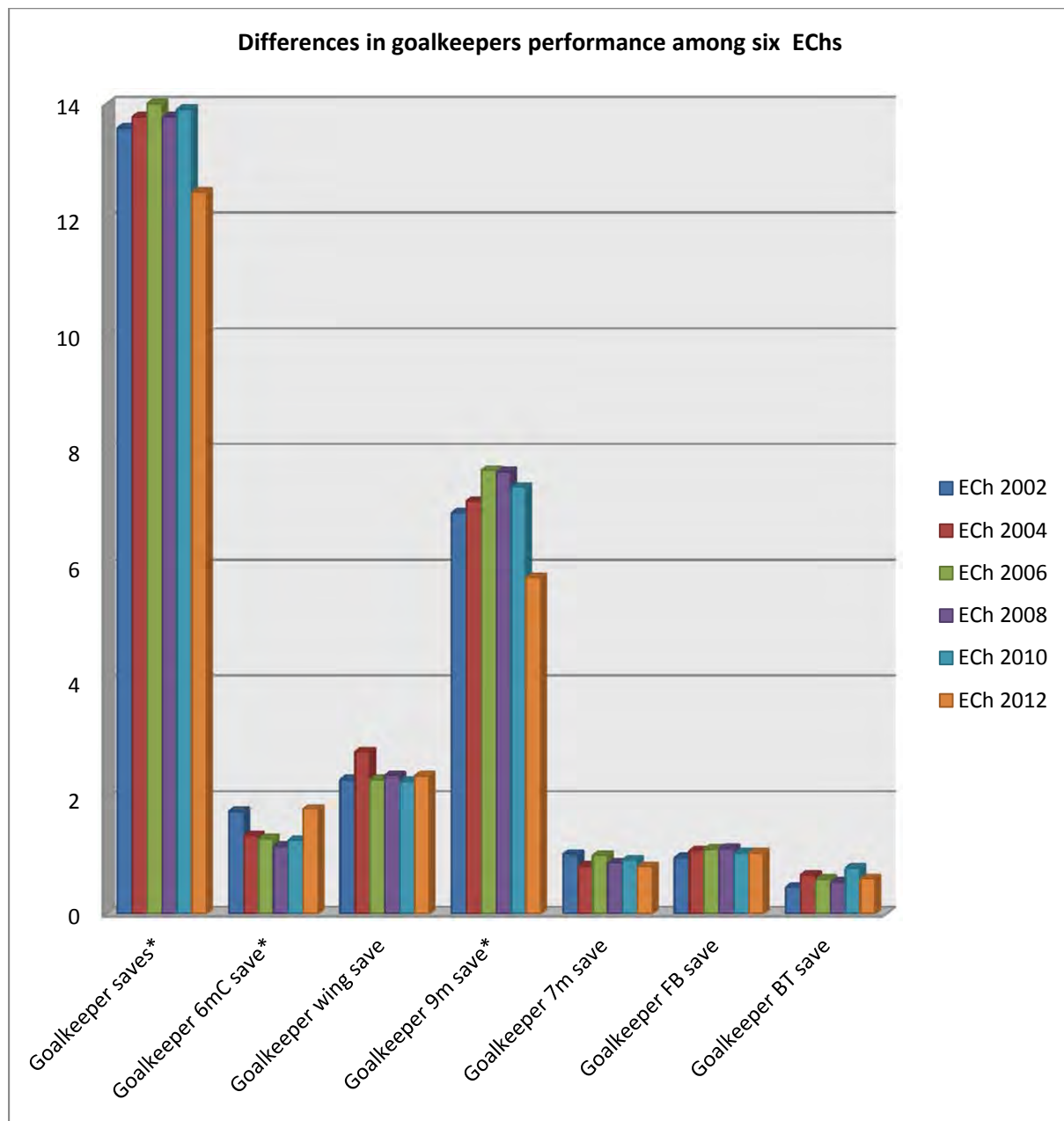
^d 2012 < 2004, 2006, 2008 and 2010.

^e no statistically significant differences.

^f no statistically significant differences.

^g no statistically significant differences.

From the Table 7 we can see that there is no significant change of goalkeepers' saves among all the EChs. The significant changes occur at goalkeepers' saves from certain positions. At the ECh 2002 and 2012 the goalkeepers' performance was significantly higher from six-meter centre position than at the ECh 2008. At the ECh 2012 the goalkeepers' performance from nine meters was significantly lower than at all the other championships, except the ECh 2002. All the other parametres (wing saves, 7-metre saves, fastbreak saves and breakthrough saves) show no significant differences among the championships.



“*” Differences significant at $p < 0.05$

Figure 3: Differences in certain goal keepers' performance among six different EChs: goalkeepers saves, goalkeepers saves of shots from 6-meter center line, goalkeepers' saves from wing position, goalkeepers' saves from 9-meter position, goalkeepers' saves of shots from 7 meters, goalkeepers' saves of fast breaks and goalkeepers' saves of shots after breakthrough

Differences between the winning and the losing teams

The following tables show whether there were any statistically significant differences between the winning and the losing teams on the six consecutive EChs. Out of the total 284 matches played at the last six EChs there were 250 matches with winning and losing teams and 34 matches ended with a draw.

We see that there are statistically significant differences in the 31 performance indicators between the winning and the losing teams at six consecutive EChs. The differences are presented in the following table.

Table 8: Differences in performance parameters between the winning and the losing among six different EChs

Parameter	All attack*	All goal*	Pl. majority g.*	Pl. minority g.*	Position att.*
Win	56,79	30,35	5,36	2,67	49,57
Lose	57,03	25,62	4,27	2,27	50,98
Draw	54,34	27,32	4,75	2,31	48,34
Parameter	Position att. g.*	FB*	FB g.*	Ind. FB*	Ind. FB g.*
Win	25,28	7,25	4,99	1,7	1,45
Lose	21,96	6,03	3,68	1,3	1,02
Draw	23,56	6,03	3,76	1,29	0,99
Parameter	Team FB*	Team FB g.*	Goal 6mC*	Shot wing*	Goal wing*
Win	5,51	3,59	5,07	8,06	4,8
Lose	4,73	2,67	4,27	7,2	3,73
Draw	4,72	2,79	4,69	7,01	3,94
Parameter	Shot 9m*	Goal 7m*	Shot FB*	Goal FB*	All shots*
Win	20,96	4,47	6,46	4,98	50,98
Lose	23,81	2,84	5,16	3,67	50,51
Draw	21,47	4,24	5,44	3,71	48,28
Parameter	AS*	TO/TF*	ST*	BS*	GK 6mC shot*
Win	15,01	10,56	4,3	4,04	5,8
Lose	11,99	11,73	3,56	2,63	6,5
Draw	11,96	10,41	3,44	3,24	5,96
Parameter	GK wing shot*	GK 9m shot*	GK 9m save*	GK BT save*	GK all shot*
Win	6,32	16,35	7,96	0,65	40,31
Lose	7,14	15,44	6,3	0,49	42,9
Draw	6,04	15,74	6,76	0,9	40,32
Parameter	GK all saves*				
Win	14,76				
Lose	12,47				
Draw	13				

“*” Differences significant at $p < 0.05$

Table 9: Differences in some attack parameters between the winning and the losing teams among six different EChs

Parameter	Num. of attacks ^a	Num. of shots ^b	Num. of goals ^c	Goals in positional attack ^d	Goals in counter attack ^e
Win	56,79*	50,98	30,35*	25,28*	4,99*
Lose	57,03*	50,51	25,62*	21,96*	3,68*
Draw	54,34*	48,28	27,32*	23,56*	3,76*
Parameter	Assistances ^f	Turn over / Technical fault ^g			
Win	15,01*	10,56*			
Lose	11,99*	11,73*			
Draw	11,96*	10,41*			

“*” Differences significant at $p < 0.05$

^a draw < win and lose.

^b draw < win and lose.

^c win > draw and lose; draw > lose.

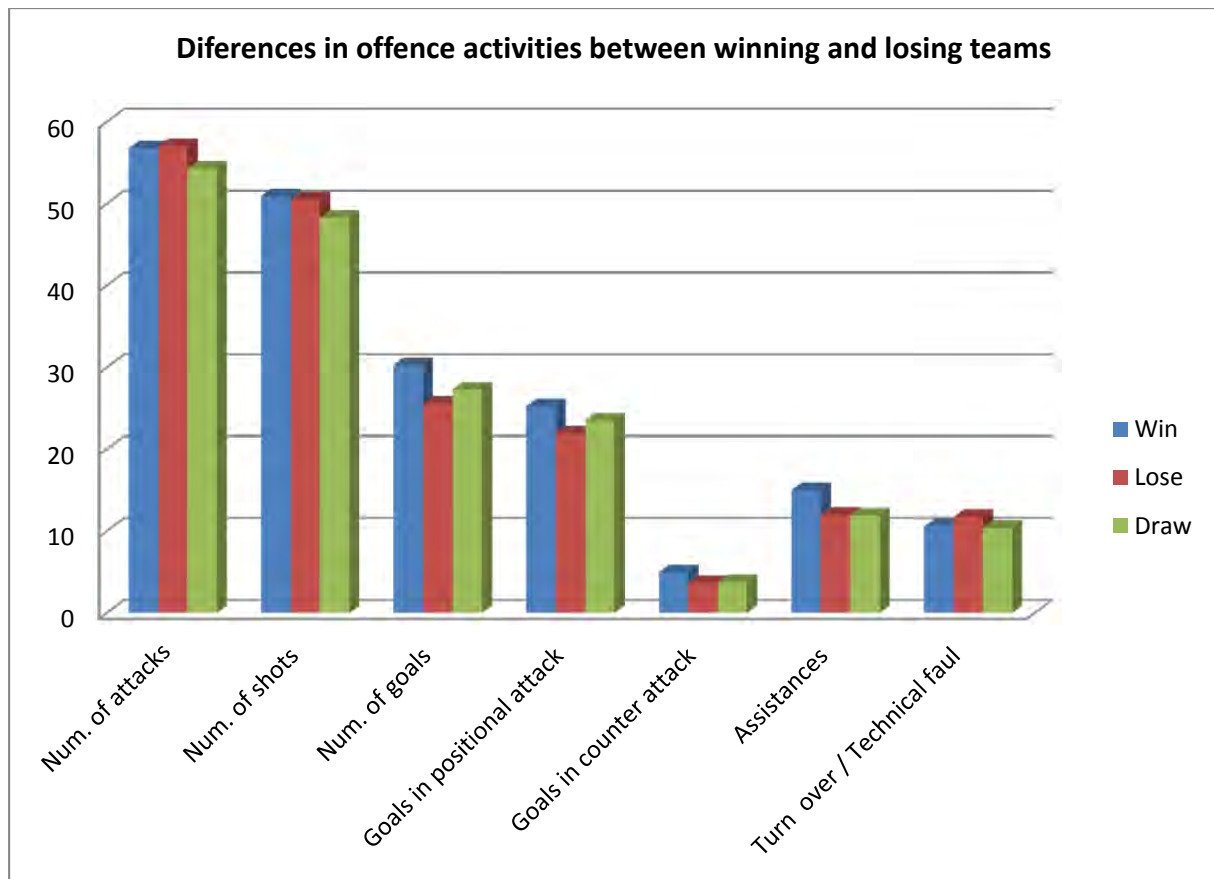
^d win and draw > lose.

^e win > draw and lose.

^f win > draw and lose.

^g lose > win and draw.

In offensive parameters there are differences in all basic parameters. The winning teams have significantly more attacks than the teams playing a draw. Surprisingly the losing teams have slightly more attacks than the winning ones and significantly more attacks than the teams playing a draw. The winning and the losing teams have significantly more shots than the teams playing a draw. Logically, the winning teams score significantly more goals than the losing teams and the teams playing a draw. The teams playing a draw score significantly more goals than the losing teams. The winning teams also score significantly more goals in position attack and counter attack than the losing teams and the teams playing a draw. The winning teams have also significantly more assistances than the losing teams and the teams playing a draw. The losing teams have significantly more technical faults than the winning teams and the teams playing a draw.



“*” Differences significant at $p < 0.05$

Figure 4: Differences in some attack parameters between the winning and the losing teams among six different EChs: the number of attacks, the number of shots, the number of goals, the number of goals from positional attack, the number of goals from counter attack, the number of assists, the number of turn-overs

Table 10: Differences in certain defence and disciplinary parameters between the winning and the losing teams among six different ECh's

Parameter	Steal balls ^a	Blocked shots ^b	Yellow card ^c	2 min. suspension ^d	RC ^e
Win	4,3*	4,04*	2,96	4,42	0,12
Lose	3,56*	2,63*	3	4,63	0,2
Draw	3,44*	3,24*	3,1	4,59	0,15

“*” Differences significant at $p < 0.05$

^a win>lose and draw.

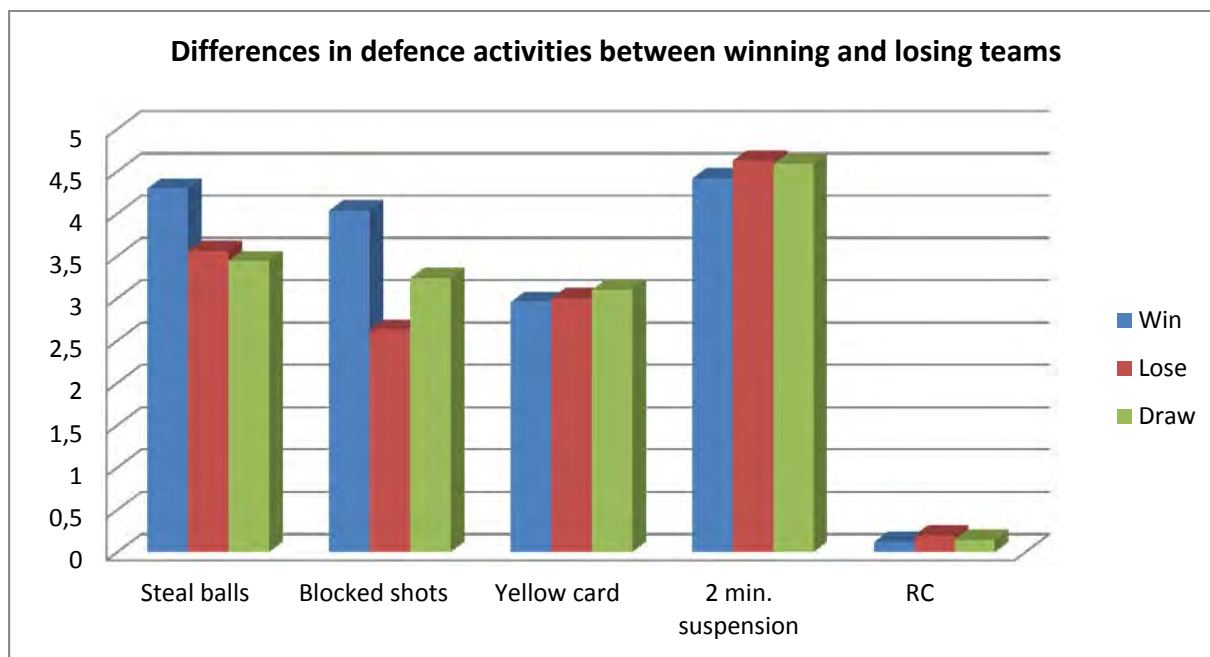
^b win>lose and draw.

^c no statistically significant differences.

^d no statistically significant differences.

^e no statistically significant differences.

The performance indicators shows the defence activities of the team and we can see that the winning teams have significantly more stolen balls and blocked shots than the losing teams and the teams playing a draw. On the other side, there are no significantly differences between the yellow cards, the 2 minute punishments and the red cards among the teams regardless of the result of the match.



“*” Differences significant at $p < 0.05$

Figure 5: Differences in certain defence and disciplinary parameters between the winning and the losing teams among six different EChs: stolen balls, blocked shots, yellow cards, 2 minute suspensions and red cards

Table 11: Differences in certain goalkeepers' performance between the winning and the losing teams among six different EChs

Parameter	Goalkeeper saves ^a	Goalkeeper 6mC save ^b	Goalkeeper wing save ^c	Goalkeeper 9m save ^d	Goalkeeper 7m save ^e
Win	14,76*	1,53	2,57	7,96*	1,02
Lose	12,47*	1,42	2,34	6,3*	0,85
Draw	13*	1,26	2,1	6,76*	0,79
Parameter	Goalkeeper FB save ^f	Goalkeeper BT save ^g			
Win	1,03	0,65			
Lose	1,09	0,49*			
Draw	1,13	0,9*			

“*” Differences significant at $p < 0.05$

^a win>lose and draw.

^b no statistically significant differences.

^c no statistically significant differences.

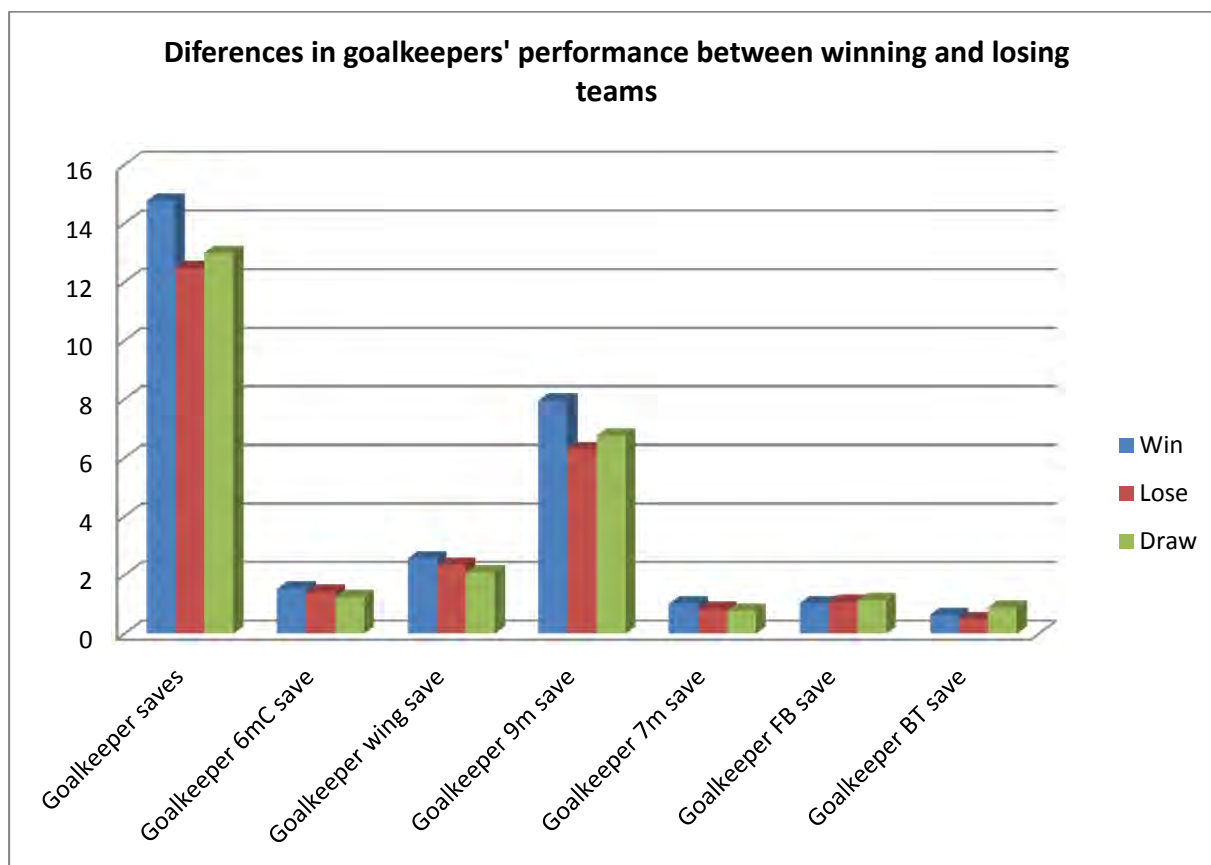
^d win>lose and draw.

^e no statistically significant differences.

^f no statistically significant differences.

^g draw>lose.

From the goalkeepers performance point of view we can see that the winning teams goalkeepers have significantly more saves than the losing teams and teams playing a draw. The winning teams' goalkeepers have significantly more saves of shots from 9 metres. The goalkeepers of the teams playing a draw have significantly more saves of shots after breakthrough than the goalkeepers of the losing teams. All the other goalkeepers' performance indicators show no significant differences between the teams.



“*” Differences significant at $p < 0.05$

Figure 6: Differences in certain goalkeepers' performance between the winning and the losing teams among six different EChs: Goalkeepers' saves, goalkeepers' saves of shots from 6-meter center line, goalkeepers' saves from wing position, goalkeepers' saves from 9-meter position, goalkeepers' saves of shots from 7 meters, goalkeepers' saves of fast breaks and goalkeepers' saves of shots after breakthrough

Discussion and Conclusions

We may conclude from our study that there are many statistically significant differences in the performance indicators. The number of attacks was significantly higher at the 2004, 2006, 2008 and 2010 EChs than at the 2002 ECh and 2012 ECh. But the surprising fact is that the last played ECh 2012 followed by a significant decline in the number of attacks per game in comparison to those played in 2004, 2006, 2008 and 2010. In a way, we could speculate that the rising number of attacks per game in handball reached a plateau at the EChs 2004, 2006 and 2008 and is now slightly in decline. This is a consequence of the rules and the teams' tactical considerations that inappropriately designed attacks with too many rush lead to the falls in efficiency. Therefore, the teams, especially at major competitions such as the ECh, slightly prefer the more controlled game with fewer attacks, (especially with less risky quick counter-attacks) which are tactically better prepared. This speculation is supported by the fact that the number of goals scored in positional attacks from the 2012 ECh has a significant difference in comparison to the EChs 2004, 2006 and 2010. Therefore, it was the ECh 2010 where significantly fewer goals were scored in a counterattack than at the ECh 2008, but the number of scored goals in counterattack slightly increased at the ECh 2012. Of those parameters which describe playing quality in defence, only "the red cards" appear not to be statistically significant. We can see a significant decrease of blocked shots and stolen balls at the 2012 ECh in comparison to all the others. The appearance of these two parameters was stable through EChs 2002, 2004, 2006, 2008 and 2010, but at the last championship they decreased. At the ECh 2012 there were significantly fewer 2-minute exlusions in comparison to the EChs 2002, 2004 and 2006. That shows us that the changes in the tactics and techniques of defence players were done at the ECh 2012 and have the influence on some defence performance indicators. So we can conclude that the efficiency of saving performance reached its peak some years ago. We may also speculate that the improvements of the skills of the shooters and goalkeepers developed simultaneously. The shooters are trying to find a new ways of shooting and especially in the last few years they have been shooting more freely. As a consequence, goalkeepers seek to adapt their own strategies according to this kind of shooters. But here we can see that, in general, the shooters are in advance, because at the ECh 2012 the number of all saves of the goalkeepers is lower than at all the other championships. The goalkeepers' performance of saving shots from 6-metre centre significantly increased in the ECh 2012, and reached the same level as at the ECh 2002. On the other hand the goalkeepers significantly decreased their performance from 9-metre-shot saves at the ECh 2012 in comparison to all the other championships, except the ECh 2002. Therefore, we can conclude that the analysis of the statistical data does not really corroborate the findings of the qualitative analysis of the goalkeepers' performances at the ECh 2006 (Pollany, 2006). The author describes the goalkeepers' performance as outstanding, pointing out in particularly the goalkeepers' progress in 1-on-1 actions against the free shots. Something similar applies to the findings of the study where the authors compared the statistical data on goalkeepers' performances acquired at three consecutive large handball competitions – ECh 2004, OG 2004 and WCh 2005 (Sevim, & Bilge, 2007). Based on this comparison, the authors claimed that the goalkeepers' performances improved gradually. However, it should be considered that the national teams participating at the EChs are generally more equal in terms of their quality (European teams are higher in quality than those from other continents) compared to those participating at the WCh or even the OG. Considering the above, the comparisons of such data and the conclusions based thereon could be misleading. It is only reasonable to compare the data acquired at the competitions of an equivalent or similar level of quality.

Coaches nowadays, regardless to the sport, are looking for any factors which will increase a chance of victory in a match. The analysis of the game actions is a research line belonging to the notational analysis and is an important means for providing feedback to the players (Taylor, James & Mellalieu, 2004). This method has been used in numerous sports for obtaining relevant information, and handball is no exception. The most important factors are the one's which differentiate winners from loser. Therefore all the official statistical data from six consecutive EChs were collected and we can see some significant differences between the teams winning the match in comparison to the teams losing it. The winning teams score significantly more goals than the losing teams. They also score significantly more goals from position attacks and counter attacks. The goals scored from position attack of the winning teams are significantly higher in comparison with the losing teams and the teams playing a draw. We can conclude that the winning teams shooting efficiency is much higher than the losing teams. Also winning teams' attackers have significantly more assistances and significantly fewer technical faults than the losing teams' attackers. This shows a great effort and efficiency of the winning teams' back players to prepare a good position to score from all positions. On the other hand, the winning teams' defence players have significantly more steals and blocked shots than the losing teams' defence players. The goalkeepers of the winning teams have significantly more saves as the losing teams' goalkeepers, especially from nine-metre shots. We can see some similar results in the work of Saez, Roldan and Feu (2009) focused on the differences between the winners and the losers in the King's Cup competition in Spain in 2008. They claim that the statistics are significantly different between the winners and the losers in the following parameters: the number of scored goals, the failed throws from 6 metres, goals from counterattack, offensive efficiency coefficient, offensive resolution coefficient, defensive efficiency coefficient and defensive resolution coefficient. The results show that the average match at the ECh has become faster, with more attacks – with above described exception of ECh 2012. Consequently, more goals are being scored. The attack preparation time has shortened and the game is becoming more individualised, with fewer assistances. It is interesting that the number of goals scored from the classical counter attack is not rising, despite the general increase in the speed of the game, the number of attacks and the goals scored. It seems that the teams prefer more controlled types of attacks against a zone or combined defence. These attacks have a very short preparatory phase and players decide relatively quickly to take a shot. It may be concluded that this is due to the change in the rules of the game which have led to a decrease in the duration of an attack in recent years. Here we mainly refer to Rule 7 governing the playing of the ball and the passive play in the attack as well as Rule 10 governing the throw off. In large competitions, the throw off after a received goal is usually performed very quickly by most teams, allowing them to gain an opportunity for a shot within a few seconds. Another important fact is the referees' criteria for granting disciplinary penalties to defenders. The referee's task is to detect gross violations committed by the defenders, so as to prevent in an unsportsmanlike manner those in offence from shooting during the play. Elite players must have an excellent command of the basic and specific activities required when attacking a set defence. They must perform them quickly, in a continual manner and without any attack preparation. The practical applications stemming from our findings are as follows:

- the training and playing of short continual attacks with rapidly taken shots by different group combinations have been gaining ground;
- after an attack has been completed, it is very important to return to the set defence quickly around the goalkeeper's area;
- few or no player substitutions during the attack-defence phases, which aggravates the position of those players only specialising in attack or defence.

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***TITLE: TRAINING SESSIONS PLAN AND PROGRAM OF HANDBALL
CLUB „PARTIZAN” FOR VELUX EHF CHAMPIONS LEAGUE
QUALIFICATION TOURNAMENT AND BEGGINING OF NATIONAL
LEAGUE 2012/2013***

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SUMMARY

In this report, I will try to present the training plan in the pre-preparation and preparation period of the Handball Club Partizan 2012/13, through methods and approaches covering all parts of the training process. Based on experiences in previous seasons and with the desire to improve, we introduced several new approaches in our work method in this season.

KEY WORDS

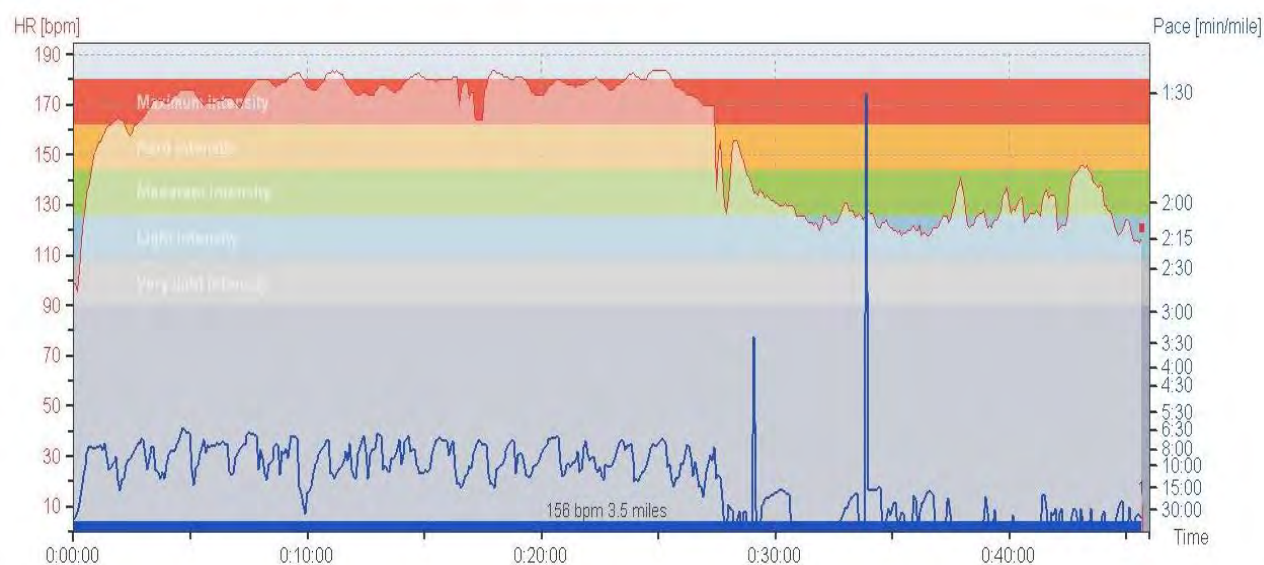
Training session, pulse, muscle, speed, strenght, preparations, running, tests, organism

INTRODUCTION

PRE PREPARATIONS

The preparations of the Handball Club Partizan were designed in several parts. The first part involved a plan and programme for each player separately, which players carried out individually before team preparations. This part was intended to last for two weeks. During this period, the emphasis was on raising the general characteristics of the organism. The programme was designed on the basic plan of preparations, created by the main coach, Aleksandar Brkovic and fitness coach, Milos Mitrovic.

The pre-prepreparation programme was prepared primarily with the aim to get the players ready for the main preparation, which began 22nd July 2012 and all of that in order to raise the components of durability, force, speed and co-ordination to the level determined for the first week of preparations. Pre-preparation period became, by all means, an integral part of the preparation. At the end of the previous season, a battery test was done for the determination of the current oxygen spending. Each player ran a distance of 1200m in maximum speed, and while the current pulse value was monitored by pulsmetar, apart from standard data, which were obtained by measuring, and which are relevant for the vo2 max. Information about current speed was obtained, how, when and why it started to fall. The correlation was mostly with pulse, as in the moment of speed fall there had been a significant increase in heart rate.



PRE PREPARATION PERIOD LASTS FOR TWO WEEKS

Players are divided into two groups. In the previous seasons, players were divided according to the results of the tests, but starting with this season, players were divided according to the positions in which they play. Of course, the results of the tests are always very important. They were supposed to be ready for the first and second week of working together, which is usually based on the components of endurance. An individual programme is made on the basis of prediction, in which state of physical shape should players be after a two-week period of pre preparations. In addition to running in different zones, strength trainings are also included, which activated groups of muscles which are mostly involved in running at specific moment, showed by the several testings together with vo2 max test. This included the strength of: abdominal wall, m.recti abdominis and m.obliquus abdominis externus, back muscles m.quadratus lumborum, m.ilicostalis lumborum, leg muscles, mostly muscles that hold the knees, entire quadriceps because in previous seasons we faced the situation that some players had more weight at the beginning of the new season than they had at the end of the previous, which caused inflammation of the patella already in the first week. The pain in the knee was caused by excess weight, but also by the unbalance of quadricep muscles that hold the knee, so the knees were burdened with the entire body weight. Players who played during the summer in national youth teams – without a break, or with a short one – and players who played and practiced on different floors, after

coming back to a routine with a team also had problems with inflammation of the patella. The results of tests at the end of the season showed the exact muscles with unbalanced strength. These tests and results were a part of a pre-preparation programme of each player. Muscles and tendons of the ankle joint are also included in the pre-preparations programme in order to strengthen the ankle joint and prepare it for fast direction changes during maneuvering and jumping. At the beginning of pre-preparation period, the emphasis was on the maximum step extension. As time went on and the muscles got stronger, it was insisted on higher step frequency and the prevalence of strong components in running. With variety of athletic exercises the frequency of steps became faster and faster. The attention was on hand strength also, but only in its own body weight and only with a purpose of better step frequency. With various static exercises in different positions, specific muscle groups of the upper musculature were targeted. Especially shoulder muscles, with the maximum number of repetitions and the greater amplitude of movement especially in the end positions of muscle load, because shoulder muscle burden the greatest load at the final position of shot or during the defense position. Training conditions during the pause were considered so, except for a few trips to the gym, all the other exercises could be done anywhere and in any conditions.

Uroš Mitrović Pre-preparation period from 9th July – 22nd July 2012.

9.07.2012

First training 10.00 AM:

- 5 min of slow running

After that:

- High knee lift on 10 meters lenght for 5 times. Break of half a minute.
- Walking on toes, 10 meters lenght in first two sets. In the 3rd, 4th, 5th set lenght is 20 meters. Break of half a minute.
- Walking on heels for 20 meters, 5 sets. Break of half a minute up to a minute.
- Walking on the inside of the foot for 20 meters, 5 sets. Break of half a minute.
- Walking on the outside of the foot for 20 meters, 3 sets. Break of half a minute

- Overside two-step running, as many steps possible, 20 meters, 5 sets. Break of half a minute.
- Short athletic jumps in height, 20 meters, 5 sets. One minute slow walking break.
- Short athletic jumps in length, 20 meters, 5 sets. One minute of break.
- Scooping up steps separately with left foot only, with right foot only, 5 sets.
- Scooping up steps with a reciprocating motion with left foot, then with a right foot, 5 sets.
- Good stretching
- 5 minutes of running with 5 fast running steps and 5 steps with 10% slower running, 4 sets, with 2 minutes of break in between sets or until the pulse is down to 120 bpm per minute.
- 5 minutes of running at an easy pace

Stabilization:

- Seating position, back leaned against the wall, full foot on the floor. Pushing against the wall with the lower part of the back, 3 sets for 1.15` minutes, active break of 15 to 20 sec with stretching and loosening of quadriceps.
- 10 minutes of stretching in motion

In the evening, before sleeping:

- 3 sets of 30 pushups, or up to endurance, 4-5 minutes of break in between sets.
- 3 sets of 40-50 of any kind of abs exercise, or up to endurance
- 3 sets of back exercise, one endurance 30 seconds
- 3 sets of 20 deep squats, break of 2-3 min, keep in down position for couple of seconds
- French pull over with weights bar, all in total of 30 kilos, 4 sets, 25 repetitions, 2 minutes of break

This was one example of training plan in the pre-preparation period for player Mitrovic Uros.

PLAN

Preparations plan was designed to work on increasing physical characteristic as a separate entity from the handball work. The aim was to be divided, but also to be specialized for the immediate needs of handball, as for the ultimate goal of increasing of all components of strength, endurance and speed needed for one match.

At the beginning of work, on the very first day when players came for training session, we did measurements and testing's first, so that we could see the results of body weight and the level of fat and muscles in body.



Plan for the preparations was made backwards. We had the exact dates for the VELUX EHF Champions League qualification tournament 08/09th September, the beginning of National league on September 15th, and also other tournaments during the preparations. The main objective for adjusting the form was CL Qualification Tournament were players in two days had two very tough matches. The form was in maximum lowered week before the QT. During this week, as during the previous week, the potential was on explosivity of movements and speedness

as two inseparable components. That week, in the gym we worked on toning the upper musculature, with fewer repetitions, in as many sets. The burden was increased from set to set until the maximum in the penultimate set. The last set was mostly for relieving of attacked muscle group. At the end of training session we did a snatch 60% of maximum for each player and rope skipping in full speed and high frequency, with holding the top speed 5 to 6 seconds.

Concerning the handball part, in sixth and seventh week we increased a number of trainings based on group work in all stages of the game. Particular attention has been paid to the transition from the defense to the attack, to improvement of collective counterattack and extended counterattack, as to improvement of the so called fast center after receiving a goal.

SPEED

During warming up, before every handball training session we worked on speed through different coordination exercises. Activity lasted for 10 seconds, the aim was to get done precisely as fast as possible given exercise. Coordination exercises were never too complicated in order not to hinder the speed. We worked on explosivity with different jumps, using complete feet, but also separate groups of muscles, which is why we paid more attention to ankle joint with fast changes of direction through jump, or with set of jumps at the end of every exercise. Running was used for warming up, the accent was on changing the direction and changing the speed. Athletic exercises that we before used for warming up in pre-preparations and preparations period, this time they served for developing the speed. We reduced the number of repetitions in the set, and reduced the duration of exercise, but we increased speed, just enough to have every exercise done with maximum precision and fast, without lost rhythm even after a large number of repetitions. The volume of the sets was small, the breaks in between repetitions were long in the set and in between sets, to reach the maximum recovery.

Speed of muscle contraction activity determines high ATP myosin activity in fast and slow muscle fibers. Fast and slow muscle fibers are inherited. Through a variety of tests we saw what players have prevailing slow and what player's fast muscle fibers, with simple running across a certain section of mostly 30 and 60 m flying start. The results were compared, as the best we took one that ran the section for shortest time. Even then it was determined that the Wings have a top speed in running and changing direction. For older players speed was decreased, but the running and rapid change in the direction they maximally used the experience gained earlier, unnecessary movements both in running and in coordination exercises have been kept to a minimum. Coordination exercises are always been subject to change, particularly because the older players accustomed quickly, each exercise was created to activate as many muscle, wide

muscle group, to activate most of motor units in the muscle fiber. Inadequate wasting of KRP means that exercise lasted from 3 to 7 seconds, cyclical were muscles activate and relax. Break intervals of 2 to 3 minutes in which the muscle is active, burdened but with lower intensity activity, which has resulted in complete resynthesis KRP, and removal of lactic acid, the number of repetitions was big, 15 to 40. Trainings of this type were made cyclically, 1 to 2 in 24 hours, 2 to 4 times a week.

Work on increasing the speed of muscle contraction is without perspective because it is conditioned with genetic potential. Time for muscle contraction is 0.2 seconds, for relax 0.4. Cycle like this should not allow rapid and complete resynthesis of ATP and a KrP. This has the consequence of decreasing the concentration of KrP, and building up of hydrogen ion in the muscles, which blocks the calcium ions in at that point active myosin centers, and that affects the formation of transverse bridges and prevents muscle contraction.

Maintaining of KrP during running and various motor activities, in defense, tricks, jumps, is in direct dependence on the mass of mitochondria in muscle fibers, or the amount of myoglobin. Oxygen which is deposited in the myoglobin should facilitate the functioning of the muscles during the first seconds of work, but I to minimize the accumulation of hydrogen ions in the muscle.

Based on this, it is easy to determine the directions in speed training methodology, where the main aim of the training is to increase the number of myofibrils in slow and fast muscle fibers, or to increase strength of muscle contractions on one side and shorten muscle relaxation time which increases the frequency of movement on the other side. Therefore it was necessary to provide ATP base to exercises that are performed at the beginning of the preparation, for quick recovery.

In addition, it was necessary to speed up the resynthesis of ATP, and it was necessary to adapt the muscles to a long and hard cyclic work. Work on the development of endurance started from the beginning of the preparation period. First two weeks work was divided into cycles, each cycle lasted for six trainings, duration of 2 hours, in the morning and in the afternoon.

During the first and second week of work, five handball trainings were held, which were also conceived with a lot of running and working on endurance, but with the ball, through handball elements. These trainings had the effect of refreshment, considering the similar trainings without ball, which had psychological positive effect on players who trained easier comparing with the trainings during the competition period, although the trainings during preparation period were hard.

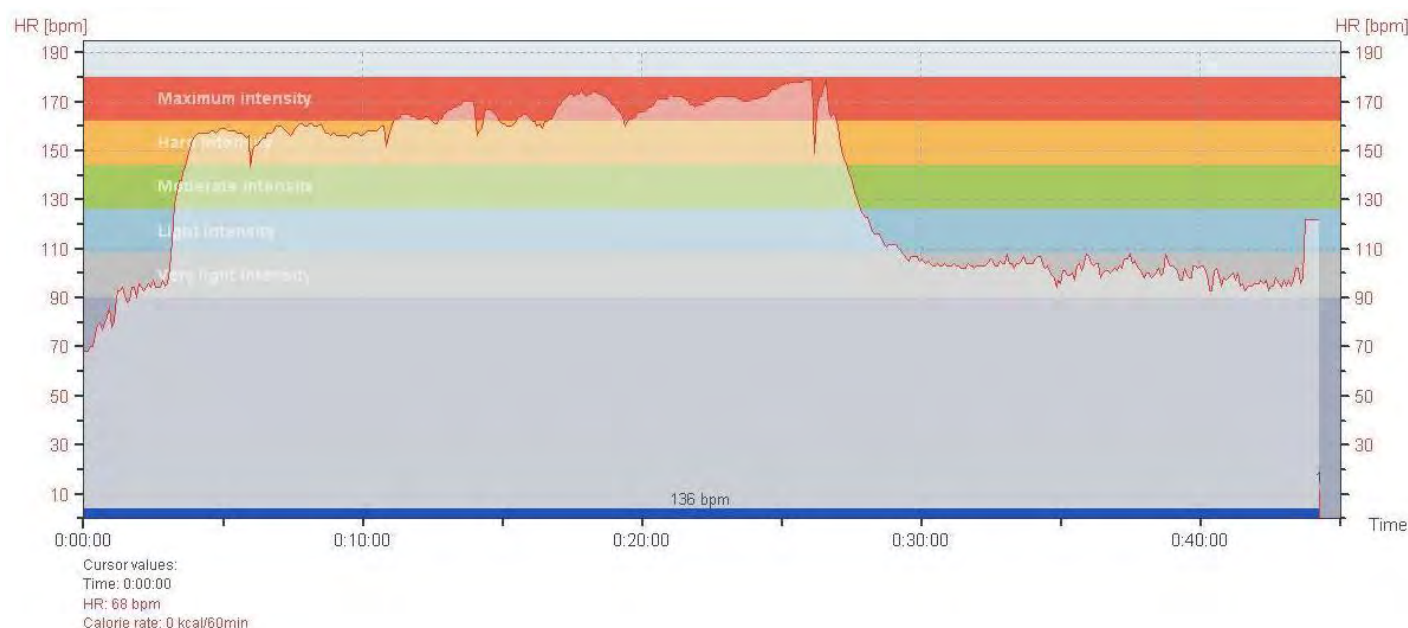
Work zones are established on the basis of criteria biochemical characteristic. Basic criteria in determining the area and managing of training load are lactate concentration in the blood and pulse frequency. Training goal was rapid development of respiratory processes to achieve maximal oxygen consumption and the ability to maintain as long as possible. But in relation to mentioned above, two main problems, which had to be solved, determined, such as increasing the intensity cardio respiratory system and raising the aerobic possibility of a muscle.

Increasing intensity cardio respiratory system involved the type of training were heart muscle optimally hypertrophied, or the type of training which has to accelerate protein synthesis in muscle cells, to allow the formation of new myofibrils which increases the force of muscle contraction and new myofibrils network which increases aerobic ability of heart.

Work load during this type of training was designed to engage as many muscle groups, primarily with running while keeping intensity levels above the maximal oxygen consumption. The duration was 60 to 120 seconds, 30 to 60 seconds with maximal oxygen consumption, break of 2 to 3 minutes where the effects of hypoxia are fully removed; the number of repetitions is from 10 to 20. Training lasted for 2 hours, with stretching and warming-up, and the main part, clear working time lasted from 60 to 90 min.

After these types of interval trainings, in one micro cycle, we created the type of training with continuous running on the verge of VO₂ max. This type of training was very hard, with a great impact on the cardiovascular system of players, because in this type of running energy expenditure is huge, prevailing the subjective feeling of great tiredness, so those workouts were done once or twice during the first three weeks, one in each micro cycle. The rhythm of running was held by Wing players. After this type of running, we did recovery, without stopping, and good dynamic stretching with loosening the entire musculature.

Image No. 2 : Running pace



This significant duration could only be carried out with a base that is made in the pre-preparations period, the base that allowed glycogen stores in the muscles so long.

Another problem that was necessary to solve was to get the muscles used to a long and cyclical work. It was necessary to activate different types of muscle fibers. Slow muscle fibers are systematically included with the maximum pulse frequency and have great aerobic fitness. This kind of fitness is achieved at the moment when all myofibrils of muscle fibers are supplied with blood. For maximum extension of the system, muscle fibers need to be activated during any kind of exercises. In sarcoplasm muscle system it is necessary to preserve the environment for the normal functioning mitochondria. High concentration of hydrogen ions leads to degradation mitochondria. This was solved by the intensity of running was such that the burden was on the threshold of anaerobic consumption, workload lasted 5 to 20 min, break intervals were conditioned with a frequency which need to get down to 120, the number of repetitions was great, until 70 minutes of pure work was reached. After each workout of this type, and before stretching exercises, coordination exercises were performed with complicated tasks, but closely connected to handball. These exercise included all types of handball movement during thrusting, going out on defense, jump shot, and blockade. Every specific movement in handball is broken down into basic movements and each movement has been worked out to maximize efficiency. To increase the effectiveness of running, to expel unnecessary movements, and to expedite certain muscles we did specific athletic exercises also broken down to the basic movements.

Every morning before training was followed by measuring a pulse in steady state. Based on this results training was determined. If the frequency of pulse is higher than the normal 80, 90, 100, the training was a smaller scale than it was planed. In most cases it was a rare that the pulse was so high. At the end of each micro cycle, recovery training was made which consisted running in the rhythm of the pulse of 150 bpm / min for half an hour with a good dynamic stretching.



During the second week training for endurance developing was modified on the one hand because of the transition to the next phase of work, on the other hand due to the decline rate, it was necessary to include speed, but with a greater emphasis on the frequency of movements. Work load was increased from set to set of exercises on the expense of speed and resistance at the same time and duration of exercise, from 60 to 120 second. Breaks were standard, 60 seconds. Number of repetitions per set was from 4 to 6, the pulse was from 140 in the first to 180 in the last repetition. In second type was work load had standard length of 90 seconds, and a standard size, but the duration of break was progressively decreased from 90 to 45 and even up to 20 seconds.

After that, according to the plan, the next was developing of anaerobic possibilities. With alactate components the aim was increasing the intensity of creatine phosphate mechanism and with lactic components the development of glycolytic reactions. These trainings were specific mainly because an adaptation of an organism to anaerobic work is too unstable and rapidly loses on termination of the work, on the one hand. And on the other side energy consumption is huge, for compensation is needed more than 24 h, so the trainings of this type were in the field 2 to 3 times a week. Besides the large expenditure of energy that was caused by the developing of anaerobic possibilities, the additional energy was spent on clean, specific, few large-scale, trainings of

strength. Anaerobic training was designed to be a work load of 90 to 95% of maximum for each player, although they had already formed a group where the wings and middle-backs were the strongest group, the left and right backs in the second and pivots in the third. Load duration was from 20 seconds to 2 min. The break was characterized and determined the concentration of lactic acid. In order to maximally activate the glycolytic process breaks were shortened, because the amount of lactate reaches a maximum only a few minutes after work load. In this way the possibility for the organism increases for efficient work at high acid quantity. The number of repetition is 3 to 4, due to the occurrence of tiredness because we shortened the break. And between the sets, 7 to 8 minutes, and it was caused by their fitness level and positions. The type of break was gently jogging, because muscle activation was needed for the next series.

GOING TO A SPECIFIC PREPARATIONS

Two weeks of work on endurance was followed by going out on the road, where considering the need for better activation parameters of strength, endurance and speed, was introduced additional morning training, footing. Footing was different every morning, during which it was primarily worked on bleeding of all muscle groups. Specifically it was worked on preparations of trainings for that day and for the trainings that will follow as the most significant trainings of that micro cycle. The surface where the footing was made was rough and uneven so the morning training, footing, had the character of primarily work on adaptation ankle joint, connections feet, and side stabilizers. In micro cycle who was named special training, volume was reduced to five training sessions related to the structural unity that every morning began with the activation of all functional characteristics, the central part of the training of that micro cycle had the training with the highest activation which included work on the strong endurance through running the 100m uphill sections, breaks were filled with slow running, and pulse at the end of a section was at or just over the edge VO₂max.

To avoid the accumulation of large amounts of lactic acid, it was necessary on standard strength training exercises to add cyclic exercises in which the muscle was contracted for a certain time, and buffers that control the creation of lactic acid maximally activated. It happened in previous seasons due to the accumulation of large amounts of acid, in the central part of the preparation when the work was the longest, and speed exercises were included as a core component, a large amount of lactic acid in the legs prevented work to be as hard as possible. As an exercise for better activation and transition from a static to a dynamic work Cycling was introduced with different tasks. Training considered driving at high speed at the strongest load. Individually, the operation was interrupted at the point when acid accumulated which resulted with slower

pedaling frequency, or the chain is transferred to the easiest load, pedaling continued but in slower pace, pedaling frequency was maximal, muscle recovery was individual and lasted 2 minutes the longest. This training occupied a central place of three micro cycles in second week. After these trainings active recovery was followed and then a day off.

When entire team was together for twelve days on preparations the base handball training generally was increased. In general, the number of training with the ball increased, in comparison to the first two weeks. We continued to work on endurance, strength and speed through work with the ball and started specific work on elements of handball through the exercises of individual, group and collective work. New players are introduced in the new system of play through certain exercises that are related to the group of players that shared similar positions on (wings, backs, pivots), and by the neighboring areas (wing-back, back-back, back-pivot). Old players has increased the level of work on certain things in order to build what the achieved in the previous two seasons, which is a period in which most of the team along with the coaching staff is together.

During the third week, the first friendly match was played against local and lower class club. In the last three seasons, mostly first match is in this stage and against a little bit weaker opponents in order to have our team already tired in this stage, handle this match easier, to ran well, to have match based on a number of counter-attacks, and of course to achieve certain victory as a motivation for future period.

STRENGTH

Strength was from the beginning of the preparation done with special care. Static and dynamic force was combined. Group of muscles that was dynamically loaded due to meet large volume of running, mainly legs, lower abdomen and lower back in strength exercises are loaded down with static exercises. The upper part of the body and other muscle groups was loaded down with dynamic exercises, 40% of the maximum, each exercise is performed for 20 seconds, and type of training is a circular. Each station has loaded the specific group of muscles. This represented handball specific work, because every handball muscle work involves the usage of a large number of movements that do not activate the burden on one group of muscles, but great number. For that reason handball muscular work had to be divided into its constituent movements, body position in which the muscles were maximally loaded. These positions are part and the position of the maximum load represented structurally separate units. Every unit was specific, the effort lasted up to 20 seconds despite the work on force it was designed to have stability of the final movement activated, which is very important for handball when, in duels,

with a contact on the shot, while pushing in defense, the accuracy and stability performs a key role.

The main task of strength training is that it should meet the metabolic activation of synthesis, more precisely increase of filamentary muscle density and achieve the necessary myofibril hypertrophy. The simplest way to increase the contractile proteins is the depletion of energy in the muscle cell. At high work loads of muscle, energy required for contractile elements progressively decreases, the adoption of an amino acid in the blood is prevented and mass catabolic proteins and the concentration of nitrogen in the blood reaches the critical level. When activation of muscles is disrupted, during breaks the opposite mechanism activates in which the synthesis of proteins occurs and the transfer of amino acids from the blood into the cells is above the normal limits. This process is called super compensation of muscle proteins and leads to myofibril hypertrophy. For protein synthesis at the cellular level is necessary to meet several factors, to increase the supply of protein in the cell, to increase the concentration of anabolic hormones in the blood, free cretin and ion hydrogen. With slow muscle fibers, accumulation of cretin increases the process of glycol sis, the process is aerobic and the only of the above factors, the amount of hydrogen does not increase. At muscles with fast muscle fibers glycolytic process leads to a buildup of lactic acid primarily because the number of mitochondria is too small. Increase of lactate leads to the formation of hydrogen in muscle fibers. Hydrogen is allows throughput of cell membranes, through which smoothly enters the cretin and hormone to molecules of DNK. From these reasons it was necessary to connect the load of muscles that maximally activated DNA process.

This process was only possible to activate when the muscle was work loaded submaximally, when it showed great tiredness, to the maximum of resistance, when it overcome the maximum of resistance and when the maximum speed overcome resistance.

The first task was to activate muscle sub maximal workload; the job was completed in the activation of muscle by the units, until the maximum of resistance. After three weeks of preparations, respectively after 5 micro cycles in training was involved the operation of maximum stresses through concentric, eccentric, and isometric and is kinetic types of exercises. Work on overcoming of sub maximal workload at maximum speed has been introduced already in the third week since the previous seasons showed that the pace of certain muscle groups declined, and it is very difficult to activate it if it is not developed parallel with the work on endurance.

Endurance in strength was performed at the size of an external load of 50 to 60% of maximum power of each player, up to the maximum resistance, number of sets was 4 or 5, break 60 seconds, which was repeated 6 to 7 times. After 4 sets and before the next series of the 4 sets active break was included, in the form of the slow running or work on coordination. Module of 4

series included progressively increasing load from 1st to 4th, and the number of repetitions was reduced.

The method of maximum load was applied through two types of exercises. First was pushing the load, where work was done on a strong endurance and maximum power, where the amount of workload on sledge was determined on the basis of individual tests in the gym and lasted up to 7 seconds, repeated at 4 to 5 sets with running out at the end, which had the task to remove lactic acid from your legs and relax muscles for the next strain. Number of modules in one training session depended on the degree of tiredness, which was determined on time results for running across a section of 40 meters, which was made immediately after pushing, and measured after 3 minutes of running out. Players on Pivot positions and Backs worked extra series because the time in sections from set to set was better. The interruption was at the moment they realized the best time.

Work at maximum power meant the basic type known as pyramid method, the type of exercise that was half way and deep squat, bench press, mound, throw-out, stepped on the bench. The number was repeated 4 to 5 times, and the load was increased in the first series of 85 to 90 in the final to be 100%. Between the pauses of 3 to 4 minutes or implied active break in skipping rope for 2 minutes immediately after the end of exercise or as a light running if it was worked on upper musculature .

It was worked by the method of maximum concentric workloads. On one hundred percent load, one or maximally two repetitions divided into 5 to 6 series, only with older players, and younger players who had older players as partners. Also it was worked with old method of isometric strain, where all energy is used to muscle strain, not to run the movement. This method had several variants, which were determined on the basis of what has been done after, if after the work on maximum strength, was worked on speed, loading rates were in the range of 40.50% of maximum, stress duration was 15 to 20 seconds, or 60 to 70% of maximum, with strain 8 to 10 seconds. If the maximum strength training workout that was the last micro cycle then the load was 80 to 90% of the maximum, in the last series and 100% and the duration of strains 3 to 4 seconds. The break was in between in function to maintain a certain tension of muscles and implied the work of the surrounding muscles 20 to 30% of the dynamic work, because it turned out in the previous seasons that only with active breaks younger players showed a significant increase in strength after only 5 weeks of work.

PREPARATORY TOURNAMENTS

One of the most important part in the preparation period of every team, and of course, ours also are preparatory tournaments where we had different goals and objectives. Handball club Partizan goal is of course to be the best and first always and everywhere, but not at all costs especially in certain tournaments in the early stages of preparation. The first tournament was at the end of the

fourth week of preparation in which the team went straight from the preparations that lasted for days of working together outside of Belgrade. At this stage, when the legs are heavy, for the last two seasons we have played in the tournament that we organized. The tournament lasted for two days, and had two matches in each day (semi-finals and placement match) with relatively weaker opponents, while this year we took part in a memorial tournament which had six teams and had pretty good quality.

The goal was to play matches with as many rotations, with virtually pre-planned playing time for all players, ignoring much of the score, as it was important that everyone feel the competition and that the load is relatively equally for all players. The second tournament was at the end of the fifth week of our work and in our plan that tournament was supposed to roughly show the quality level of the team. Again, the goal was a bit more rotation of players, but this time with more emphasis on the result, which was more important than the previous tournament. Last check before qualification for the Champions League was a friendly match seven days before the CL Qualification Tournament against a strong team which was planned to show most realistically the situation and after which in the seventh week of work, we had the opportunity for corrections, improvement and development of the basic things and the details of the game in all phases. CL Qualification tournament had to be used as a preparation for the start of national competitions.

CONCLUSION

The last three seasons RK Partisan team is prepared in a similar way, of course progressing from year to year in certain parameters of all segments of the work and game and with the increasing volume of work. The first year we participated in the Challenge Cup, where we reached the semi-finals, and this year and last year we were preparing for the qualification for the Champions League, so we had to start earlier with trainings and that is the only small difference in work, concerning the number of trainings and getting the form ready for competition. Besides all that, it was very important to create a base for long national competition which is in the first part of season played from mid-September to mid-December, and in the second half of the season from February to June. It should be taken under consideration that team has many young players who in the summer played for youth national teams and most of the times do not attend complete preparation period with the team, but are joined at certain stages after a short break from activities they had with national teams. This is a specific situation especially when you consider that junior team members in our team, unlike other members of the Champions League, have an important role and their absence from work are very sensitive. I believe that this system of work is adapted to the conditions of life and work in this area where the club exists and, as such, is not the most perfect, but it is effective. But of course, there is always enough space for improvement in the organization and the work itself as on technology of trainings.

EHF "Rinck" Convention Open Master Coach and Licensing Course

3rd Module

GRADUATE WORK

**TECHNICAL AND TACTICAL PREPARATION HANDBALL IN ATTACK
WITH EMPHASIS ON THE ROLE OF MIDDLE BACK THE ATTACK**

CANDIDATE

Lukic Dragan

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INTRODUCTION

Handball is a modern, very popular game that has been successfully presented in the open field and sports halls. This very dynamic, attractive and interesting game with the ball, realizes the constant alternation phases of attack and defense, where the teams play an active and organized in order to achieve a favorable outcome of the meeting.

In one century duration and implementation in various forms of sports games is evident that the defense would like the game, much less attention is paid in relation to the attack.

Successfully and effectively playing one or more games, successfully realization one or more shares in both attack and defense, depends not only on the technical, physical and psychological education team or individual, but also on the applied tactics. The term "tactics" originates from the Greek word "tactics" which means a way, method, or device that is used to solve the problem and achieving a certain goal.

Tactic Handball can be defined as "the deliberate and planned activities of an individual, a group or a team player, which is the purpose of the particular situation of the game and its entire course and predict based on the best solution.

In sports games, which means in handball, the tactic has primary importance and a very important and complex factor to successfully achieve the set goals. If the technical preparation of each player and the team as a whole well-trained, adequate, good tactics adopted to efficiently and rationally implement all movements (in attack and defense, without the ball and with the ball). Therefore, it is possible to conclude that the tactics actually skills with the help of rally sport is realized. This indicates that the tactic is one of the most important areas that affect the successful presentation of dances and technique handball, field tactics and constantly sought new solutions and procedures that are confirmed in practice or were eventually eliminated, and went into oblivion.

Tactical preparation in modern handball is a complex, extensive and time-consuming process. Using the tactics of the game to determine the means and procedures for the competition with an opponent in any particular case. To means that the ability of each player to use the best and most cost effective way.

Elements of tactics and its basic variants begin to learn and adopt the very beginning of learning the game of handball (and in the first year of training). Serious and studious work on the adoption of more complex variants tactics can be realized only after the adoption of large-scale element techniques. This means that the first prerequisite for learning tactics technique was handball, and other physical preparations for carrying out the activities of handball.

Tactical preparation handball area and an inexhaustible process that aims at preparing an individual, group of players and teams for the long term, exhausting and competing. This area can be divided into tactics in defense and attack tactics in the game. Also, we share a game keeper on the game in defense and attack.

Given the number of players participating in the implementation of specific actions in attack and defense differentiate between individual, group and collective (team) game. When a player, for example. After "cutting" of the ball, without assistance, individual action going towards the opponent goal and to direct the ball to goal (shoots), then it is a game room.

If in solving certain attacks (planned or improvised) involved two and a maximum of five players, then it is a group game. The attack usually is an element of group games: cooperation of two or three players in the stabbing, intersection, blocking, unblocking, running, and distract. Defensively, the elements of this nature are double or triple block, taking players on offense blocking Half, cooperation with others keeper.

When solving certain tasks in the game by all the players of a team, then it is called collective

tactics. In all three cases distinguish the game in defense and attack as well as individual, group and collective, or team sports.

We can safely say that it is a handball sport branch that is located in Serbia at the top of the men's and women's competition. If we add to the end and to remind: the attractiveness of the game, the speed of the players and the ball, force shots and reflection, countless duels, throws frequency goalkeeper defense and attacking combination, uncertainty and constantly changing ... the results, it is clear why handball Serbia and almost all over the world have so many supporters and sympathizers.

1. TACTIC FOR ATTACK GAME

The game of handball can be conditionally divided into the period, which is realized in the attack and defense in the game period. Attack Handball is one part of the game when one team has the ball, and the instance of steals by the end of the attack or until the ball is gone. The aim of any attacks that, using individual skills, well-coordinated combination or spontaneous actions of individuals, groups or entire teams player scores a goal (goal). Success in solving problems attacks, among other things, depends upon the stage of practice, the choice of means and methods to develop attacks become more difficult, more complicated and require more serious and studious approach. New systems in defense and how their implementation before the attack is difficult and often impossible to solve the problem. Technical and tactical abilities individual can play an important but not decisive role. Solid, impenetrable and highly elastic defense rally require constant and varied game play in the attack phase.

Attack in all games, including handball, is part of the game that players prefer more than defending. However, modern high-class handball before the attack raises a very serious task, the realization of which requires great physical, mental and intellectual effort.

Success in solving the task in the attack depends on various factors. Selection of the most efficient systems in the attack game, too, is a complex, difficult and responsible job coaches and players in full. Attack is part of the game where creativity and innovation capabilities certain coaches and players can no longer come to the fore and be successful are installed in the game.

The choice of game modes in an attack caused by a number of important factors. In doing so, the coach must respect the following.

- **Characteristics own gaming staff (anthropometric dimensions, physical abilities, mental abilities, motivation, social structure ..)**
- **Knowledge of the characteristics of opponent**
- **Knowledge of the characteristic modes of play in the defense of the opposing team (basically: rod or deep zone formation)**
- **The balance of power and capabilities of an adversary**
- **What is the course of the game, ie. movement result**
- **What are the changes in the way of playing the defending**
- **How much time you have to learn and practice the attack (basic principles of attack combinations).**

In addition, the choice of the game on offense coach should have in mind:

- **importance of the match (primary, preparatory, friendly, propaganda), is concerned achieves an important match or placement**
- **the conditions in which the matches (indoor or covered terrain or outside,**

brightness, background, hygiene and weather conditions) criteria and method of interpretation rules handball game of the judges who arbitrate the respective game (known Unfortunately, there are stricter and more, objective and less objective, neutral judges and local)

These are the major factors that we need to have in mind when selecting modes of play in the attack. The success in the implementation of the attack depends on whether the players and coaches at all times strictly adhere to policies conceived plan and an agreed system attacks the game. It is necessary to organize the attacks change and adapt to a particular situation, finding the best and most effective solutions.

Selection of the attack and its variants depends primarily on the technical and tactical skills of players with which to organize the attack and played some games, and the degree of practice and the applicability of such attacks. Ingenuity, rationality, efficiency of implementation attacks is reflected in the movement of all players involved in the attack. All these movements need to be implemented quickly, cost-effectively, with some degree of change in the direction, pace and rhythm of movement.

1.1. PRINCIPLES OF ATTACK

The realization of the present attack certain principles that should be followed. These principles can be divided into two groups when it is implemented or extended counter and counter attack when organizing the defense formed.

In order to rally and create the conditions for an effective attack against an established defense must, in addition to the outstanding conditions, to fully know the weaknesses of the opponent's defense. The coach and the players much earlier analyzes, observed and practiced attack on the defense used by most opponents.

Bearing in mind that the teams we play against defending choose which suits us at least, it is necessary to know the details and strictly apply the basic principles of attack on defense formed. These are:

- **Principle width attacks**
- **The principle of depth attack**
- **The principle of speed ball**
- **The principle of mobility of players in attack trends specific to the game in attack phase**
- **The principle of the change of rhythm and tempo of the game in attack**
- **The principle of optimal length of the attack**
- **The principle of creating a surplus of players**
- **The principle of rapid transition into**

2. SHARING THE ATTACK TACTICS

Tactics in the attack are divided into:

1. Individual code

- **Detection**
- **Running**
- **Added**
- **Receiving the ball**
- **Running and dribbling**
- **Shooting**
- **Feinting**

2. Group

- Stabbing
- Double pass
- Dragging
- Crossing
- Blockade
- Group counter

3. Collective (team)

- The system of attack:
- With a circular attacker
- With two circular attacker
- With a circular attacker either one Postmen
- One Postmen
- No circular attacker
- Play with players more and less player
- The collective counter

In the modern division handball game on offense and defense, generally, be carried out according to the number of players involved in organizing the attack.

2.1. REQUIREMENTS OF GAMES IN ATTACK

- **The fundamental starting point is the existence of games BASIC CONCEPTS OF GAMES**
- **full contribution of all players in the game**
- **Rational use of steps, time and space**
- **more finals on the wing positions, due to the low tolerance of brutality by the judges and the relatively large free space for shooting**
- **discover the weak points in the opponent's zone and put pressure on them**
- **note "which now goes" and play for him**
- **play around the area and not just in front of her**
- **repertoire of attacks should be diversified and rational**
- **adaptability to specific games on time (extra player, player less, etc..) Is required**
- **getting out of control and avoid neutralizing the game by the opponent**
- **shoots at goal with all of the positions that are as diverse, appropriate situations and to make all players**
- **mandatory use of deception**

2.2. INDIVIDUAL TACTIC IN ATTACK

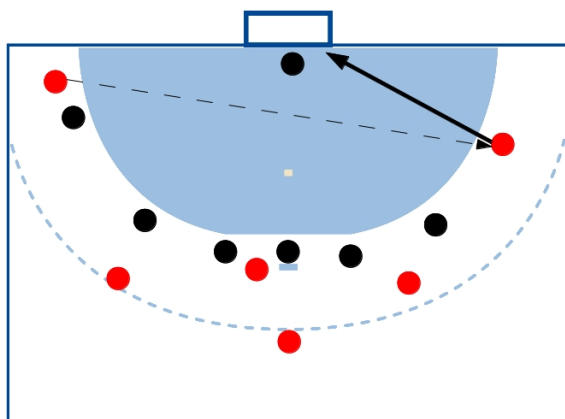
Modern handball more players looking for a model that will tackle the most complicated situations of the game in the most effective manner. A player who has extensive technical knowledge, great bodily ability and preparedness, especially talent for the game, will be able to successfully operate on individual tactical plan. Means of individual tactics in the narrow sense of the elements of technique, and in a broader sense attitude towards the player, referees, opponents, audience, etc..

2.3. HANDBALL BACKGROUNDS AND ASPIRATIONS INDIVIDUAL GAME FOR THE ATTACK

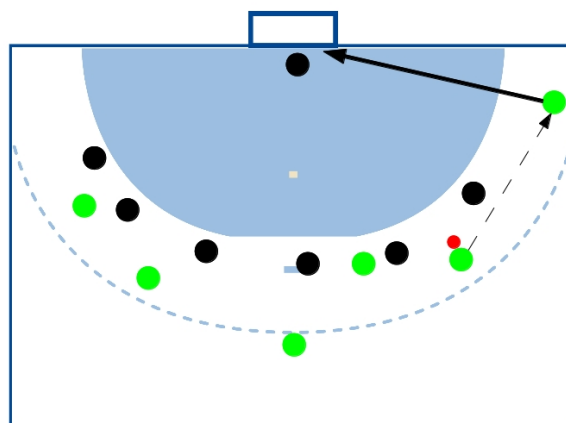
- The image of the game and the integrity of its details must be as complete
- To meet the requirements of the game details at all locations
- strength of mind and skill, against the "muscles" of the game
- Review and creative game-building advance human initiative
- The better control his body in space and time
- receipt and delivery of the ball is stressed (critical) the importance of the game
- A full and unconditional implementation (handover balls, steps, tricks, shooting)
- discernment of the game is prevention future events, and it is derived from "large" knowledge
- Self-confidence and self-belief, based upon the work and knowledge

Tasks and instructions for individual tactics wingers (wings)

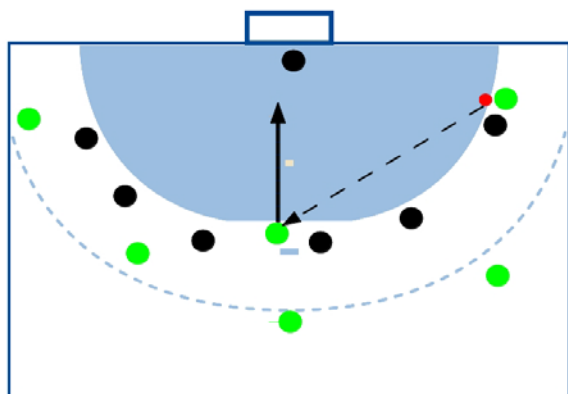
- cooperation with other wing (Pic. 1)
- Cooperation with defenses (Picture 2)
- Cooperation the pivot (Picture 3)
- Throwing on goal from his position (wings)
- shoot with the position of the opposite wing
- shoot with fullbacks position
- feinting with the implementation (Picture 4)
- detecting and getting rid of opponents
- obstruction (blocking)



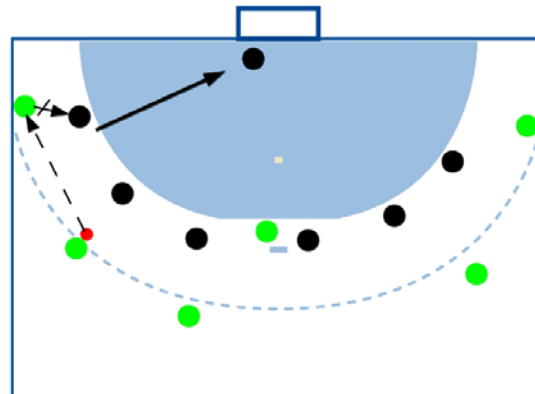
Picture 1



Picture 2



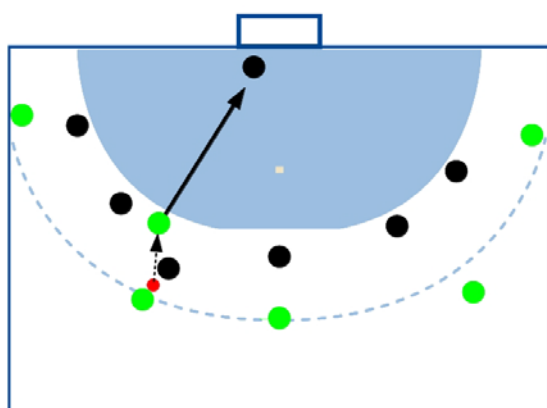
Picture 3.



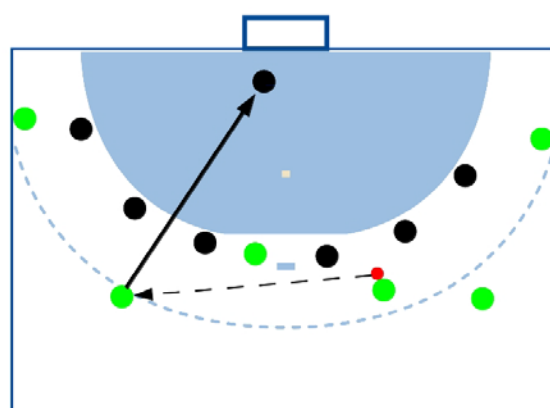
Picture 4.

Tasks and instructions for individual tactics Foreign players (backs)

- cooperation with other defense (back), pivot and wing players should be coordinated accurately, quickly and accurately performed (Figure 2, 5 and 6)
- defense should have a great shot from distance beyond 9m, with the environment and with the basic significance of any good back is a jump shot from all positions outside 9m, with and without interference player
- At least one of the three back has to be a good striker circular (pivot)
- ideal left-back and right-back would be good to put the position of the wing
- knowledge of setting up blockades incumbent upon all guard



Picture 5.

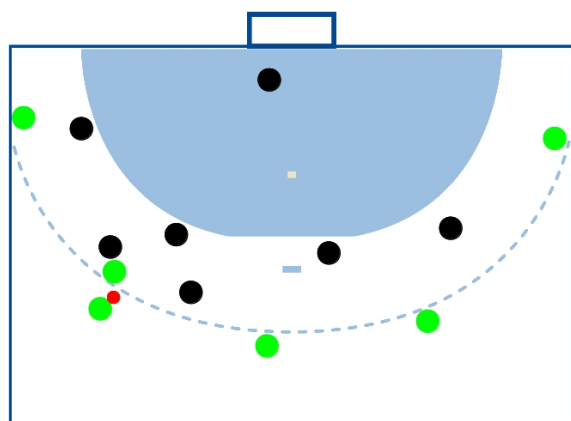


Picture 6.

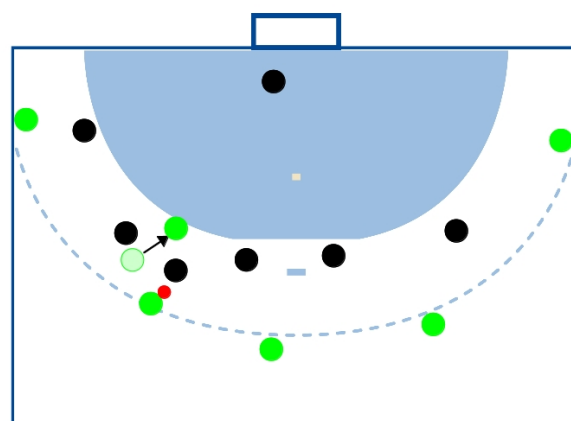
Tasks and instructions for individual tactics round player (pivot)

- Cooperation with backs (defense) (Picture 7)
- Cooperation with winger (Picture 3)
- detection
- capture different balls added
- shoot with the goal interference
- shoot the goal from the pivot position
- shoot the goal from the wing and backs

- **lock and unlock (Picture 8)**



Picture 7.



Picture 8.

3. CENTRAL CONNECTION ATTACKER – CENTRAL BACK

The current practice is common division into right and left defense, "responsible" for the shooting and middle guard who should organize and lead play-maker in a game like basketball, which is the hardest, most complex and most demanding roles in the attack, which requires extraordinary abilities and experience.

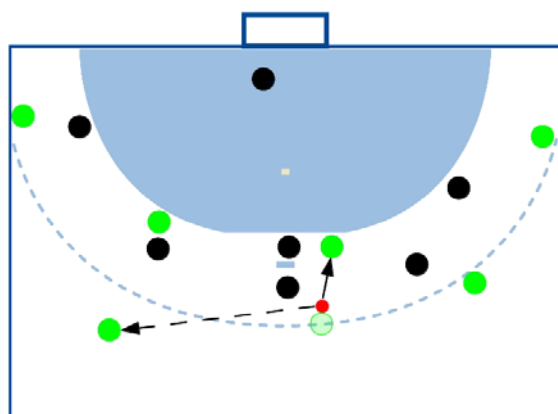
- Mid-back is the "alpha and omega" of the game being the attack on organized defense. He usually starts the action and significant impact on the success of the implementation of the agreement well-coordinated combinations. He is also the most distant from the opponent's goal. So we should have a good view of the great power of identification, how to distribute the ball where it is currently the weakest defense.

- You need to have some variety in the technique of passing, dribbling and keeping. He knows all the shots from the middle and from the place of left and right-back. Passage, after tricks, dribbling and games 1-1, to be successfully performed. **(Picture 10)**

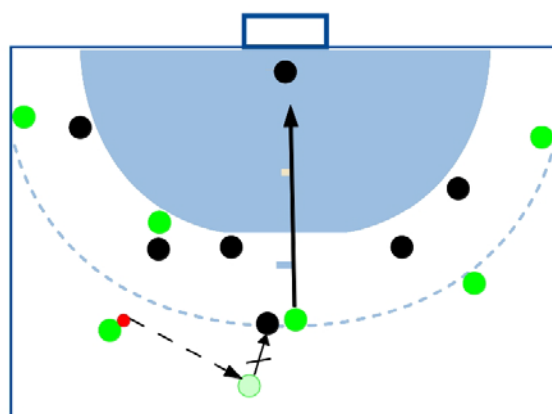
- Cooperation in organizing the attack with all his teammates must also be marvelous. Recruit Pivot at close range with the use of various techniques to add the basis of his cooperation with the offensive player.

- With other players to attack successfully applied to all elements of group attack tactics (lock, unlock, crosses, distraction, etc.).

- Medium back is usually the player who goes to stage attacks pivot position, when the opponent plays in the formation of deep zonal defense (eg 3:2:1 or zone defense combined 4 +2) **(Picture 9)** The teams that have great defense that medium. Games organizers in the attack have been in the top handball world - eg. Spain, Sweden, Croatia, France, Russia,



Picture 9.



Picture 10.

3.1. PLAY AS MIDDLE BACK AND CORRECTION OF GAMES IN THIS SPACE

The current game in the middle guard position could be precisely defined, and some of these requirements are:

- That this player has an above-average game review
- Have a strong command ball, used trickery and steps to the optimal extent
- To successfully assist teammates and make advantage
- The timely delivery and the seemingly fine balls
- That "binds" itself from the player who controls the ball tracker
- The "quick thinking" all "see" and provides good
- To use the "big" knowledge and insight
- The initiator and the leader in finding good solutions
- Use errors and misunderstandings in the opponent's defense
- That at no time must not "fall out" of the game and others.

We must not forget that modern handball is going in that direction, so that all three back should play by rational and well thought out concept, regardless of which position who at the moment is found or located. It would be a richer and more diverse threats opponent's goal and finding better solutions.

Now, each one wrapped positional role "specialist" for that place, and the goal should be that all three are equally successful back to play in all three positions.

3.2. TRAINING AND DEVELOPMENT OF MIDDLE BACK IN THE TRAINING PROCES

It starts from the most basic techniques, because the knowledge of techniques to achieve the requirement of good results later. Mission of elementary techniques - adding and capture, not just the jump, shoot, etc.

Elements of the technique are:

- With ball
- Without ball

When it comes to technology, players should be directed immediately to the elements and tactics.

At mid-back position, which is definitely the most responsible positions in the team, can play only

one player who has a very high-quality technical and tactical skills, excellent visual perception, which has the psychological stability (which is the dominating factor on the right this position), and high morale and human qualities.

Extract a few players at the position of middle guard who occupy the very top in the last 10 years of T. Duishebaew, J. Richardson, Lj.Vranješ, M. Anderson and I. Balic.

When training should adhere to method in which phase must have:

- creating conditions for training
- Understand the elements
- Training in the simplified (simple) conditions
- training in conditions similar to the game
- consolidation of learning
- practicing the game with two goals
- Troubleshooting

3.3 ORGANIZATIONAL PRINCIPLES TO TRAIN THE MIDDLE BACK

There are certain principles in the training process, to be followed, including:

- The principle of programming
- The principle of individualism
- didactic principles
 - Gradual load
 - The principle of repetition
 - Psychological
- The principle of systematics
- The obvious principle
- The principle motivating and activating
- The principle modification athletes

Methodology of training is the only way to pass one element, if these principles are applied.

Methodology of a single creative area depending on the conditions, depending advancement of technology will progress and our methodology of training.

3.3.1. Round 1 - BASIC TRAINING METHODS OF TECHNICAL ELEMENTS HANDBALL MIDDLE POSITION BACK

- Methods of keeping the ball
- Methods of catching and passing the ball
- Methods of keeping the ball training
- Methods of training keeping the ball in motion
- Methods feinting
- Methods of side shoot
- Methods frontal shot
- Methods jump shot jump
- Methods jump shot in the air
- Methods of training shooting in the fall

Organization and implementation methodology training within the training process is implemented

I coach. The success of the process depends mostly on the methodological training of vocational and educational training. Trainers for this type of work. The effect of the training process will be complete if the subjects (athletes and coaches) are active in the work, and if the organization has the required level.

3.3.2. Stage 2 - TRAINING

It is a superior training period, the second and last part of the process of long-term training in handball. Termination phase begins training and acquisition of aromaticity, and takes continuously until the end of his career of players.

During this stage, the player adjusts its optimal gaming achievements. He aspires to the highest levels of handball, or reaching maximum capacity and performance. The road to sports excellence - mastery in handball, according to scientific studies, a total of about 6-8 years of continuous, systematic and planned work.

Technical skill position players in the mid-back is characterized by three indicator:

First - the scope of technology or a number of technical variations, the player is able to perform and display the game.

Second - diversity technique elements

Third - efficiency element techniques, ie. successful showings technique elements in play

When all of these technical elements of the game connected with tactics, gives a true picture of quality players at the position of middle guard.

Plays in midfield with the ball and without the ball, cooperation with the players - crosses, distraction, double passes, tricks, sales, various shots and a good overview of the game at any time, the characteristics of a good playmaker and water on the ground.

4. ATTACK VERSUS 3:2:1

Bearing in mind the basic layout of 3:2:1 zone, the defense is trying to cover the "saves" the whole area of debris, the width of the "dead" corners of the wings, and a depth of 11m (Page 11).

Rally with a deep defense is essentially the most complex and difficult way to play in the attack. The complexity is increased if the attack in solving larger number of players. So it is said that the quality of a team attack reflected in the level of teamwork and efficiency in the game deep formations.

The organization and implementation of the attack on the deep zone defense must be built and placed on the basic principles of developing attacks. Success will be greater if more fully realize the principle of breadth and depth of the attack, the principle flexibility players and ball speeds, continuous assaults on goal, with frequent changes of rhythm and tempo (individual, group and team).

The high degree of teamwork is the foundation of the rally. However, if the offensive player does not have individual abilities, it is difficult to succeed in the game to such a defense. In this case, each player is required greater mobility and versatility in movement with the ball and without it. Individual technical and tactical skills such as receiving and passing the ball, extraction, lock, unlock, as well as the diversity of shooting at goal as a starting point in the development and implementation of effective attacks.

During the rally, players attack and defense in the zone come 3:2:1 'individual abilities almost every offensive player. Individual actions, particularly the rally 1:1 is the dominant style of play. From the offensive player is required to control of the situation when trying to get rid of a player who

keeps it, Ankle break, dribbling, etc.. So you need to get rid of any defense at the time, and this is the basic prerequisite for the smooth head towards the opponent goal.

When breaking the opponent's zone applied to a typical stabbing, which are used on short trips and quick roll, often combined with a change of direction with the use dribbling and maneuvering. Sinking, as a rule, are made between the two defense players, with the intention out into empty space. If we want to force a foul shot or the foul, thrusting towards the defensive player.

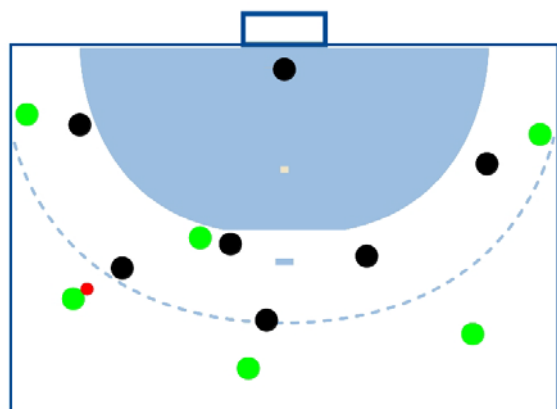
Where possible, and if it has a certain effect, to use the crossing in small spaces that do not have a great depth. Crossing as a means to rally the deep zone is less used in practice, especially if it is repeated and the participation of a large number of players. Thus, the cross is not typical of the game against deep defense.

A characteristic feature of the game attacker, typically in terms of deep formations, such as the defense of 3:2:1, the "pan", after which he continued to go to the position of "widespread" second Pivot.

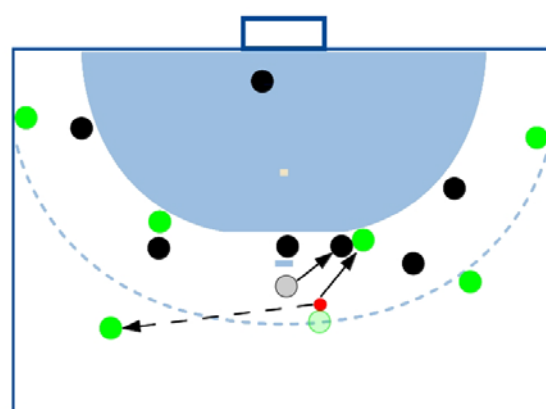
After a "distraction" regarding departure of one of the offensive player to the position of the second round striker (pivot), the defense has to undergo transformation by a player who was responsible for the attacker (usually mid-back) will have to continue to keep their players, but the the line, or to withdraw the whole defense and take a shallower formation. In both cases, players attack this transformation comes in a convenient location. (Page 12)

The advantage of the attack on a 3:2:1 defense and the team that has good game with Pivot and which, moreover, has two backs with a high degree of efficiency.

So, in the attack need a certain amount of aggressiveness, which cause very good physical condition.



Page 11.



Page 12.

4.1. MIDDLE BACK IN ATTACK ON 3:2:1 DEFENSE

The characteristics of the players at the position of middle guard on offense I have already spoken. Only note some of the most important characteristics that must mean that the back has to be able to adequately attack the deep zonal formation (such as the defense 3:2:1):

- speed and explosiveness, quickness, jumping ability, agility
- good technique of movement without the ball and with the ball
- good technique to capture and add

- good shoot technique and variety
- good cooperation with teammates, that is. excellent review of games
- successful and diverse tricks
- implementation of a good reflection on the left and right legs from all positions
- Pivot resourcefulness in position when the run line 6m.
- good defense motions
- high intellectual ability

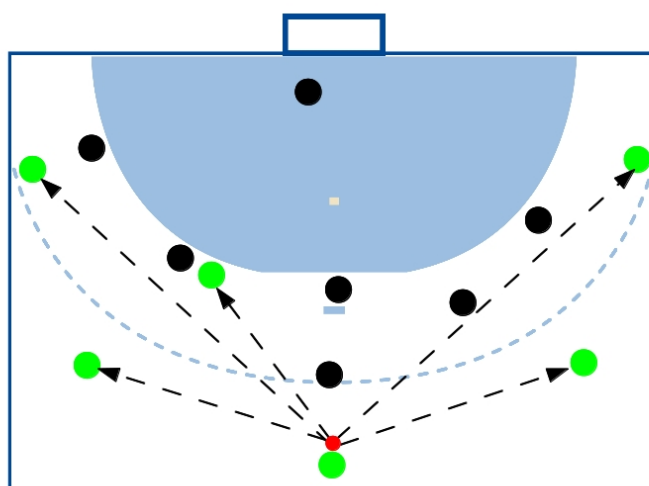
Movement of middle guard on defense 3:2:1

Now we pay attention to what are the demands of player movement in the position of the space-time orientation.

In preparation (quiet, passive) movement stage of the game the player is completely free and without obligation. However, the developmental stage of the game, the movement must be planned and organized. Does not meet at least one of these requirements, means to make a mistake that causes the termination action started, the game "fall" and needs to start all over again.

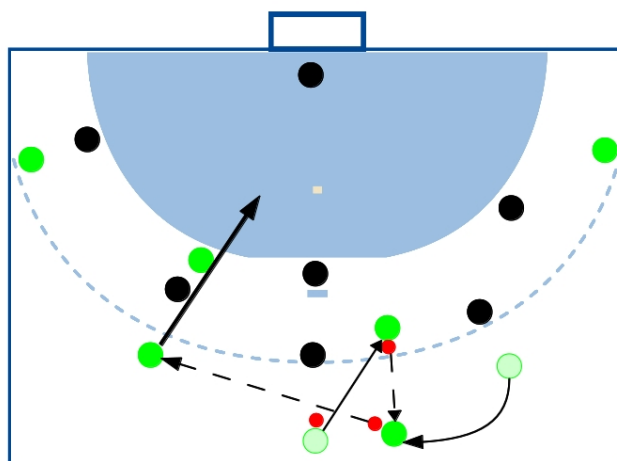
The requirements of space-time orientation is put middle-back, may be the following::

- the starting back position medium must be broad and deep
- so that the open relationship mean back-back-Pivot-winger (Picture 13)
- to assess the real moment of departure (running), because there's only one real
- Choose a good direction (running), ie. have a good selection of running
- a good estimate of the moment of receiving the ball
- optimum speed (running)
- unerringly in the right measure to use steps, according to the needs and circumstances
- timely shooting, the attacker through balls round (pivot), fullbacks and wings, which must
- be derived in the active (aggressive) performance



Picture 13.

How responsible and difficult role of secondary defender can be seen from the above requirements, which can make 4 mistakes and that the ball had not even met, so the player will not get a usable ball, which has a negative impact on the further course of the game.



Picture 14.

- **transfer the ball**, where the zone is the most important phase of 3:2:1 Possession, in which back can mean:
 - passes the pivot
 - passes the defense
 - passes the winger
 - I "pass" through the zone
 - shoot or pass the ball

rationalization of movement

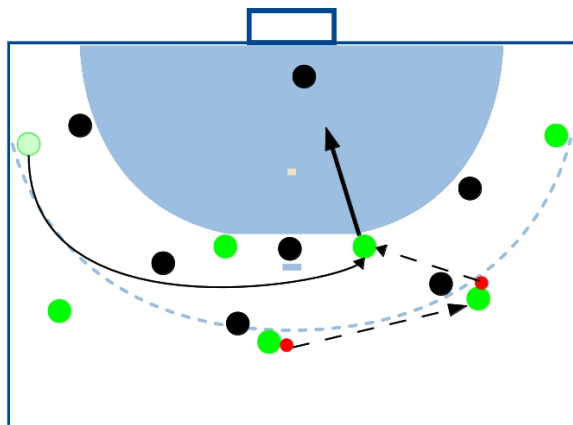
- Carry out the implementation of the most appropriate shooting position, avoided block opponents, shoot the foul and bad positions.

Middle guard their imagination in play, therefore, can be expressed in several ways. It should also be practiced at several flow 3:2:1 defense team to be ready for a deep zonal formation. (I have enclosed a few flow on defense 3:2:1) (Figures 15 and 16) • a safe and active attack using fast and safe handover of the ball

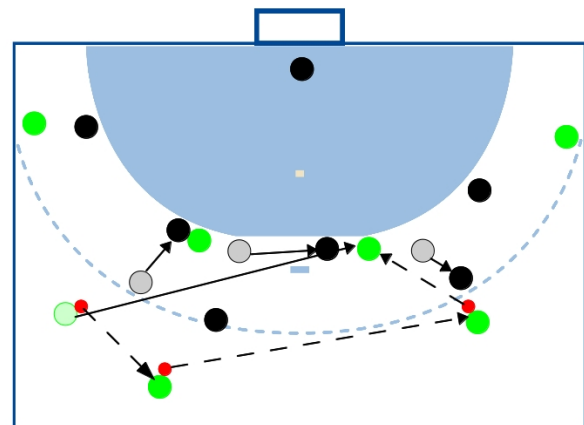
- Permanently endanger the goal attack and constant thrusting
- Avoid "contact" game, and not let the front center-half to frequent interruptions shall obstruct the game and disrupts the continuity of the game. Action must have its course with successful rationalization of movement

- Carry out the implementation of the most appropriate shooting position, avoided block opponents, shoot the foul and bad positions.

Middle guard their imagination in play, therefore, can be expressed in several ways. It should also be practiced at several flow 3:2:1 defense team to be ready for a deep zonal formation. (I have enclosed a few flow on defense 3:2:1) (Pictures 15 and 16)



Picture 15.



Picture 16.

From all the above, we conclude that the position of middle guard most responsible positions in the team. Therefore it is necessary that when selecting players for the position of middle guard take care of all these parameters. Decisive role in who is best suited for that spot on the team has a coach.

Conclusion

Attack in all games, including handball, is part of the game that players prefer to practice than defending. However, modern high-class handball before the attack raises a very serious task, the realization of which requires great physical, mental and intellectual effort.

Selection of the attack and its variants depends primarily on the technical and tactical skills of players with which to organize the attack and played some games, and the degree of practice and the applicability of such attacks. Ingenuity, rationality, efficiency of implementation attacks is reflected in the movement of all players involved in the attack. All these developments should be implemented quickly, cost-effectively, with some degree of change in the direction, pace and rhythm of movement.

When implementing attacks are present certain principles that should be followed. These principles can be divided into two groups when it is implemented or extended counter and counter attack when organizing the defense formed.

Modern handball more players looking for a model that will tackle the most complicated situations of the game in the most effective manner. A player who has extensive technical knowledge, great body ability and preparedness, especially talent for the game, will be able to successfully operate on individual tactical plan. Means of individual tactics in the narrow smisiu the elements of technique, and in relation to broader smisiu players, referees, opponents, audiences, and others.

Technical skill position players in the mid-back are characterized by three parameters:

First - the scope of technology or a number of technical variations, the player is able to perform and display the game (locomotion and manipulations).

Second - diversity technique elements

Third - efficiency element techniques, ie. successful showings technique elements in play The organization and implementation of the attack on the deep zone defense must be built and placed on the basic principles of developing attacks. Success will be greater if more fully realize the principle of breadth and depth of the attack, the principle of movement of players and ball speeds, continuous assaults on goal, with frequent changes of rhythm and tempo (individual, group and team).

A characteristic feature of the game attacker, typically in terms of deep formations, such as the defense of 3:2:1, the "pan", after which he continued to go to the position of "widespread" second Pivot.

Middle-back must have:

- **speed and explosiveness, quickness, jumping ability, agility**
- **good technique of movement without the ball and with the ball**
- **good technique to capture and add**
- **good shoot technique and variety**
- **good cooperation with teammates, that is. excellent review of games**
- **successful and diverse tricks**
- **implementation of a good reflection on the left and right legs from all positions**
- **Pivot resourcefulness in position when the run line 6m.**
- **good defense motions**
- **high intellectual ability...**

From all the above, we conclude that the position of middle guard most responsible positions in the team. Therefore it is necessary that when selecting players for the position of middle guard take care of all these parameters. Decisive role in who is best suited for that spot on the team has a coach.

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LEGEND - mean in handball

	Napadač/Attack player
	Predhodna pozicija napadača/Previous position of attack player
	Igrač odbrane/Defense player
	Predhodna pozicija igrača odbrane/Previous position of defense player
	Lopta/Ball
	Putanja kretanja igrača bez lopte/Player motion trajectory without of ball
	Šut na gol/Gol shot
	Dodavanje lopte/Pass
	Finta/Feint

Methods and Tactics of Counterattack Development

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(SRB)

SUMMARY

Counterattack is one of the most powerful methods in modern handball. Except for efficiency is an important influence on the security team as destabilizing effect on the opposing team. Depending on how it is performed and how many players involved we have: individual, group and collective counterattack. An important element is the extended counterattack. Counterattack efficiency depends primarily on the tactical and technical abilities and physical preparation. The focus is on the development of counterattack from basic defensive formations.

Development of counterattack from 6:0, 3:2:1, 5-1 zone defense.

Key words: handball, counterattack, tactics, efficiency, score

INTRODUCTION

The wealth and variety of movement structures make handball one of the most complex sport games and enables uniform development of a large number of anthropologic characteristics of the players. Lately in handball almost all visions represented ideas on the use of counter attacks as a form of collective attacks.

Undoubtedly, the efficiency of the implementation of tactical elements in the attack in this case counter attack depends on numerous anthropologic characteristics as well as motor and functional abilities.

It is extremely important individual abilities of players and physical preparation.

METHODS

The attack usually begins when a team comes into the possession of the ball, then the break of the game, that is half the game. Each has its onset characteristics and development opportunities. The efficiency of the attack depends very much on the other phases. Good onset is characterized by calmness and determination, great variety of tactical solutions development and speed of transformation of the defense in the offensive action.

Attack segment was defined as part of the attack interrupted by the action of a defender or temporary loose of ball. From beginning to end attacking players perform various offensive activities with respect to movement player and ball:

- Counterattack
- Prolonged counterattack

Counterattack

First phase of attack is counterattack. Counterattacks are individual, group and collective. Counterattack is the basis of modern handball.

Group counterattack

Group counterattack is attack containing two or more players. This attack is the characteristic of a quality team. It depends not only on speed but also on technical abilities. For counter attack training special attention should be placed on diagonal passing between players. Also important is the role of the player who receives the ball and organizes a group counterattack.

Collective counterattack

Collective counterattack contains all players advance by the principles set schedule with games on defense like the position and number of defense players.

The team who participating in counterattack must be good technically and physically prepared. Recently there was more prevalence in the counterattack where players go to the three waves.

First wave – wings and pivot on their positions

Second wave – back go to the half of court

Third wave – player who receiving ball

For counterattack used fixed assets: passing, crossing, changing positions...

Prolonged counterattack

Prolonged counterattack additional offensive action when the opponent defense returned but not enough organized. Players from attack perform their prolonged actions. In this case most of teams has already prepared actions. If the prolonged counterattack in not success the team continues for active attack.

Basic principles of counterattack

- Constant presence counterattack during the game
- All players should participate in counterattack
- Using most diagonal passes
- Using passes without dribbling ball
- Moving players in counterattack (depend of defense zone)

In counterattack every player needs to know the exact schedule of movement and which player should receive the ball and which way the ball should be passed.

Segment of counterattack

1) Organization

- Attack based on group cooperation.

Partially organized attack based on group cooperation of a few players while position and activity of other players having no direct impact on group activity

- Attack based by all almost of the players

Counterattack based on elementary tactical principles

- Based on individual action

This segment based on independent action

2) Direction

- Right: course of attack – ball direction from the players on the left to the players positioned on the right.
- Left: course of attack – ball direction from the players on the right to the players positioned on the left
- Center: course of attack – ball direction along depth line, from outside towards line players

3) Duration

Counterattack against no organized defense.

- Small number of passes (4 to 5) including the goalkeeper
- Not more than 5 sec from having come in the possession on the ball
- None of the opposite defenders is in front of the forward at the moment of shooting at the goal.

Counterattack against partially organized defense

- duration of the attack not exceeding 10 sec
- not all opposite team defender have organized their defensive

Counterattack against organized defense

- in this case to used prolonged counterattack

Generally, these are some basic facts necessary for successful counterattack efficiency, keeping in mind the different defensive formations. Each defensive formation requires different methods and tactics development counterattack.

DEVELOPMENT

The counterattack phase consists of a combination of tactical movement and the beginning of the attack zone to kick at goal. In relation to time, the development of the attacks may last longer or shorter time

As previously noted for the success of the implementation of counter-attacking much attention should be paid to the individual skills of the players for whole efficiency of counterattack.

Counterattack

First phase of attack is counterattack. Counterattack can be : individual, group and collective.

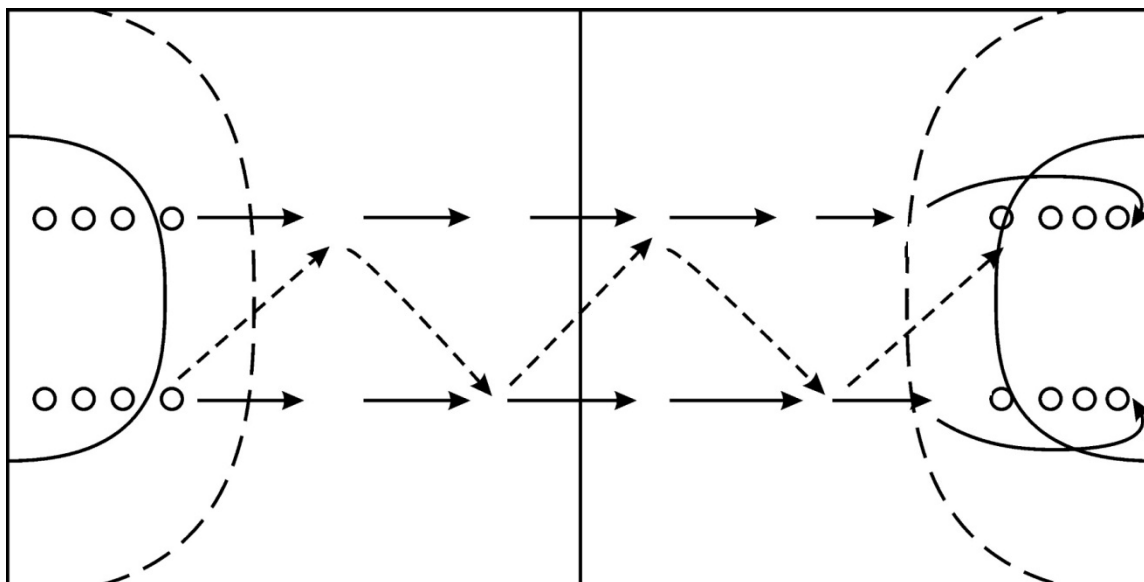
1) Elements of individual tactics

In the training process, especially with the younger categories, need to be constantly present the following elements:

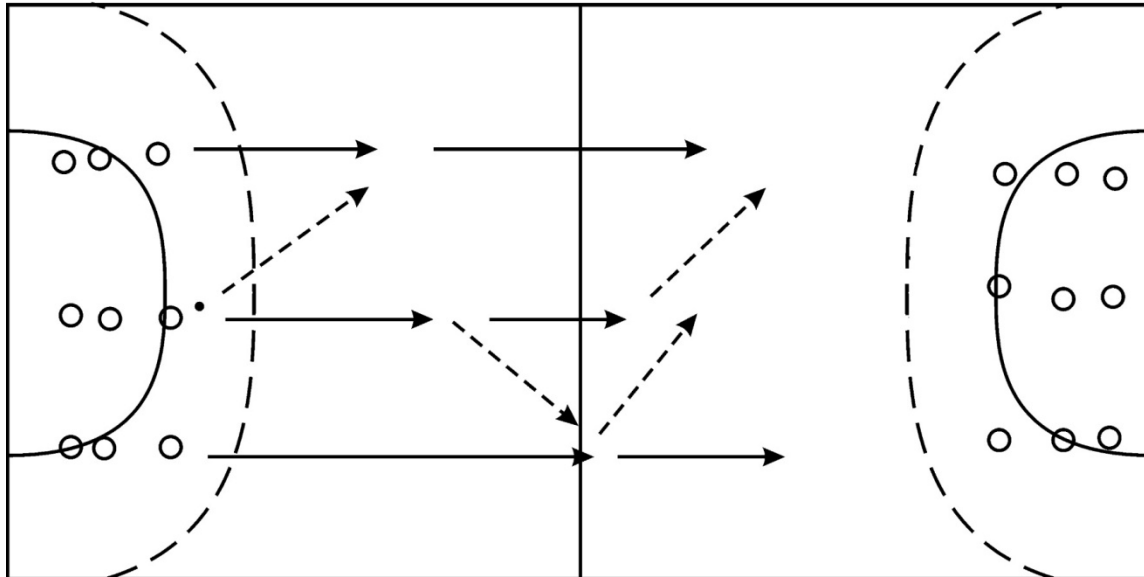
- dribbling
- feint
- passing the ball
- receiving the ball
- the change of direction...

2) Elements of group tactics

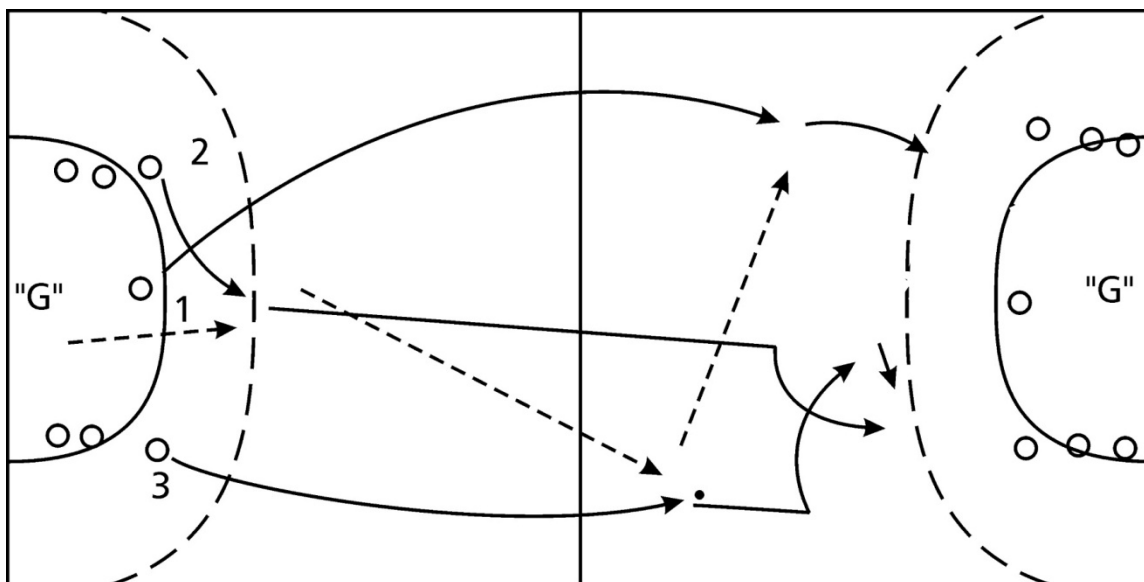
- double passing



- changing positions



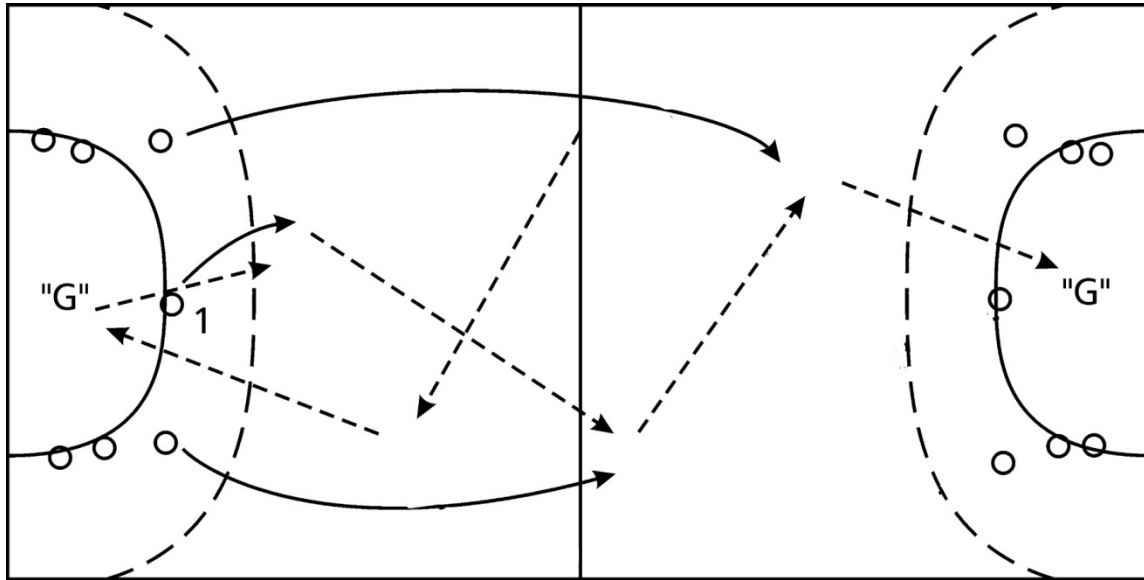
- crossing



In example is crossing element of group tactic with possibility of continuing.

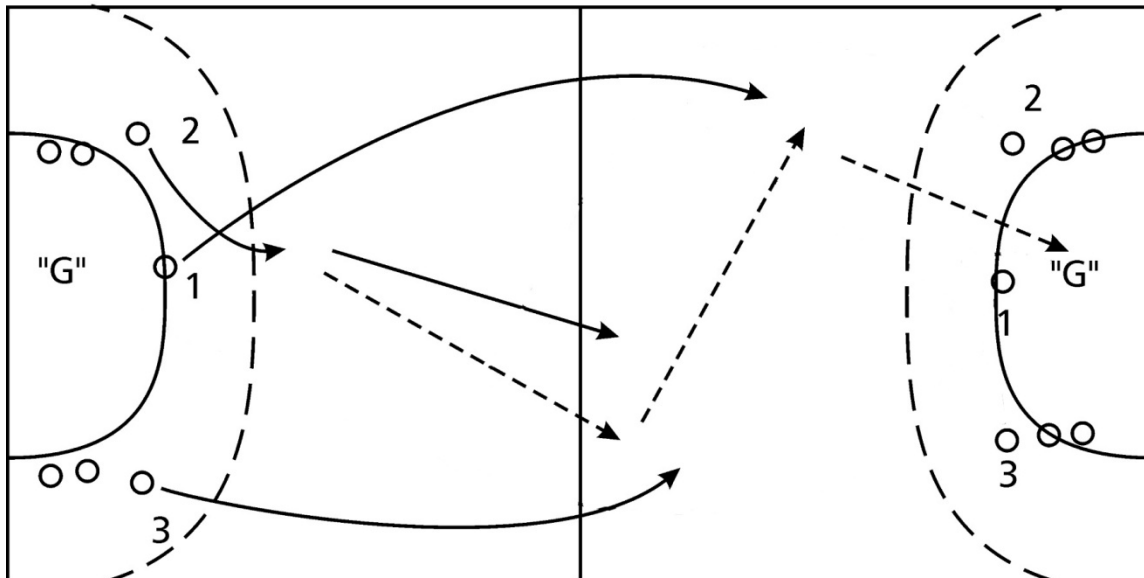
- crossing in empty space

In the process of developing a counterattack to use as much of diagonal passing.

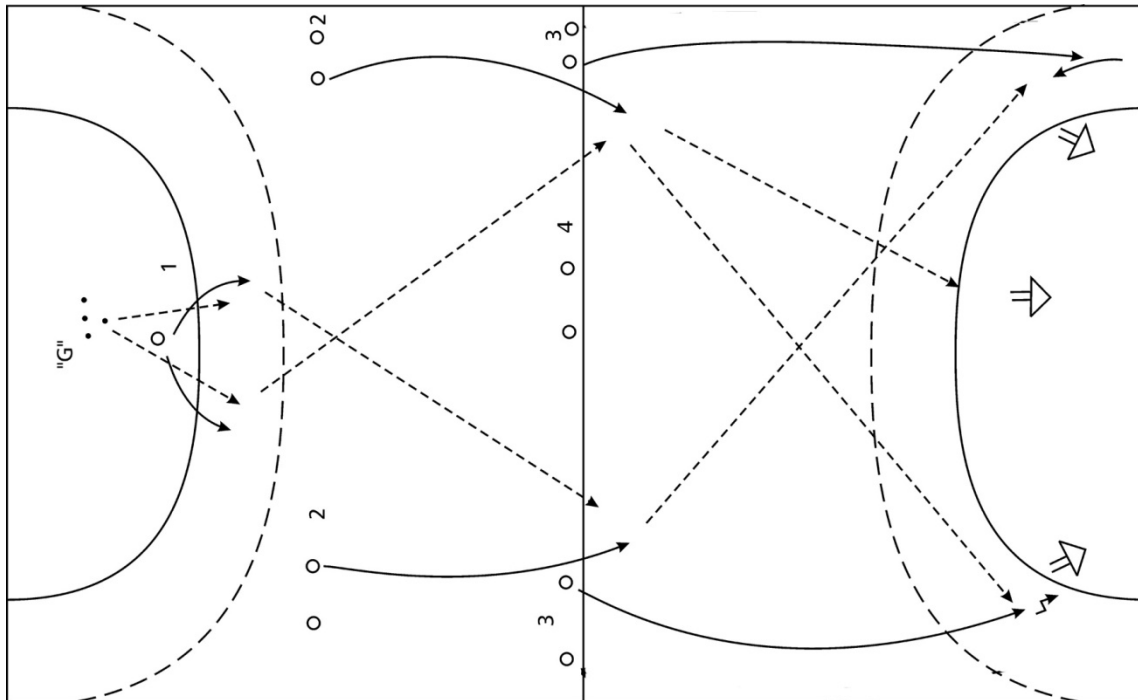


- diagonal passing

In this case wing player receiving the ball. This is very important because of variety in movement



After group counterattacks we have extension – collective counterattack



3) In collective counterattack we have three phases:

1. Wing and pivot go on their position
2. Backs go on the half of court
3. Player who receiving the ball

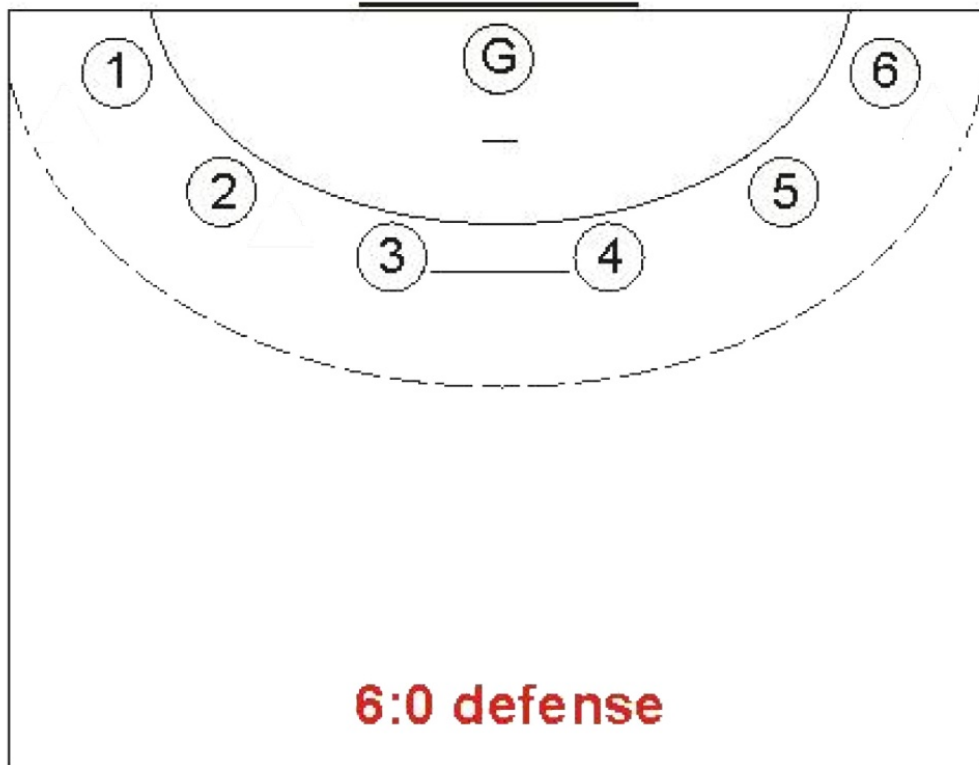
Depending on the defensive formation, depends on the system of counterattack and movement path of players and their tasks.

Prolonged counterattack

Prolonged counterattack is the extension of counterattack when the opponents back to defense but not organized yet. In that situation the teams have clear offensive tasks. This extension also requires a high rhythm of attack.

Counterattack from 6:0 zone defense

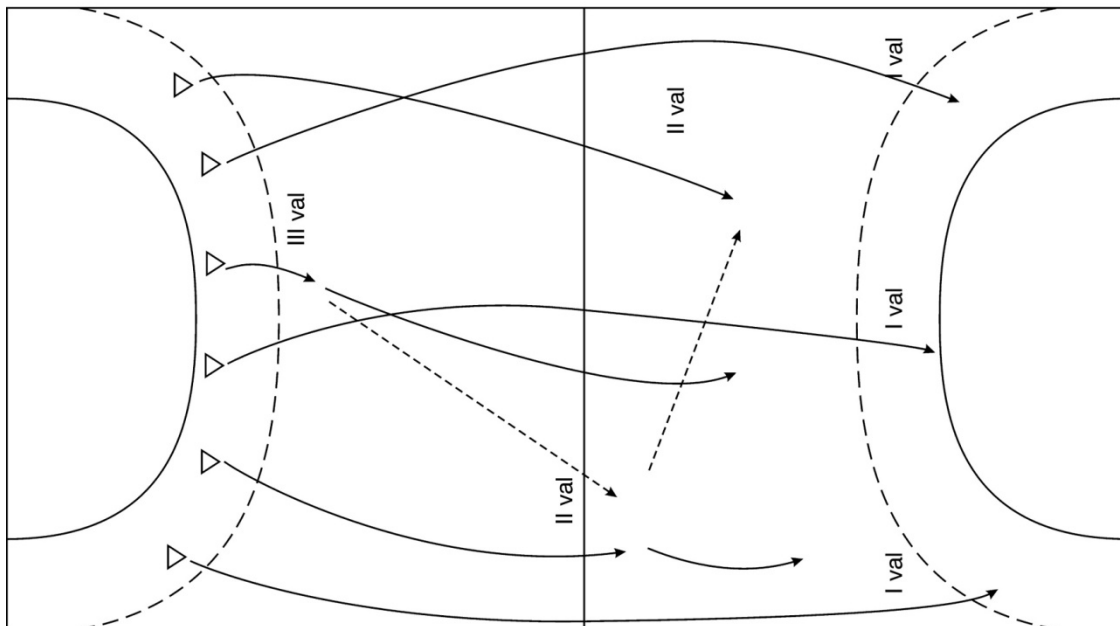
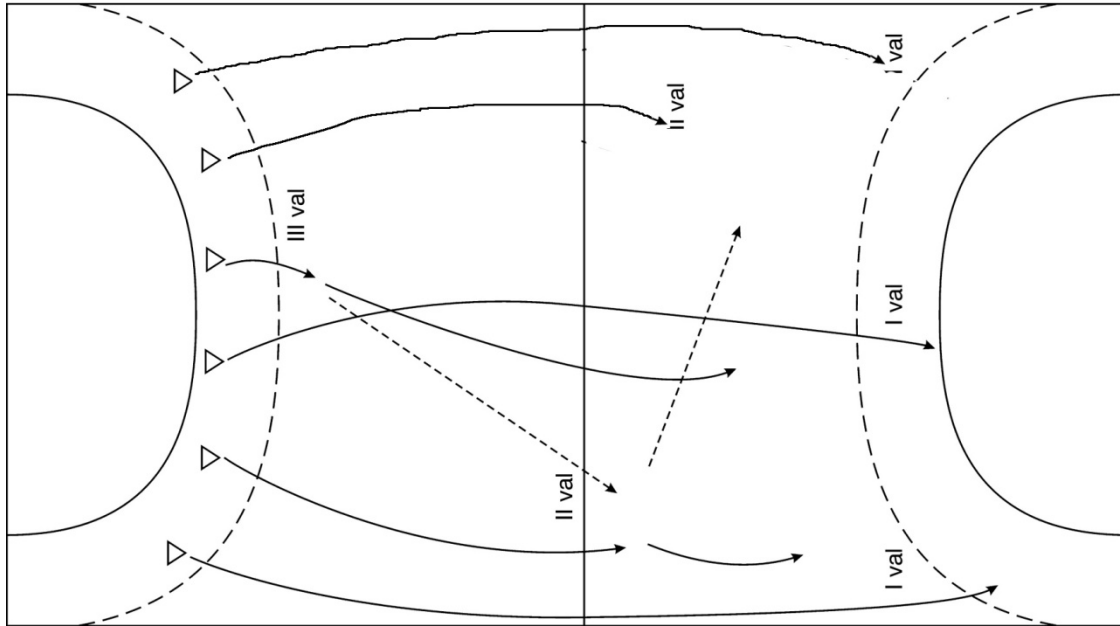
In this zone formation we have following players schedule:



- Position 1 and 6 are usually wings and they lead counterattack with pivot (position 3) who usually playing in the middle. They are the first phase.
- Second phase are usually two backs who playing in positions 2 and 5
- Third phase is player who receiving the ball usually central back, in this case position 4

That is the schedule of players in most teams.

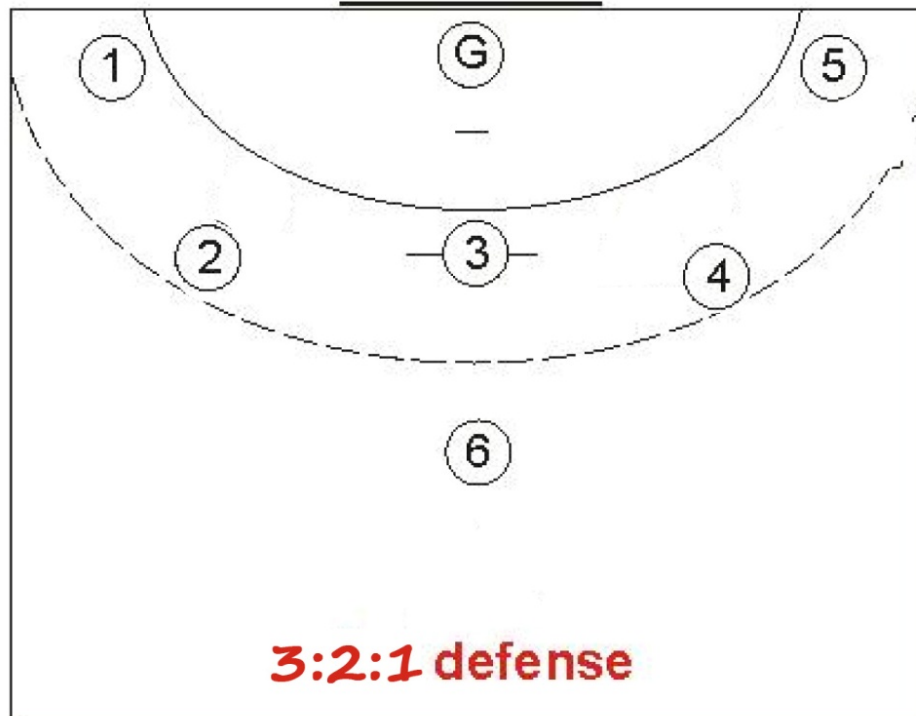
Today, modern skilled players can play more positions in defense, but they must to know path of movements. Also, must know the players who go on the counterattack immediately and which players make the space. Also must know the player who first receiving the ball. This is the important segment in development of counterattack.



In variety we have situation that the central back and wing change the position and in development of counterattack we have different movement.

Counterattack from 3:2:1 zone defense

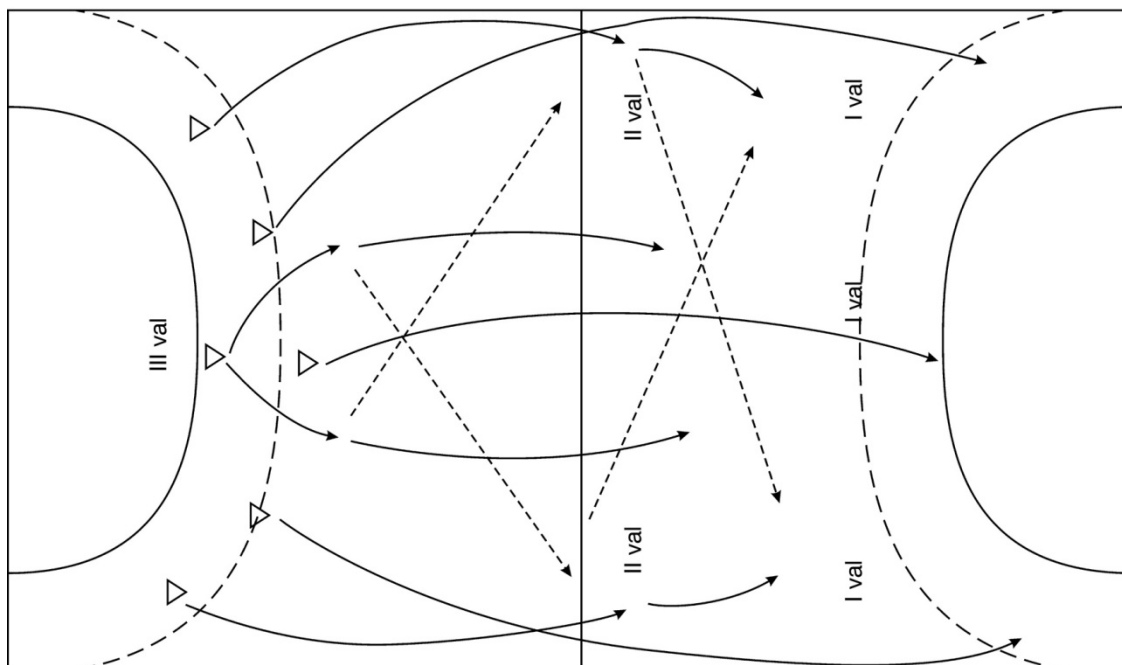
In this zone formation we have following players schedule:



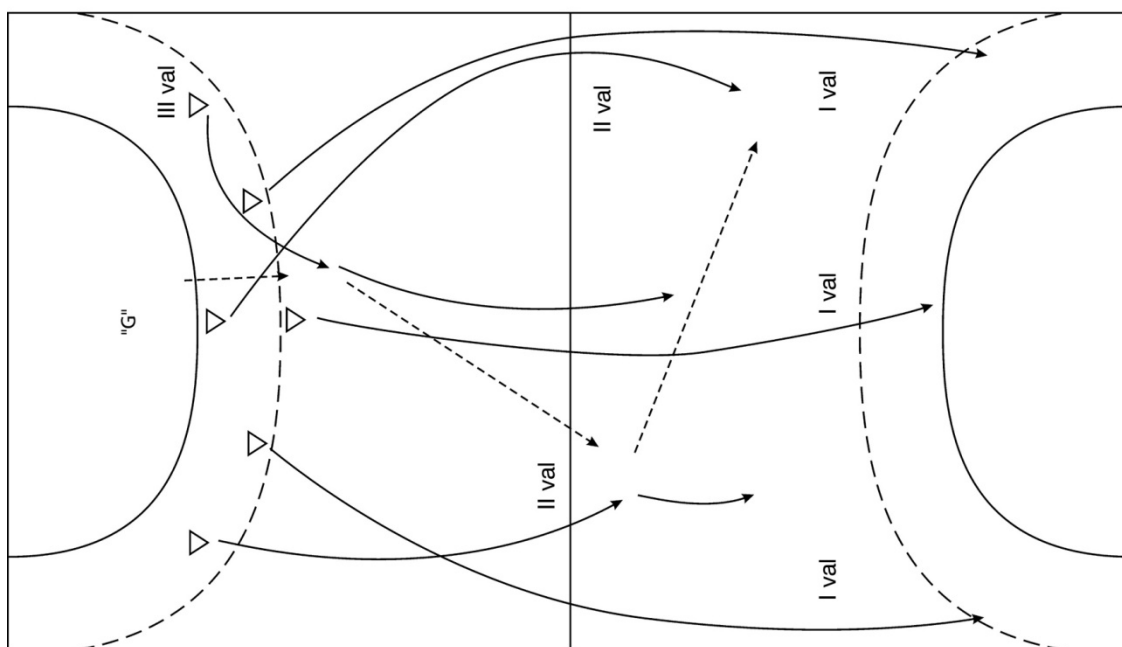
- Position 1 and 5 usually are backs like a position center half
- Halfs are usually wings
- Forward center is pivot

In this schedule

1. First phase: pivot and wings
2. Second phase: two back who go to the half of court
3. Third phase: center half who receiving the ball



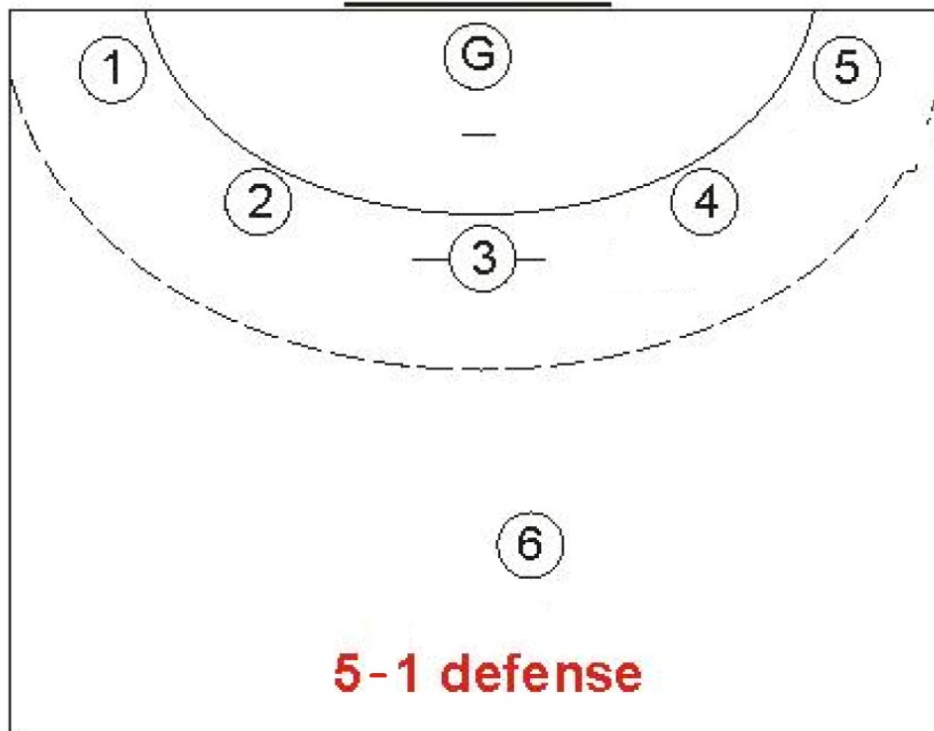
This is the formation is mostly used in this schedule of players. Zone defense formation depends of players' ability and tactical variation.



There are many variations in example wing in position forward centre and pivot in half position.

Counterattack from 5-1 zone defense

In this zone formation we have following players schedule:

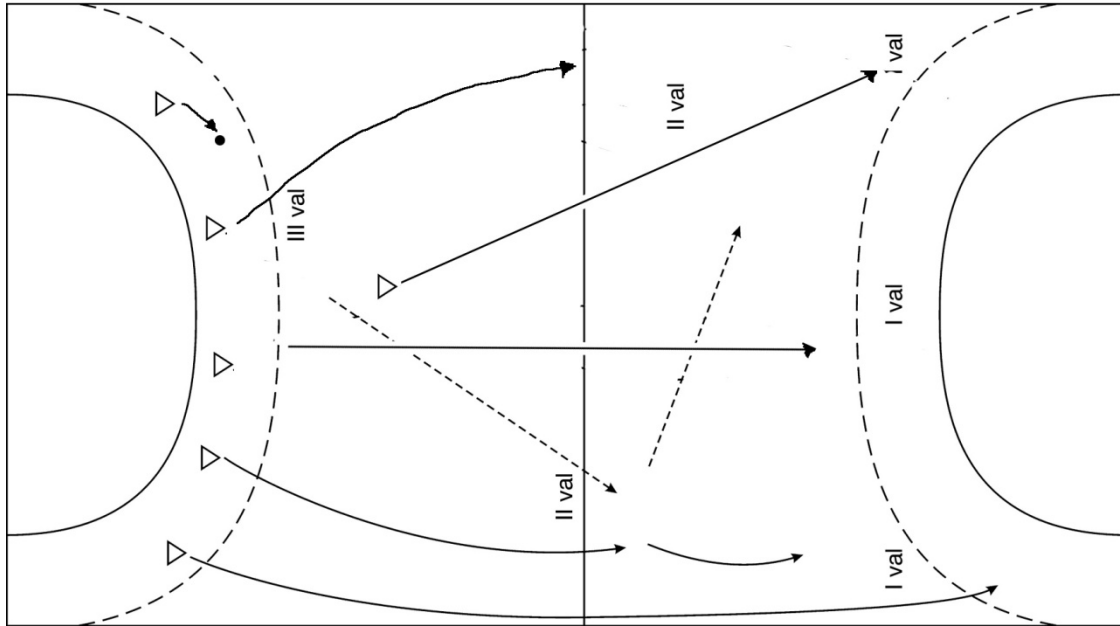


- in position forward center usually wing players
- in position 1 and 5 we have second wing and usually central back
- in the middle two back court players and pivot

Also all is depend of team and players that we have.

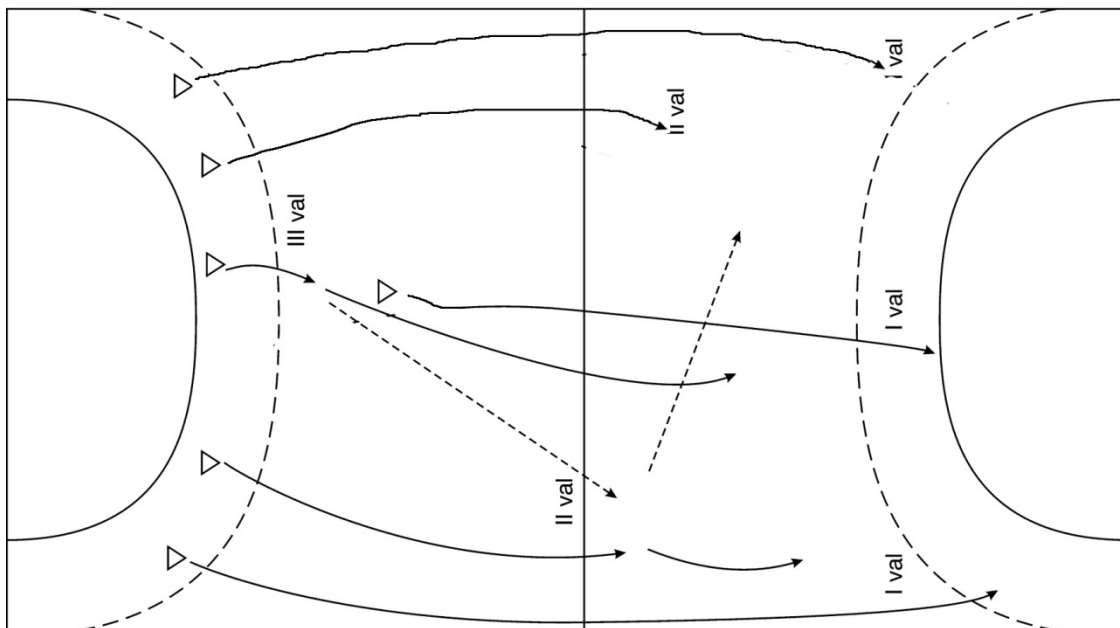
In this formation:

1. First phase: forward center, pivot, second wing
2. Second phase: two back court
3. Third phase: center back who receiving the ball



In formation when the pivot in position forward centre we have following situation in development of counterattack:

1. First phase: pivot and wings
2. Second phase: two back courts
3. Third phase: center back



RESULT AND DISCUSSION

Already stated that the counterattack was characteristic of quality teams where they develop counterattacks give special attention. Characteristics of such teams are that at any time since his arrival in possession of the ball, each player knows their tasks, the direction of movement to the finale and implementation. Teams are well coordinated patterns used depending on what the opposing zone formation and whether organized or unorganized defense. We have the situation when the defense completed but not enough organized. Then very important prolonged counterattack with prepared actions.

Precondition for the successful development of a counterattack is defense. With good and aggressive defense, frustrates the opponents attack, creates the possibility of making technical mistakes, this is faster ball possession and thus facilitate the realizations.

All these formations are different formations when it comes to the arrangement of players, as we have seen with the top teams in position forward center (3:2:1 zone defense) we can find one of back court players. This is one of the trend of modern handball – that the players be trained to play in several positions.

Goalkeeper role is a very important for develop on counterattack. He must throw the ball as soon as in the attack and his correlation with player who be first in ball possession, depend starting phase of counterattack.

This first player who receiving the ball also important because that is player who leads the rhythm, choose the direction and tactical variation.

If it happens the markings to be the first player to receive the ball must have a backup solution and what to do in this case and that the counter is still quick and efficient.

Important part of the development of counterattack is choice of directions, especially when the opposing team makes changes players attack -defense.

CONCLUSIONS

All of these formations in the development of counterattacks are just some of the basic principles. Given the importance of counterattack in everyday training process opens the possibility of innovative principles. It all depends on the capacity of the team and its performance. The teams that can respond to the tactical and technical tasks as well as physical well-prepared can be performed. Everything mentioned above suggests that teams with such top class features make them stand out from the rest.

Besides good defense is an important prerequisite for the overall development of counter-attack. As a good deterrent impact on the decline of morality as an attacking team with the successful implementation of a psychological counterattack and most importantly results dominance.

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INTERVAL TRAINING SPECIFIC TO HANDBALL AND TRAINING PROGRAMME DESIGNS

Murat BİLGE
TÜRKİYE

Summary

This present study aimed to understand about the condition trainings for handball must contain the nature of this branch. The branches' nature has to determine according to game duration, heart rate, working loads, running profiles, running distances and the specificities for the playing positions. The interval training programme examples given in this text applied to the young and the senior female / male handball players playing in their top divisions.

Keywords: Interval, Team Handball, Intermittent

Introduction

In many team sports strength, quickness, speed, agility, cardio respiratory fitness and repeated sprint ability have been shown to be important factors determining success, in addition to sport-specific technical and tactical skills (BUCHHEIT, 2010, p 153).

Team Handball is one of today's fastest and the most endurance required team sport and is epitomized by special manoeuvres such as jump shot under pressure, faking against hard defence players and attempting fast breaks despite all the fatigue (BILGE et al, 2010, p 154, STONE, 2007, p 2). Competitive team handball is an intermittent high intensity body contact team sports that requires a combination of aerobic and anaerobic fitness to perform a sequence of well-coordinated activities (CHELLY, 2011, p 2412; BUCHHEIT et al, 2009, p 252; BUCHHEIT & LEPRETTE, 2009, p 400; DELAMARCHE, 1987, p 56; RANNAU, 2001, p 350). Team handball places a heavy emphasis on sprinting, jumping and throwing (GOROSTIAGA, 2006, p 358). Motor ability, sprinting, jumping, flexibility and throwing velocity represent physical activities that are considered as important aspects of the game and contribute to the high performance of the team (ZAPARTIDIS et al, 2009, p 54).

When we look at the running profile of the handballers in a regular game, it was defined that the movement patterns and the sum of distance of these categories as standing still (0 km/h), walking (4 km/h), jogging (8 km/h), running (13 km/h), fast running (17 km/h), sprinting (24 km/h), sideways movement (10km/h) and backwards running (10 km/h) (MICHALSIK et al, 2011, p 169).

Effort during team handball is often described as long-term acyclical work, with an interval character, where energy is obtained both aerobically and anaerobically (ZWIERKO T. et al, 2008, p 69).

Max VO^2 improvements generally occur when a high percentage of VO^2_{peak} is elicited during exercise, the general goal of interval conditioning is to accumulate a greater training stimulus at high intensities compared to what can be tolerated in a single bout of continuous exercise (WENGER & BELL, 1986, p 349). The prescription of interval training is based on five variables: work interval intensity and duration, recovery interval intensity and duration and

total work duration. These variables can be manipulated to generate a large range of interval training prescriptions designed to primarily stress aerobic and/or anaerobic energy metabolism. Sufficient physiological data are now available to classify different types of aerobic interval training, ranging in intensity from %85 to %130 of the power or velocity associated with $\text{VO}_{2\text{peak}}^2$ (BILLAT, 2001, p 17).

When we look at the relationship between team handball physiological nature and interval training (both aerobic and/or anaerobic), we can see the importance of interval training is the one of the most important conditional factor in handball (BUCHHEIT, 2008, p 367).

The aim of this review was to describe the effects of high-intensity training on performance and to design interval training exercise examples (both aerobic and/or anaerobic) specific to team handball according to the literature.

Methods

Interval training is a type of discontinuous physical training that involves a series of low- to high-intensity exercise workouts interspersed with rest or relief periods. Because of the intermittent nature of this form of training, the exercise intensity and the total amount of work performed can be greater than with continuous training, making discontinuous training a versatile method that is widely used by athletes, as well as individuals with low cardiorespiratory fitness. This method is popular among athletes because it allows the athlete to exercise at higher relative intensities during the work interval than are possible with longer duration, continuous training. Interval training programs also can be designed to improve speed and anaerobic endurance, simply by means of modifications in the exercise intensity and length of the work and relief intervals (HEYWARD, 2006, p 106).

We can define as the interval training specific to handball in five parts:

1. Athletic performance must be taken under team handball requirements.
2. The loadings must be defined for the purpose of development of motor skills especially for handball performance.
3. Physiological changes must not turn back to normal levels between the repetitions.
4. Different recovery types must be used in the different loads (aerobic and/or anaerobic, extensive or intensive).
5. Load intensity – Work duration – Rest duration – Repetition and also total work must be designed according to the simulation of the handball match (BAECHLE, 2000, p 415; HEYWARD, 2006, p 107; STONE et al, 2007, p 267).

As the requirements of the athletic performance in the game, team handball is a complex intermittent sport game which requires players to have well developed aerobic and anaerobic capacities (DELAMARCHE, 1987, p 57; GOROSTIAGA, 2006, p 359). Several motor abilities such as sprinting, jumping, flexibility and different technical competences like passing, shooting, dribbling, faking, defencing or saving balls are considered as important aspects of the game that contribute to the high performance of the team (GRANADOS, 2007, p 853, MARQUEZ, 2006, p 567, MARCZINKA, 1993, p 112, CLANTON, 1997, p 2). Zapartidis (2007) pointed that the importance of $\text{VO}_{2\text{max}}$ in terms of distinguishing young handball players according to their level. Depending on the level of competition and the playing position, players usually cover a distance between 4,5 – 6,5 km/h and require high level of aerobic capacity to aid recovery after high intensity periods of activity. On the other

hand, he stated that a number of differences in anthropometric and physical fitness characteristics exist between playing position.

When we look at the nature of handball's energy consumption, the metabolic demands of modern handball involve the aerobic and anaerobic energy pathways. As supportive evidence, during a Handball match, players perform 190 rhythm variations, 279 changes of direction, 16 jumps and also an handball players performs a total of 485 high-intensity movements in 60 minutes (EHF Documents 2004, p 1-12).

These studies support the idea of Handball as an intermittent activity. This intermittent activity is determined by high-intensity motion (with energy mostly furnished by ATP-PC and anaerobic pathways) and low intensity motion (in which the aerobic pathways have the function of active recovery).

About 170 players were monitored with cameras from the top of the sport halls during nine games of the 2007 Men's World Cup in Germany using a computer based match analysis system. The recorded player trajectories delivered information about total distances covered and individual motion velocities of the players. By defining four categories of intensity (walking: 0 - 1.5 m/s, slow running: 1.6 - 4.0 m/s, fast running: 4.1 - 6.0 m/s, and sprinting: > 6 m/s), we were able to analyse a differentiated motion profile according to player position (LUIG, 2008). Mean time of player's action was 32.11 ± 15.34 min. Wing players (37.37 ± 2.37 min) and goalkeepers (37.11 ± 3.28 min) had significantly higher shares ($p < 0.05$) of playing time than backcourt players (29.16 ± 1.70 min) and pivot players (29.37 ± 2.70 min). Mean distance that players covered was 2938.5 ± 1403.9 m per match (range: 234 - 6490 m). According to player position wing players (3710.6 ± 210.2 m) covered a highly significant greater total distance ($p < 0.01$) than backcourt players (2839.9 ± 150.6 m) and pivot players (2786.9 ± 238.8 m), whereas goalkeepers (2058.1 ± 290.2 m) covered the lowest total distance as compared to all other groups ($p < 0.01$). The total distances covered by field players during a match consisted of $34.3 \pm 4.9\%$ walking, $44.7 \pm 5.1\%$ slow running, $17.9 \pm 3.5\%$ fast running and $3.0 \pm 2.2\%$ sprinting (LUIG, 2008).

As a result for women handball, Mean HR during the match was about 86% of HRmax. For more than 90% of playing time it was higher than 85% of HRmax in 25 elite handball players from Germany (n=11) and Norway (n=14) of different positions (3 goalkeepers (GK), 12 back, 10 wing and pivot (field players - FP) agreed to participate (age: 25.2 ± 2.8 years; height: 175.2 ± 6.3 cm; weight: 67.8 ± 4.9 kg.; VO2max: 53.1 ± 4.8 ml/min/kg; HRmax: 194.8 ± 5.2 1/min, V4: 3.62 ± 0.25 m/s). During the 1st half of the matches, players stayed in higher intensities with mean heart rates higher than 95% of HRmax for a longer time period as compared to the 2nd half of the match. Mean run distance during the match was 4614 m and varied widely between 2066 m (GK) and 5251 m (FP). Accordingly, also mean run distance per minute varied in a remarkable manner between 31.3 m/min (GK) and 69.7 m/min (FP). Differences in acceleration categories among some field players might indicate some position-specific patterns. Especially wing players had a high variability in their movement patterns. Individual endurance capacity (VO2max and V4) determined the individual demands during the matches: players with a high level of VO2max were able to execute activities with a higher velocity as compared to players with a lower level of VO2max, with the same level of cardiac load (no differences in HR and %HRmax). At the same time, players with a higher VO2max mainly stayed in aerobic metabolic intensity categories during the match (MANCHADO C. et al, 2008).

When we compare the same parameter's results of this two studies (LUIG and MANCHADO), we can see a difference between men and women's running distance per game.

Table 1. Running Distance Profile Between Men and Women

RUNNING DISTANCE (m)	MEN HANDBALL (LUIG)	WOMEN HANDBALL (MANCHADO)
Mean Run. Distance	2938.5 ± 1403.9 (234 – 6490)	4614
Wing Players	3710.6 ± 210.2	As field players 5251
Back Court Players	2839.9 ± 150.6	
Pivot Players	2786.9 ± 238.8	
Goalkeepers	2058.1 ± 290.2	2066

Additionally to women handball, to determine the physical demands in a handball match for Danish female elite players as well as to clarify any possible differences arising from different playing positions, 24 Danish female elite handball field-players (25.7±3.3 years, 174.9±5.7 cm and 70.3±7.4 kg) were examined over a four-year period from 2002 to 2006. The players were divided into three categories for both attack and defence, namely wing players (WP), circle runners (CR) and backs (B). In addition, the heart rate was continuously monitored. A treadmill test was carried out in order to find the individual correlation between heart rate frequency and oxygen uptake. Furthermore, a Yo-Yo intermittent recovery test was performed on a separate day. The average maximal aerobic power for female elite handball players was 47.5 ml O₂/min/kg. The average physical load during match play was found to be 79 % of VO₂-max. A mean total distance of 4.0 km was covered per match and up to 700 changes of activity were observed on the basis of eight categories of the locomotive analysis. The high, intense work of quick runs (0.7 %) and sprints (0.1 %) constituted a total of approximately 1 % of effective playing time. Each player had an average of 27 high intense play actions per match. There were a number of marked differences in both the locomotive and the technical analysis and in the practical, physical test between the various playing positions. A mean total distance of 4.0 km was covered per match with an average physical load during match play corresponding to 79 % of VO₂-max. A game consists of up to 700 activity changes with an average of 27 high intense play actions per match. There are distinct differences in the physical demands in the various playing positions, where wing players do more high intense work, cover a greater running distance, and do less tackles compared to backs. (MICHALSIK, 2008).

Development

After all these data's from handball literature, we can improve some interval training programme examples especially for handball.

Literature Examples For All Sports

- Interval training is necessary to enhance speed or anaerobic endurance.
- Sprint activities of a few seconds require a higher power output than longer duration sprints of 1 to 2 minutes.
- Trainings need to be related to both the distance and the duration of the activity performed in the particular sport.

- It is important to differentiate between “quality” sprint training for maximal speed and “quantity” sprint conditioning for speed endurance and improvement of lactic acid buffering capacity.
- Interval training workouts should be performed 1 to 5 days per week depending on the sport and the training cycle (FLECK, 2004, p 139).

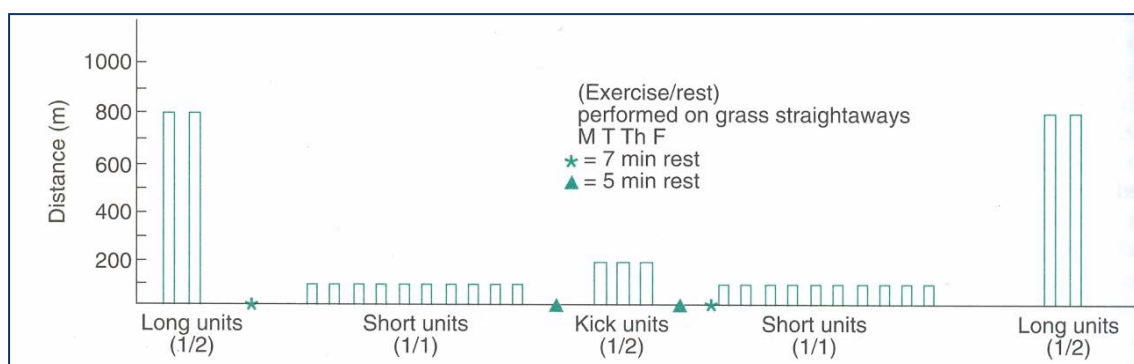


Figure 1. An Anaerobic Interval Training Design (FLECK, 2004, p 140)

Table 2. General Guidelines for Interval Training (FLECK, 2004, p 140)				
Exercise Duration (min:s)	% Intensity	Recover (min:s)	Number of Intervals	Sessions Per Week
0:05	100	0:05	20-30	2-4
0:10	100	0:10	20-30	2-4
0:20	100	0:15	10-20	2-4
0:30	100	1:00 – 2:00	8-18	2-4
1:00	95-100	3:00 – 5:00	5-15	2-4
2:00	95-100	5:00 –15:00	4-10	2-4
3:00	80-90	5:00 –15:00	3-8	2-4

Stone et al classified the interval trainings as follows (STONE et al 2007, p 267):

Extensive Interval Training

- Relative intensity: low – medium (% 60-80 competitive speed / power)
- Duration / distance: short – medium (e.g., 14-180 s over 100-1000 m running distance for advanced athletes; 17 – 100 s over 100-400 m running distance for novices)
- Volume: large (e.g., 8-40 reps for advanced athletes; 5-12 reps for novices)

- Session density: high; short incomplete relief interval allowing heart rate to recover to 125-130 bpm for advanced athletes or 110-120 bpm for novices (i.e., $< 1 / 3$ the time needed for complete recovery; 45-90 s for advanced athletes, 60-120 s for novices, respectively) (STONE et al 2007, p 267).

Intensive Interval Training

- Relative intensity: high (% 80-90 competitive speed / power)
- Duration / distance: short (e.g., 13-180 s over 100-1000 m running distance for advanced athletes; 14 – 95 s over 100-400 m running distance for novices)
- Volume: small (e.g., 4-12 reps for advanced athletes; 4-8 reps for novices)
- Session density: medium; longer but still incomplete relief interval allowing heart rate to recover to 110-120 bpm (e.g., 90-180 s for advanced athletes, 120 – 240 s for novices)- advanced athletes can use “intermittent exercise” (e.g., 10 s max effort followed by 15 s of submax at %50 effort, performed in sets) (STONE et al 2007, p 267).

The principle of repetition is used in all methods except the method of continuous training. The principle of summation is used in the interval method and the method of intermittent training. The ratio determines the main energy mechanism, influenced by the interval method (Table 3).

Table 3. Variant for the interval method for influence of Different Energy Mechanism in Athletes (VIRU, 2000, p 245)

Main mechanism for ATP resynthesis	Time of each running set	Repetitions per training sessions	Sets per training sessions	Reps per set	Running to rest (relief) ratio	Type of relief
PC Mechanism	10 s	50	5	10	1:3	Rest relief
	15 s	45	5	9		Walking,
	20 s	40	4	10		Flexing
	25 s	32	4	8		
PC + Anaerobic Glycogenolysis	30 s	25	5	5	1:3	Work relief
	40-50 s	20	5	5	1:3	(Light to mild jogging)
	60-70 s	15	3	5	1:2	
	80 s	10	2	5	1:2	
Anaer. Gly. + oxidative phosphorylation	1:30-2 min	8	2	4	1:2	Work relief
	2:10-2:40 min	6	1	6	1:1	Rest relief
	2:50-3 min	4	1	4	1:1	
Oxidative phosphorylation	3-4 min	4	1	4	1:1	Rest relief
	4-5 min	3	1	3	1:0,5	

The area of the action of the principle of duration is not only the method of continuous training, but also the method of intermittent training, the interval method. A way of using the principle of duration is performance of exercise up to exhaustion. In these exercise intensity is usually prescribed. In cases of so called tempo training not only the exercise intensity, but also the distance or performance time is prescribed (VIRU, 2000, p 243).

Literature Examples For Handball

Pori et al, analysed response of the players in some physiological and loading variables on different intense interval “fast-break and quick retreat” exercise in Team handball. They found that the physiological response of players during the interval “Fast-break with quick retreat” 3 versus 3 is the most closely related with the results of similar studies, made on the sample of the team handball players during the handball matches (Figure 2) (PORI et al, 2010, p 101).

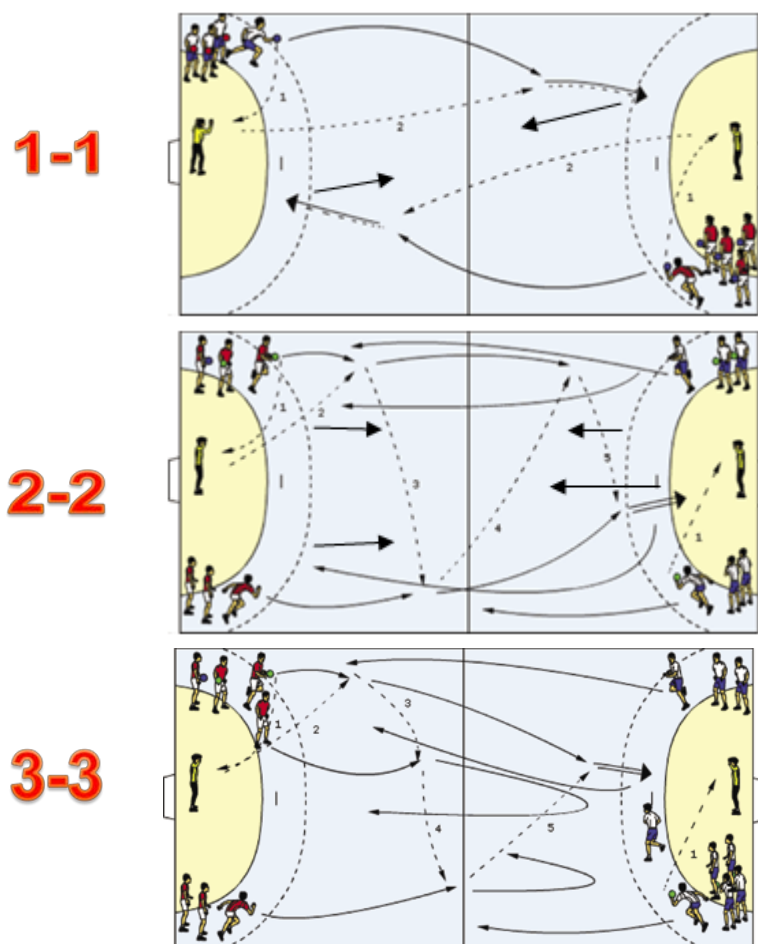


Figure 2. Fastbreak drills with quick retreat 1 versus 1, 2 versus 2 and 3 versus 3 (PORI et al, 2010, p 104).

Buchheit et al compared the effects of speed/agility (S/A) training with sprint interval training (SIT) on acceleration and repeated sprint ability (RSA) in well-trained male handball players. They found that S/A training produced a very likely greater improvement in 10-m sprint (+4.6%, 90% CL 1.2 to 7.8), best (+2.7%, 90% CL 0.1 to 5.2) and mean (+2.2%, 90% CL – 0.2 to 4.5) RSA times than SIT (all effect sizes [ES] greater than 0.79). In contrast, SIT resulted in an almost certain greater improvement in VIFT compared with S/A (+5.2%, 90% CL 3.5 to 6.9, with ES = –0.83). As their result in well-trained handball players, 4 week of SIT is likely to have a moderate impact on intermittent endurance capacity only, whereas S/A training is likely to improve acceleration and repeated sprint performance (BUCHHEIT et al, 2009, p 152). Table 4 shows their training programme according to the study.

Table 4. Training contents for each training group (BUCHHEIT et al, 2009, p 155)

Week	Speed/Agility Training	Sprint Interval Training
0	Field tests	
1	3 × (10-m sprint + 2 × agility drills + 5-m shuttle sprint), r = 30 s and R = 3 min	3 × all-out 30 s (r = 2 min)
2	4 × (10-m sprint + 2 × agility drills + 5-m shuttle sprint), r = 30 s and R = 3 min	4 × all-out 30 s (r = 2 min)
3	4 × (2 × 10-m sprint + 2 × agility drills + 2 × 5-m shuttle sprints), r = 30 s and R = 3 min	5 × all-out 30 s (r = 2 min)
4	3 × (10-m sprint + agility drills + 5-m shuttle sprints), r = 30 s and R = 3 min	3 × all-out 30 s (r = 2 min)
5	Field tests	

Note. r = between-repetition recovery, R = between-set recovery.

Meckel et al worked on 20 elite handball players and they evaluated the effect of different types of sprint interval sessions. Exercise consisted of increasing distance (100 m, 200 m, 300 m, 400 m) and decreasing distance (400 m, 300 m, 200 m, 100 m) sprint interval runs on a treadmill (at random order), at a constant work rate of 80% of the personal maximal speed (calculated from the maximal speed of a 100 m run). The total rest period between the runs in the different interval sessions were similar (Figure 3). Their results suggest that despite the fact that running distance, running speed, and rest periods were similar in both training protocols, the metabolic demands and the anabolic response to the decreasing distance protocol is significantly greater compared with the increasing distance protocol. These data should raise the awareness of coaches and athletes that different types of interval training lead to different metabolic demands and hormonal responses, and as a consequence to the need of adapting specific modes of recovery to each type of training (MECKEL et al, p 2161-9).

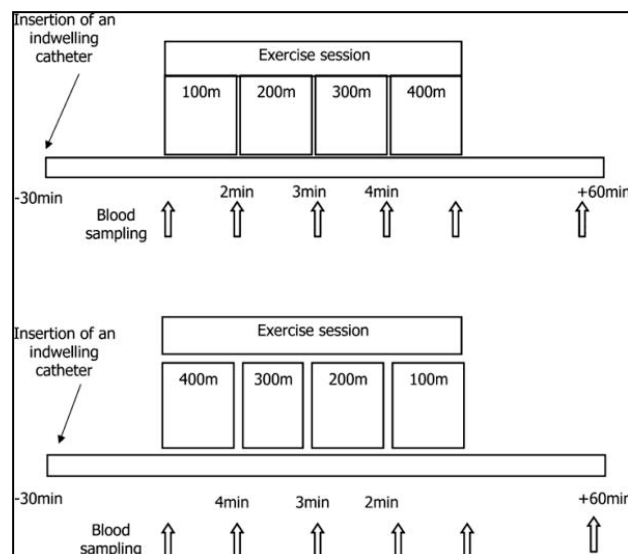


Figure 3. The exercise protocol and blood sampling procedure of the study (MECKEL et al, p 2165).

After 20 m shuttle run test, a new test considered as more effective especially in team sports, 30-15 intermittent fitness test (30-15_{IFT}) was used since 2000. 30-15_{IFT} consists of 30 s shuttle runs interspersed with 15 s passive recovery periods. Velocity is increased by 0,5 km/h every 45 s stage thereafter. The 30-15_{IFT} is performed over a 40 m shuttle distance (handball court), within which the athlete has to run back and forth at a pace governed by a pre-recorded beep, so that each short beep sound the athlete should be within 3 m zones at each extremity or in the middle of the court. During the 15 s recovery period, athletes walk in the forward direction to join the closest line from where they will start the next stage from a standing position. Exhaustion is defined as the inability to match the covered distance with the audio signal on three consecutive occasions (BUCHHEIT, 2009, 2010).

30-15_{IFT} applied in different branches in different countries, also both women and men (Table 5, Figure 4-5).

Table 5. 30-15_{IFT} applied in different branches in different countries (BUCHHEIT, 2010).

EVENT	COUNTRY	TEAM S
Football	UK, Italy, Germany,, Belgium, Qatar, Canada, USA, Australia	- Lille - National Centre in Clairefontaine - Many other clubs in all divisions
Basketball	USA, Thailand France	- Strasbourg Pro A, - Federal center in the INSEP - Men French National Team
Handball	France (All categories, levels, males and females) Germany,, Belgium, Greece, Tunisia, Qatar, Croatia, Romania, Poland	
Tennis		INSEP Ex-team Legendere
Rugby	Australia, UK, Ireland Australia	Top 14
AFL		
Netball	Australia, New Zealand	
Field Hockey	England National Teams,,	
Judo	France	French training center in Strasbourg
Badminton		INSEP
Futsal		
More popular within schools	Because of intermittent nature, Physiological appropriate for children and adolescents Less painful for untrained population	

Buchheit, 2010

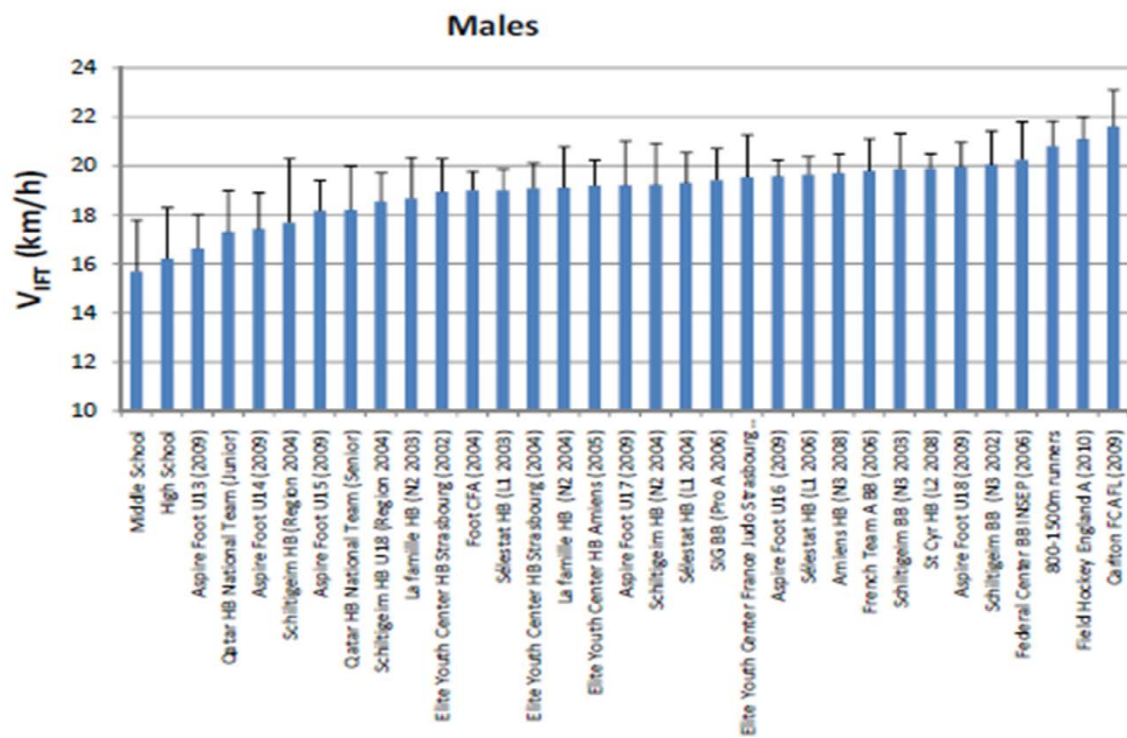


Figure 4. 30-15_{IFT} applied in males (BUCHHEIT, 2010).

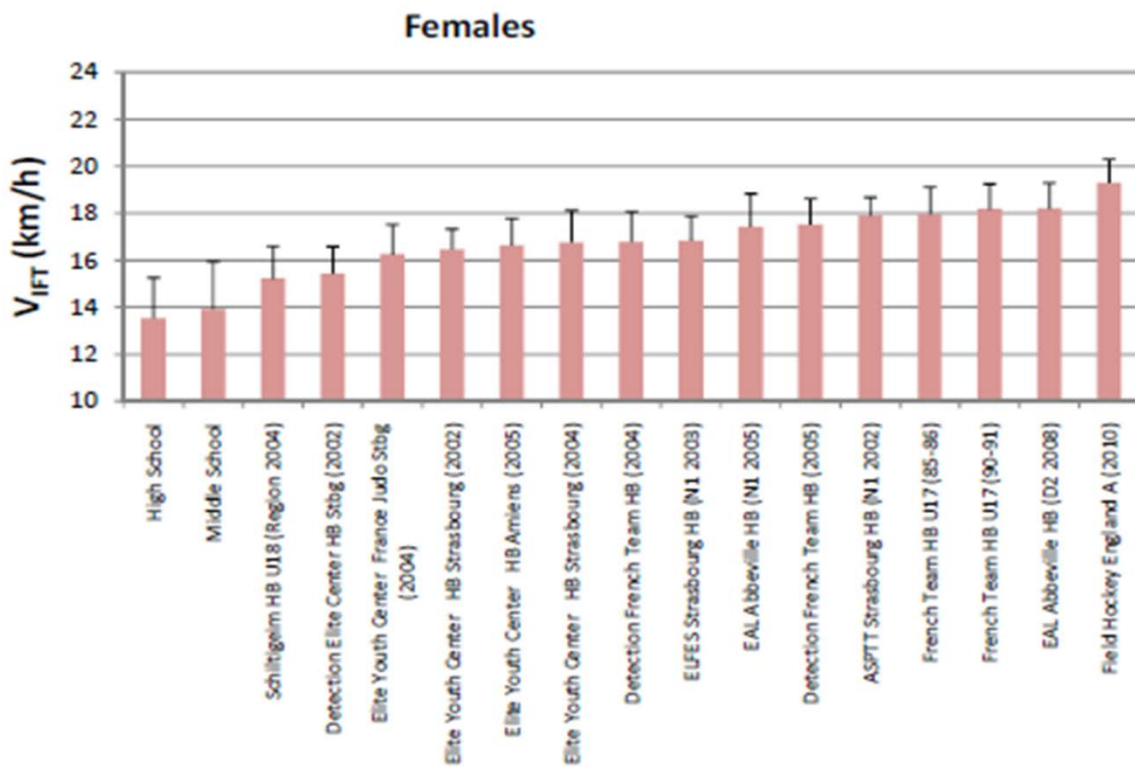


Figure 5. 30-15_{IFT} applied in females (BUCHHEIT, 2010).

Interval Training Designs

1. Low Intensity Interval Training (VOCK 2012) (Figure 6)

60 s jumping rope + 30 s isometric strength + 30 s dynamic strength (core training)
12 repetititon = 24 min

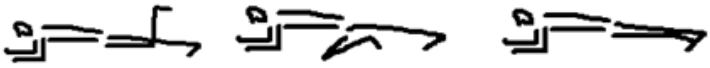
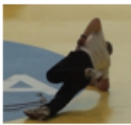
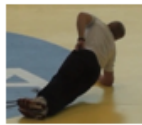
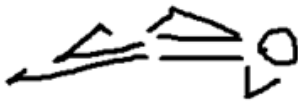
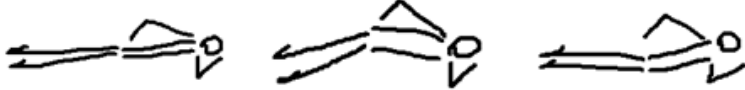
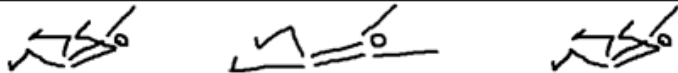
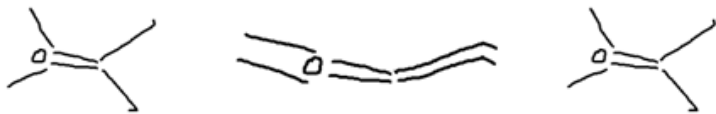
Exer.	Izometric Strength(30 s)	Dynamic Strength (Core Training) (30 s)	
1.			
2.	Other leg of 1. exercise		
3.			
4.	Other leg of 3. exercise		
5.			
6.		 Other side of 5. exercise	
7.			
8.	Other leg of 7. exercise		
9.			
10.	Other leg of 9. exercise		
11.			
12.	Lie on the floor open arms-legs, open and close		

Figure 6. LIIT Sample 1 (VOCK 2012)

2. Low Intensity Interval Training (VOCK 2012)

- WARMING UP (AGILITY LADDER)
- 12 repetitions (20 s – 80 m tempo) – 40 s rest
- 12 repetitions (18 s – 80 m tempo) – 42 s rest
- 12 repetitions (16 s – 80 m tempo) – 44 s rest
- TOTALLY 40 min

3. Middle Intensity Interval Training (Murat Bilge)

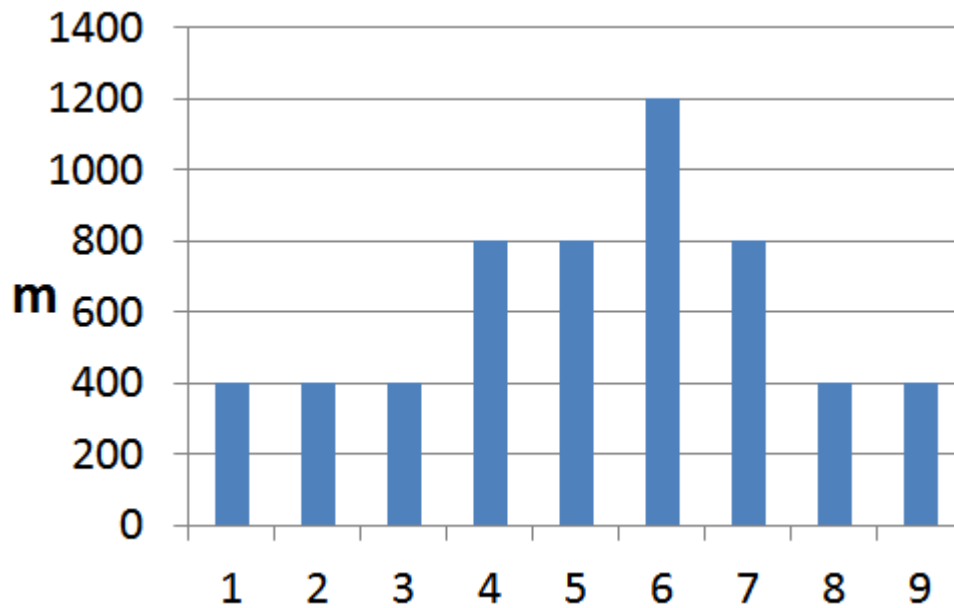


Figure 7. MIIT Sample 3 (Murat Bilge)

4. Middle Intensity Interval Training (Murat Bilge)

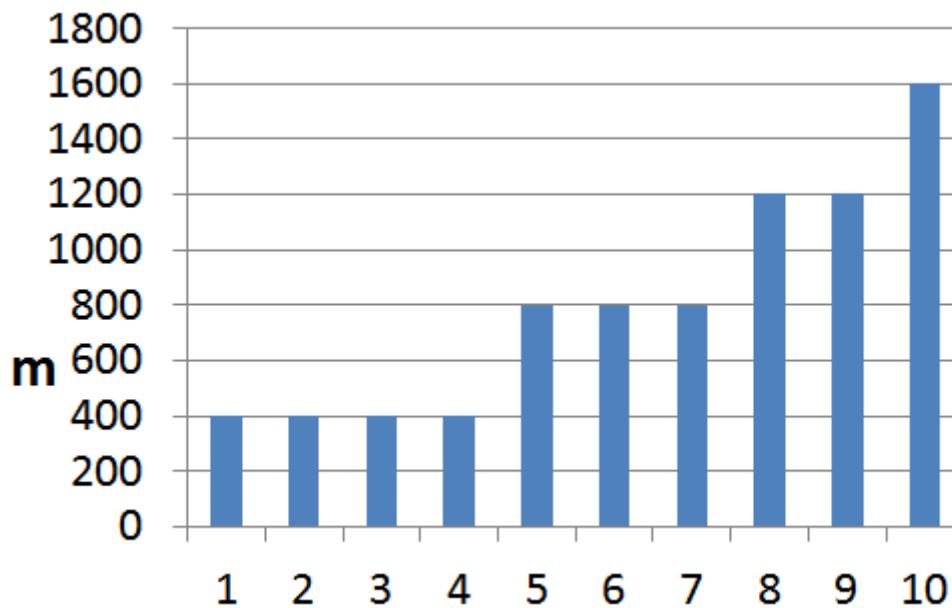


Figure 8. MIIT Sample 4 (Murat Bilge)

5. Middle Intensity Interval Training (Murat Bilge)

All players are in three groups and they stand on the 6 m lines (2 of them stand on one side with the ball, one of them stand on the other side, Figure 9) (Murat Bilge)

- 6 m line to the other 6 m line
- 60 s dribbling
- 60 s 3 times dribble and basic pass to partner
- 60 s 2 times dribble and basic pass to partner
- 60 s 1 times dribble and basic pass to partner
- 90 s put the ball to the 6 m line, run to the middle and receive the ball from the partner, the pas the ball to the other partner.
- 90 s put the ball to the 6 m line, run to the other 6 m line and try to interrupt the fast break pas.
- Totally 7 min x 2 or 3 sets
- 1 / 3 load / rest ratio

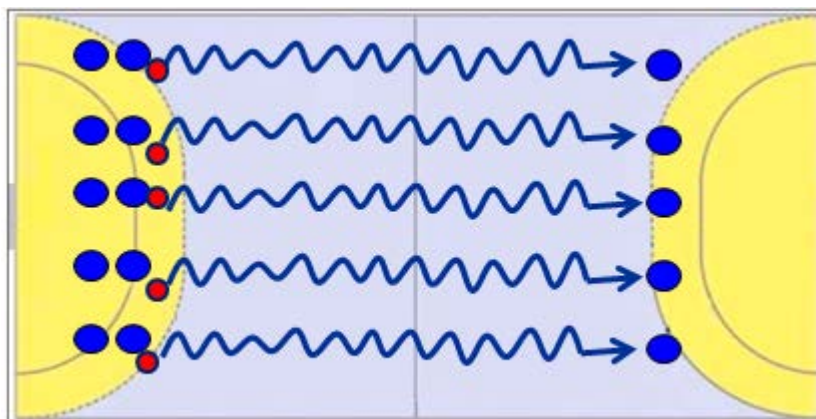


Figure 9. MIIT Sample 5 (Murat Bilge)

6. High Intensity Interval Training (Murat Bilge)

- WARMING UP (AGILITY LADDER)
- 30-15_{IFT} to the 14th level (to the ~5 m / s speed)
- 12 repetitions (20 s – 80 m tempo) – 40 s rest (4 m / s speed)
- 12 repetitions (30 s – 120 m tempo) – 30 s rest (4 m / s speed)
- TOTALLY ~ 35 min Anaerobic Interval Training (Murat Bilge)

7. High Intensity Interval Training (Murat Bilge)

All players are in double groups and they stand on the 6 m lines (2 couple of them stand on one side with the ball, one couple of them stand on the other side, Figure 10) (Murat Bilge)

- 6 m line to the other 6 m line
- 8 repetition 28 m passing and change
- 5 repetition 84 m (28 m x 3 times) passing and change
- 3 repetition 140 m (28 m x 5 times) passing and change
- 5 repetition 84 m (28 m x 3 times) passing and change
- 8 repetition 28 m passing and change
- ~ 14-17 min loading x 2/or 3 sets Anaerobic Interval Training (Murat Bilge)
- 1 / 3 load / rest ratio

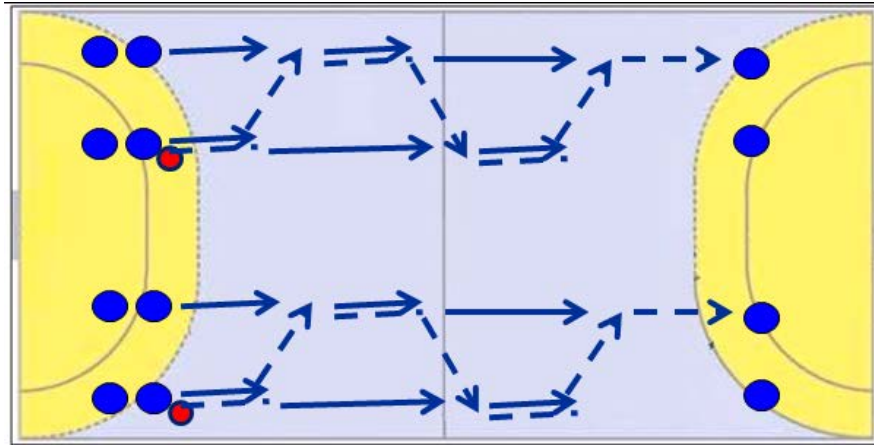


Figure 10. HIIT Sample 7 (Murat Bilge)

8. High Intensity Interval Training (Murat Bilge)

- WARMING UP (AGILITY LADDER)
- Sprinting front and backward between 6 m – 9 m (a) 16 times
- 3 m side stepping with tempo (e) 16 times
- Sprinting front and backward between 6 m – 12 m (b) 12 times
- 6 m side stepping with tempo (f) 8 times
- Sprinting front and backward between 6 m – center (c) 8 times
- 3 m side stepping with tempo (e) 16 times
- Sprinting front and backward between 6 m – 6 m (28 m) (d) 4 times
- 6 m side stepping with tempo (f) 8 times
- ~ 20 min x 2 set (the programme can be performed pyramidal)
- Between drills players can jog as resting.

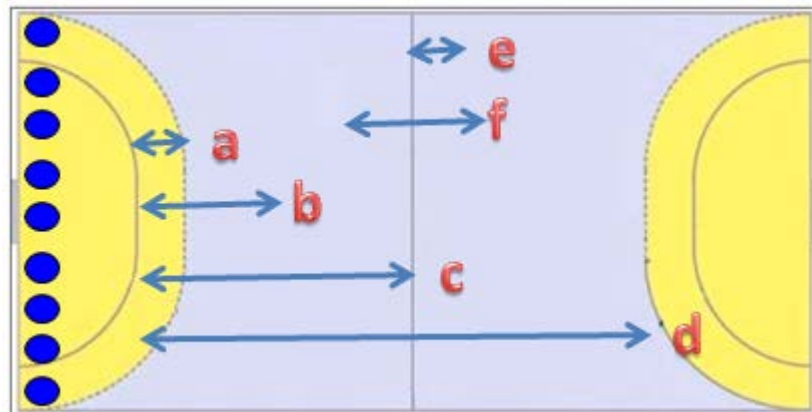


Figure 11. HIIT Sample 8 (Murat Bilge)

9. High Intensity Interval Training With Handball Techniques According to the Playing Positions (Murat Bilge)

1. 30-15_{IFT} to the 7th level with dribbling (for young / amateur players) or 30-15_{IFT} to the 10th level with dribbling (for senior / professional players) (Table 6)
2. 30-15_{IFT} to the 7 – 14th level with basic passing(for young / amateur players) or 30-15_{IFT} to the 20th level with dribbling (for senior / professional players) (Table 6)

- 10 handball court (400 m) with 5 m / s speed tempo (Totally 100 s) for wing and line players. (Table 7)
- 20 semi handball court (400 m) with 5 m / s speed tempo (Totally 100 s) for back court players. (Figure 12)
- Goalkeepers get ready for shooting while the court players running.
3. 10 jumping shoot from 6 m by faking after double pass (for wing and line players) (Figure 13).
10 jumping shoot from 9 m by faking after double pass (for back court players) (Figure 13).
 4. 8 handball court (320 m) with 4,5 m / s speed tempo (Totally 72 s) for wing and line players. (Table 7)
16 semi handball court (320 m) with 4,5 m / s speed tempo (Totally 72 s) for back court players. (Figure 12)
 5. 8 jumping shoot from 6 m by faking from other side after double pass (for wing and line players) (Figure 13).
8 jumping shoot from 9 m by faking from other side after double pass (for back court players) (Figure 13).
 6. 6 handball court (240 m) with 4 m / s speed tempo (Totally 48 s) for wing and line players. (Table 7)
12 semi handball court (240 m) with 4 m / s speed tempo (Totally 48 s) for back court players. (Figure 12)
 7. 6 jumping shoot from 6 m by reversing after double pass (for wing and line players) (Figure 13).
6 standing shoot from 9 m by faking after double pass (for back court players) (Figure 13).
 8. 4 handball court (160 m) with 3,5 m / s speed tempo (Totally 28 s) for wing and line players. (Table 7)
8 semi handball court (160 m) with 3,5 m / s speed tempo (Totally 28 s) for back court players. (Figure 12)
 9. 4 jumping shoot from 6 m by reversing from other side after double pass (for wing and line players) (Figure 13).
4 standing shoot from 9 m by faking from other side after double pass (for back court players) (Figure 13).
 10. 2 handball court (80 m) with 3 m / s speed tempo (Totally 12 s) for wing and line players. (Table 7)
4 semi handball court (80 m) with 3 m / s speed tempo (Totally 12 s) for back court players. (Figure 12)
 11. 2 fast break shoot after long running (for wing and line players).
2 fast break shoot after short running (for back court players).
 12. Cool Down

- ~ 60 min Anaerobic Interval Training With Handball Techniques

According to the Playing Positions (Murat Bilge)



Figure 12. HIIT Sample 9 Shuttle Run Ways (Murat Bilge)

Table 6. HIIT Sample 9 30-15_{IFT} (Level – Duration – Speed) (Murat Bilge)

LEVEL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DURATION	45 s	1:30	2:15	3:00	3:45	4:30	5:15	6:00	6:45	7:30	8:15	9:00	9:45	10:30	11:15	12:00	12:45	13:30	14:15	15:00
SPEED	8 km/h	8,5 km/h	9 km/h	9,5 km/h	10 km/h	10,5 km/h	11 km/h	11,5 km/h	12 km/h	12,5 km/h	13 km/h	13,5 km/h	14 km/h	14,5 km/h	15 km/h	15,5 km/h	16 km/h	16,5 km/h	17 km/h	17,5 km/h

Table 7. HIIT Sample 9 Running Sets (Distance – Speed – Total Load) (Murat Bilge)

HIIT with Handball (M. Bilge)				TOTAL DISTANCE / LAP TIMES (m / s)																			
Set	Total	Distance	Speed	20 m	40 m	60 m	80 m	100 m	120 m	140 m	160 m	180 m	200 m	220 m	240 m	260 m	280 m	300 m	320 m	340 m	360 m	380 m	400 m
1	400 m	10 court	10 s / 40 m	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
2	320 m	8 court	9 s / 40 m	4,5	9	13,5	18	22,5	27	31,5	36	40,5	45	49,5	54	58,5	63	67,5	72				
3	240 m	6 court	8 s / 40 m	4	8	12	16	20	24	28	32	36	40	44	48								
4	160 m	4 court	7 s / 40 m	3,5	7	10,5	14	17,5	21	24,5	28												
5	80 m	2 court	6 s / 40 m	3	6	9	12																

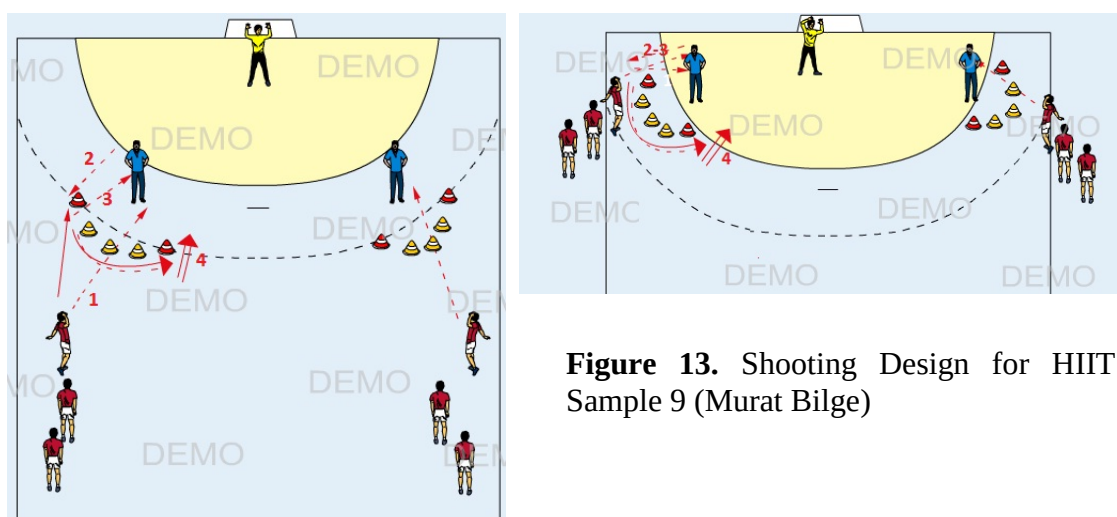


Figure 13. Shooting Design for HIIT Sample 9 (Murat Bilge)

Conclusions

There are many researches which contain lots of method aimed to develop condition of the athletes. Sports branch's nature is very important to understand to design the training programme for reaching best results.

It is impossible that not the handball specific interval training (intensive and / or extensive, aerobic and / or anaerobic) can gain the game performance.

In conclusion as the trainers we have to design the condition training programmes according to the handball's specificities. Game duration, heart rate, working loads, running profiles, running distances and the specificities for the playing positions have to shape the training plans.

The interval training examples in the present study suggest that a handball specific interval training methods have more effect on game performance.

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THE ATTACK TACTICAL PREFERENCES OF THE FINAL GAMES IN HANDBALL

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Summary

The purpose of the study is to analyze final games according to team's attack options in handball. At the second part of this study, some successful set plays were chosen from the final games. This organize attacks were examined in detail and some training drills were proposed in order to build this set plays could be played in matches.

Keywords: Team Handball, Fastbreak, Set play.

Introduction

The fast break has a specific particularity regarding the dynamics of efficiency during various international handball competitions. The conduction of fast attacks on non-organized defense, or to say of the fastbreaks and the half-fastbreaks, has great influence on the determination of the match result (SRHOJ, 2001, p 612). On the other hand, especially at the final games (ECh, WCh, Olympics or Champions Leagues finals), the coach can obtain information such as attack options performance rates, which allows at any given time get certain advantage against opponents; Set Play or Fast Break / Fast Throw Off (BILGE, 2010, p 154).

The purpose of the study was to analyze final games according to team's attack options in handball; Set Play or Fast Break / Fast Throw Off.

Methods

In this study, we analyzed 6 final games (WCh, ECh, EHF Ch League final games) using video analyzer. Goal ratio per total attacks, goal ratio per organize attacks, goal ratio per fastbreak attacks, goal ratio per fast throw-off attacks, organize attacks ratio per total attacks and fastbreak attacks per total attacks were analyzed.

At the second part of this study, some successful set plays were chosen from the final games. This organize attacks were examined in detail and some training drills were proposed in order to build this set plays could be played in matches.

The technical variables were examined using descriptive statistics.

Results and Discussion

The present researcher took into consideration organize attacks success and fast break / fast throw-off attacks success in final games. In the total analyses, the most important quantitative variable is the number of games.

Table 1 shows the descriptive statistics of the related variables obtained ECh 2008 final game; Denmark against Croatia.

Table 1. Teams' attack options in ECh 2008 final

ECh 2008 Final	DENMARK (24)		CROATIA (20)	
	 /....	%	 /....	%
Goal / Total Attacks	24 / 50	48	20 / 49	40
Goal / Organize Attacks	16 / 39	40	20 / 47	42
Goal / Fastbreak Attacks	7 / 10	80	0 / 2	0
Goal / Fast Throw-off	1 / 1	100	-	-
Organize Att. / Total Att.	39 / 50	78	47/49	95
Fastbreak Att / Total Att.	11 / 50	22	2/ 49	5

In terms of the ratio of fast break attacks, the winner team used more fast break options as statistically. When we look at the total success of the attacks, again winner team was more effective as fast break efficiency (Table 1).

Table 2 shows the descriptive statistics of the related variables obtained WCh 2009 final game; France against Croatia.

Table 2. Teams' attack options in WCh 2009 final

WCh 2009 Final	FRANCE (24)		CROATIA (19)	
	 /....	%	 /....	%
Goal / Total Attacks	24 / 45	53	19 / 46	41
Goal / Organize Attacks	22 / 41	55	16 / 40	40
Goal / Fastbreak Attacks	2 / 4	5	3 / 6	5
Goal / Fast Throw-off	-	-	-	-
Organize Att. / Total Att.	41 / 45	91	40 / 46	86
Fastbreak Att / Total Att.	4 / 45	9	6 / 46	14

In terms of the ratio of fast break attacks, between the winner team and the loser team there was no significant differences as attack options. But we can easily say that both teams didn't choose more fast break attacks (Table 2).

Table 3 shows the descriptive statistics of the related variables obtained WCh 2011 final game; France against Denmark.

Table 3. Teams' attack options in WCh 2011 final

WCh 2011 Final	FRANCE (37)		DENMARK (35)	
	 /....	%	 /....	%
Goal / Total Attacks	37 / 54	68	35 / 53	66
Goal / Organize Attacks	37 / 52	71	32 / 48	66
Goal / Fastbreak Attacks	0/ 2	0	3 / 5	6
Goal / Fast Throw-off	-	-	-	-
Organize Att. / Total Att.	52 / 54	96	48 / 53	90
Fastbreak Att / Total Att.	2 / 54	4	5 / 53	10

In terms of the ratio of fast break attacks, between the winner team and the loser team there was no significant difference as attack options. But we can easily say that both teams didn't choose more fast break attacks like WCh 2009 final (Table 3).

Table 4 shows the descriptive statistics of the related variables obtained 2011 EHF Champions League final game; Barcelona against Ciudad Real.

Table 4. Teams' attack options in 2011 EHF Ch League final

EHF Ch. League Final 2011	BARCELONA (27)		CIUDAD REAL (24)	
	 /....	%	 /....	%
Goal / Total Attacks	27 / 60	45	24 / 60	40
Goal / Organize Attacks	25 / 56	44	18 / 50	36
Goal / Fastbreak Attacks	2 / 3	66	5 / 9	55
Goal / Fast Throw-off	-	-	1 / 1	100
Organize Att. / Total Att.	56 / 60	93	50 / 60	83
Fastbreak Att / Total Att.	4 / 60	7	10 / 60	17

In terms of the ratio of fast break attacks, the loser team used more fast break options as statistically. When we look at the total success of the fast break attacks, between the winner team and the loser team there was no significant difference as fast break efficiency (Table 4).

Table 5 shows the descriptive statistics of the related variables obtained ECh 2012 final game; Denmark against Serbia.

Table 5. Teams' attack options in ECh 2012 final

ECh 2012 Final	DENMARK (21)		SERBIA (19)	
	 /....	%	 /....	%
Goal / Total Attacks	21 / 44	47	19 / 44	43
Goal / Organize Attacks	17 / 40	42	16 / 35	45
Goal / Fastbreak Attacks	4 / 4	100	3 / 9	33
Goal / Fast Throw-off	-	-	-	-
Organize Att. / Total Att.	40 / 44	90	35 / 44	79
Fastbreak Att / Total Att.	4 / 44	10	9 / 44	21

In terms of the ratio of fast break attacks, the loser team used more fast break options as statistically. But when we look at the total success of the fast break attacks, winner team was more effective as fast break efficiency (Table 5).

Table 6 shows the descriptive statistics of the related variables obtained 2012 EHF Champions League final game; THW Kiel against Atletico Madrid.

Table 6. Teams' attack options in 2012 EHF Ch League final

EHF Ch. League Final 2012	THW KIEL (26)		ATHLETICO MADRID (21)	
	 /....	%	 /....	%
Goal / Total Attacks	26 / 51	50	21 / 51	41
Goal / Organize Attacks	24 / 46	52	18 / 45	40
Goal / Fastbreak Attacks	1 / 4	25	3 / 6	50
Goal / Fast Throw-off	1 / 1	100	-	-
Organize Att. / Total Att.	46 / 51	90	45 / 51	88
Fastbreak Att / Total Att.	5 / 51	10	6 / 51	12

In terms of the ratio of fast break attacks, between the winner team and the loser team there was no significant difference as attack options. Also when we look at the total success of the fast break attacks, between the winner team and the loser team there was no significant differences as fast break efficiency (Table 6).

Table 7 shows the cumulative statistical data of the related variables obtained 6 final games between winner teams and the loser teams.

Table 7. Teams' cumulative attack options in 6 final games

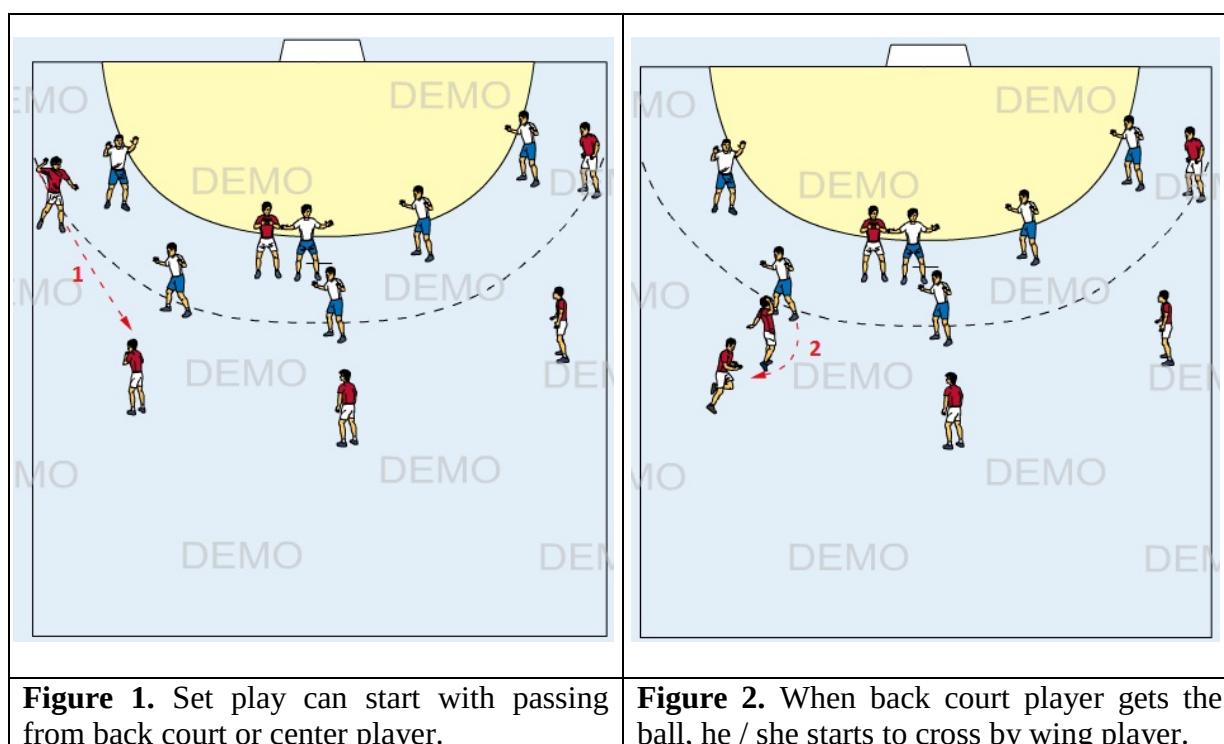
N= 6 final games	Winner Team		Loser Team	
	 /....	%	 /....	%
Goal / Fastbreak Attacks	18 / 29	62	18 / 38	47
Organize Att. / Total Att.	275 / 304	90	266 / 304	87,5
Fastbreak Att / Total Att.	29 / 304	10	38 / 304	12,5
Fast Break Goals per game	3		3	

In terms of the goals from fast break attacks per game, between the winner team and the loser team there was no significant difference. But when we look at the success of the ratio of fast break attacks, winner teams were more effective than losers as fast break efficiency (Table 7).

As the second step, some perfect set plays were chosen from the games as video. We divided the set plays to the sections and we prepared the training design to build up these set plays by giving exercises.

SAMPLE SET PLAY BY DENMARK (Figure 1-5)

- Transition from wing players after crossing with back players



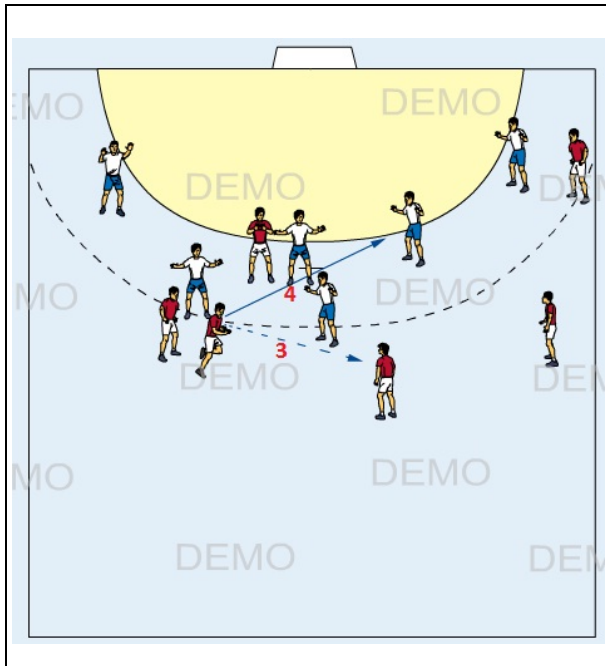


Figure 3. After crossing wing player passes the ball to the center and starts transition to the opposite of line player.

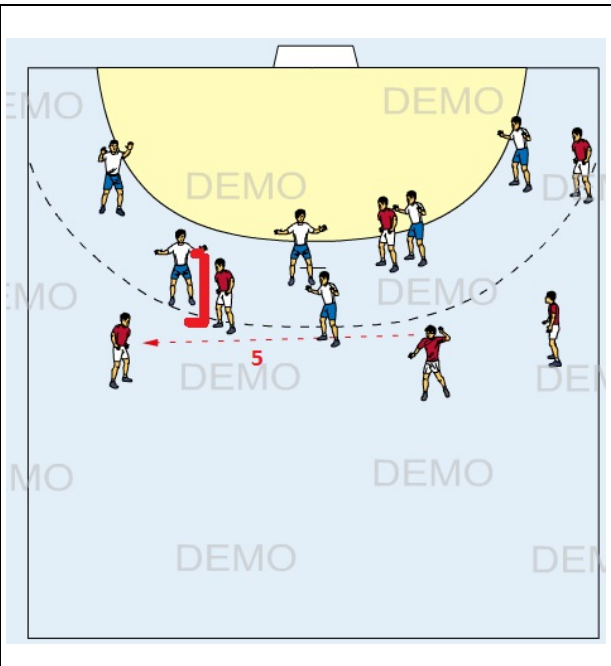


Figure 4. Center player moves with the ball to the opposite side and turns back to the back court player and passes the ball. At the same time line player runs for blocking.

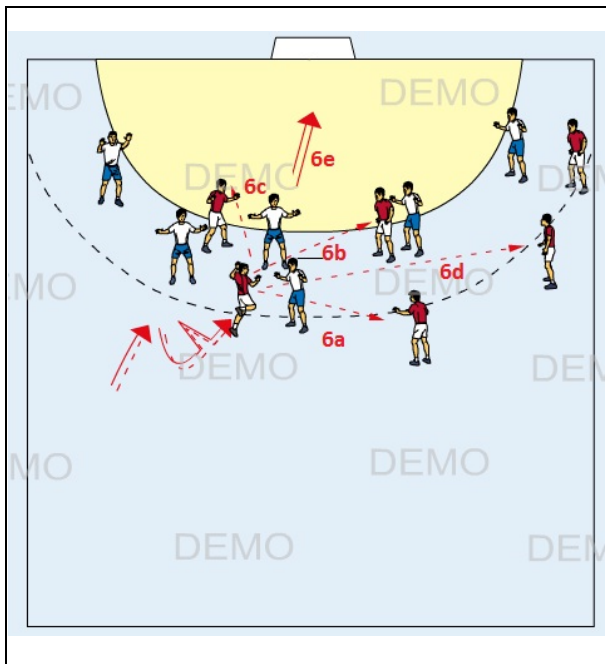


Figure 5. When back court player gets the ball, he / she has options written under below.

- If center defender comes for helping, he / she can pass back to the center player (6a).
- He / she can pass to the wing player (6b).
- He / she can pass to the line player when he / she is rolling (6c).
- He / she can pass to the opposite back court player (6d).
- He / she can shoot (6e).

SAMPLE SET PLAY BY SERBIA (Figure 6-10)

- Transverse piston movement after pick and roll using crossing without ball from the other side.

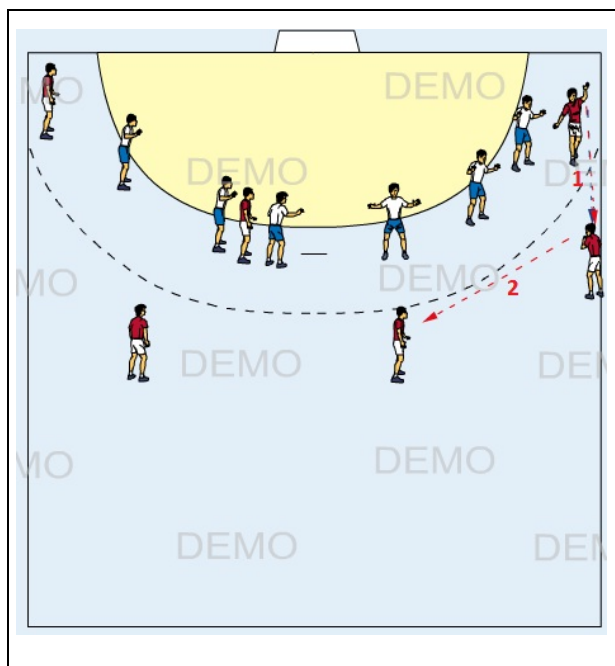


Figure 6. Set play starts with passing from wing player to the back player. Then the ball receives to the center.

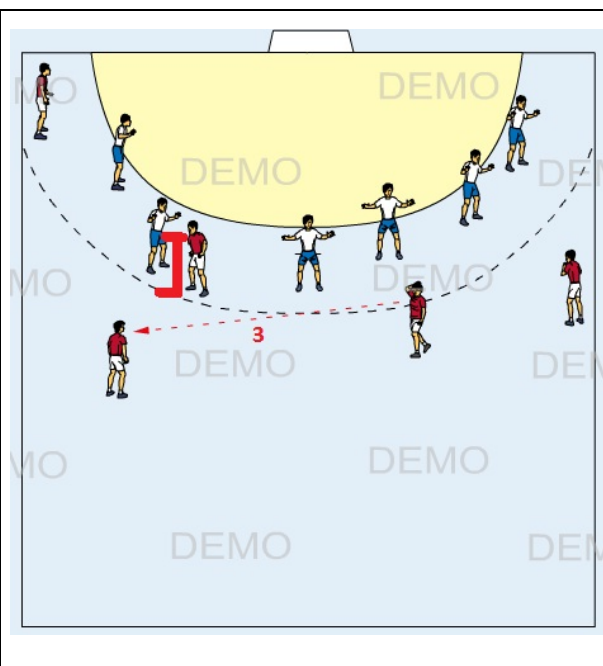


Figure 7. When center player gets the ball, he / she passes to the other back court player creating a big space for him. At the same time line player comes to block.

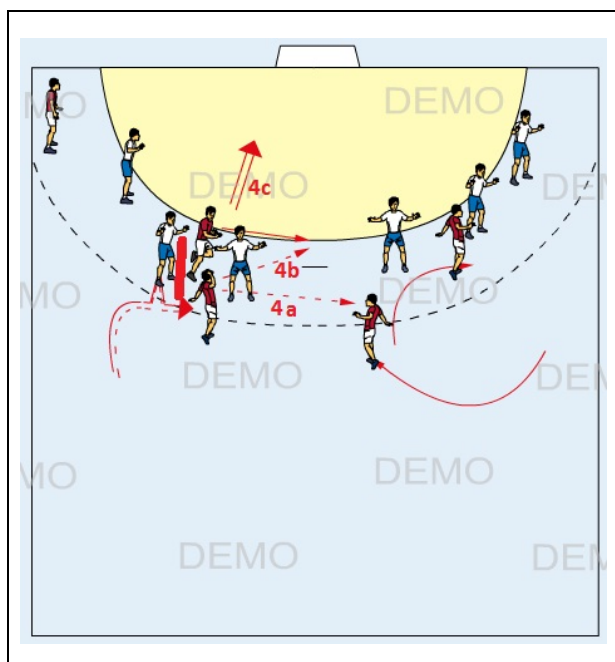


Figure 8. When back court player gets the ball, he / she uses pick and roll with line player, he / she can shoot (4c), pass back to the center (4a) or to the line player (4b).

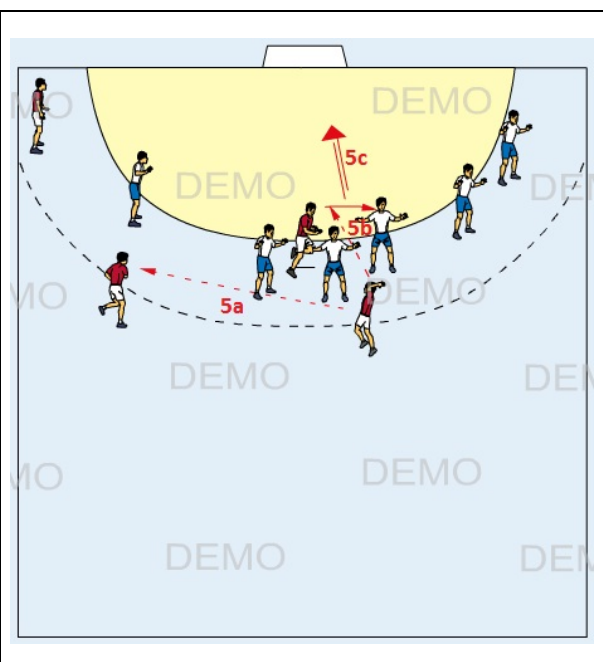


Figure 9. If center player gets the ball, also he / she can shoot (5c), pass back to the back court player (5a) or to the line player (5b).

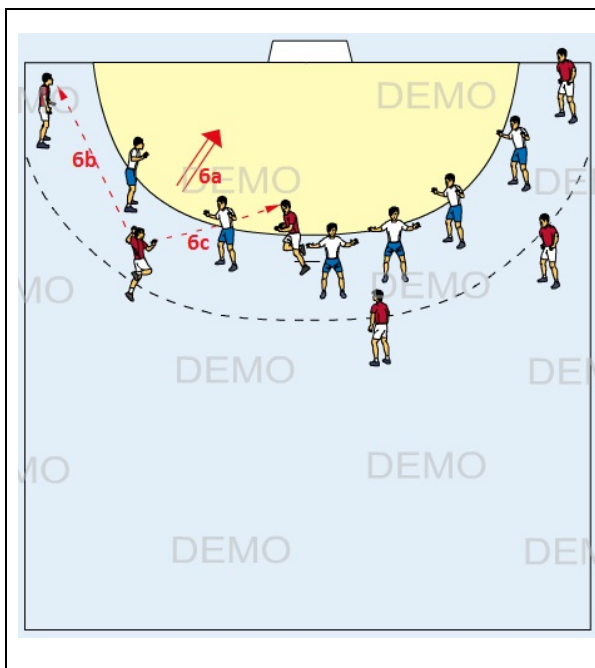


Figure 10. When back court player gets back the ball, he / she has options written under below.

- He / she can shoot (6a).
- If wing defender comes for helping, he / she can pass to the wing player (6b).
- He / she can pass to the line player when he / she is rolling (6c).
- He / she can pass back to the back court player.

SAMPLE SET PLAY BY DENMARK (Figure 11-14)

- Transition by line player after crossing between center and pivot.

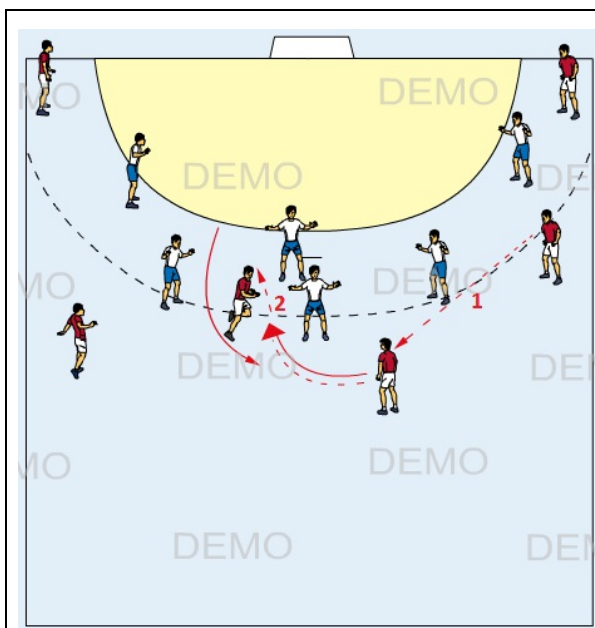


Figure 11. Set play starts with passing from back court player to the center. When the ball receives to the center, he / she starts to cross with line player.

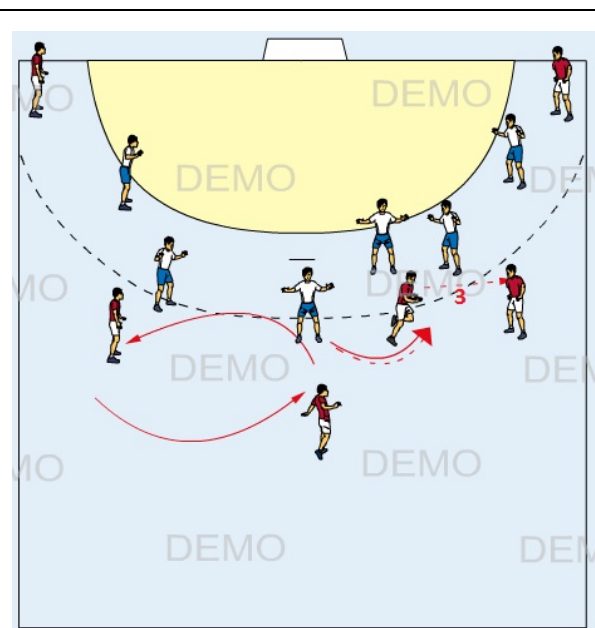


Figure 12. When line player gets the ball, he / she passes to the back court player by approaching. At the same time center and the other back court player make a big cross without ball.

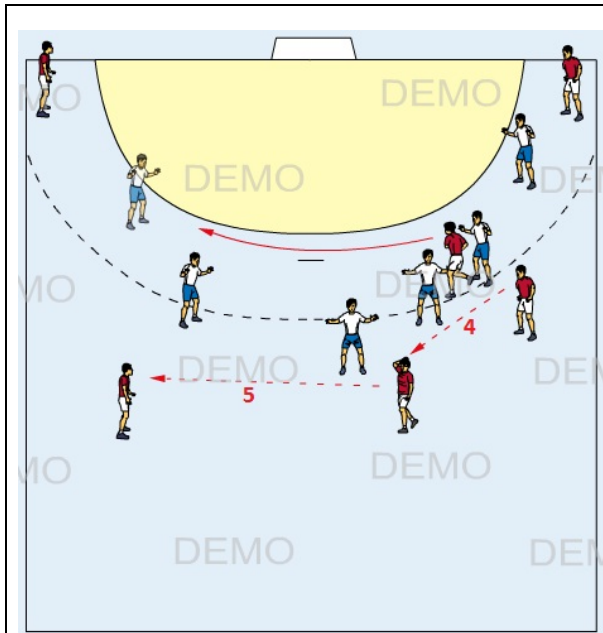


Figure 13. When back court player gets the ball, he / she passes to the center (who comes from back court). Then center passes to the back court player (who changes his / her position from center).

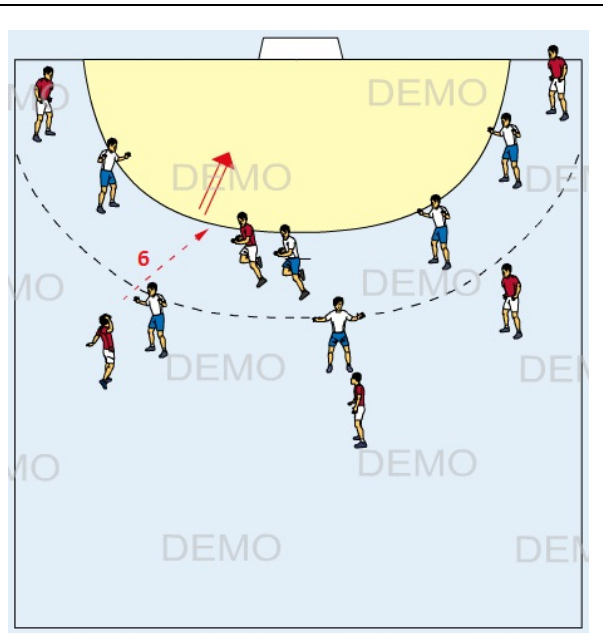


Figure 14. After getting the ball, the playmaker passes to the line player who makes transition rapidly.

SAMPLE SET PLAY BY FRANCE (Figure 15-18)

- Transition from center without ball after crossing.

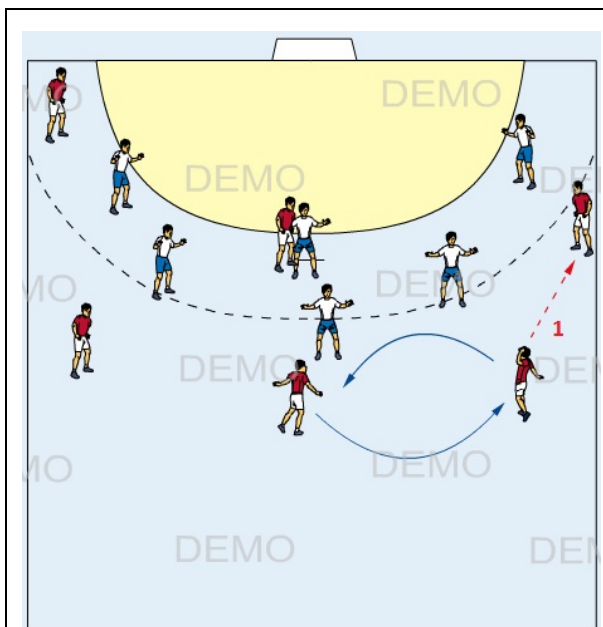


Figure 15. Set play starts with passing from back court player to the wing player. When the ball receives to the wing, center and the back court players start to cross without ball.

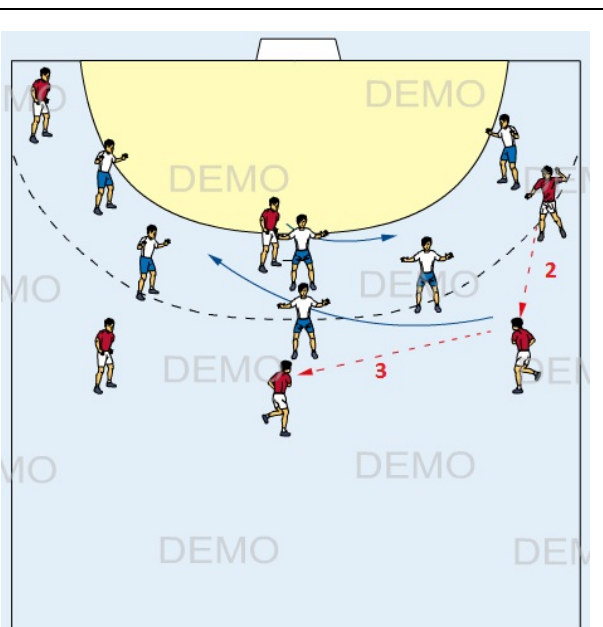


Figure 16. Wing player passes back to the back court player (who comes from the center) and ball goes to the center (who crosses from back court). At the same time he / she starts to transition.

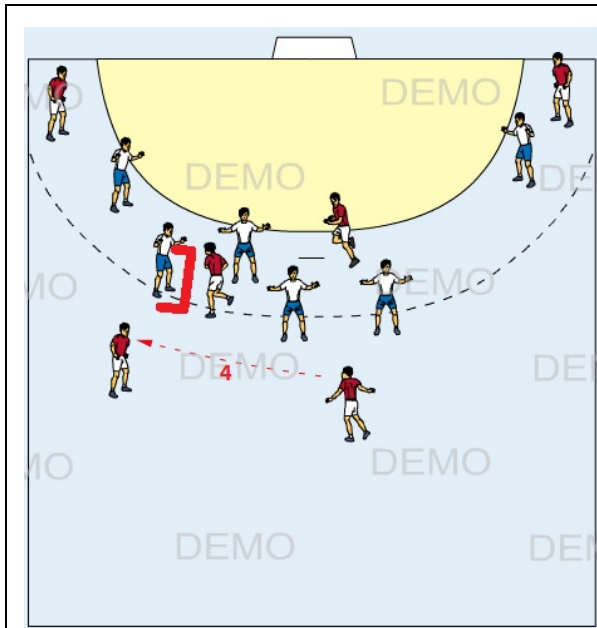


Figure 17. When back court player gets the ball from center, he / she plays pick and roll with the player who makes transition from the other side.

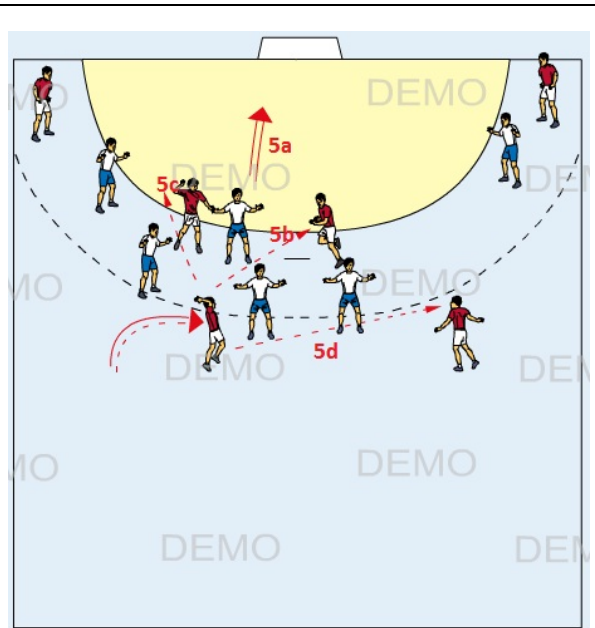
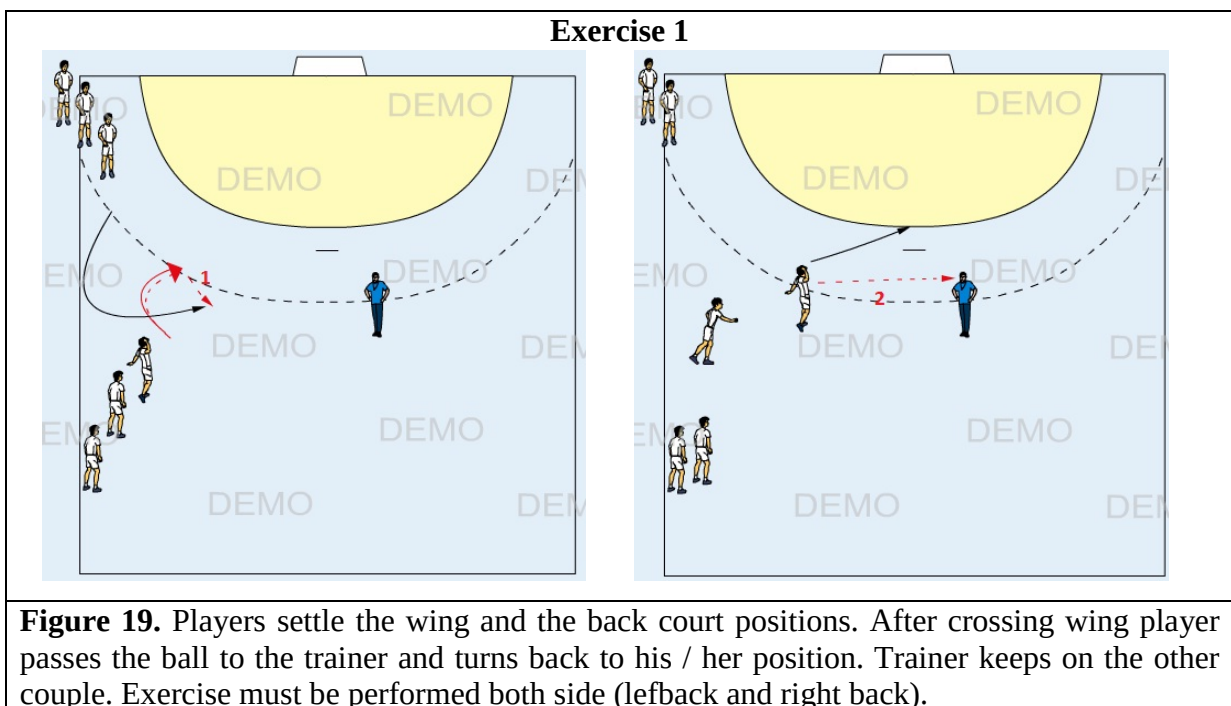


Figure 18. After pick and roll, back court player can shoot (5a), pass to the line player (5b), pass to the player who makes transition from the other side (5c) or pass to the other back court player (5d).

BUILDING SET PLAYS WITH EXERCISES

To build up the organized attacks, the trainer can prepare a training design especially for youth and junior players. In this study we prepare a design for Danish set play (Transition from wing players after crossing with back players, shown in Figure 1-5) (Figure 19-23).



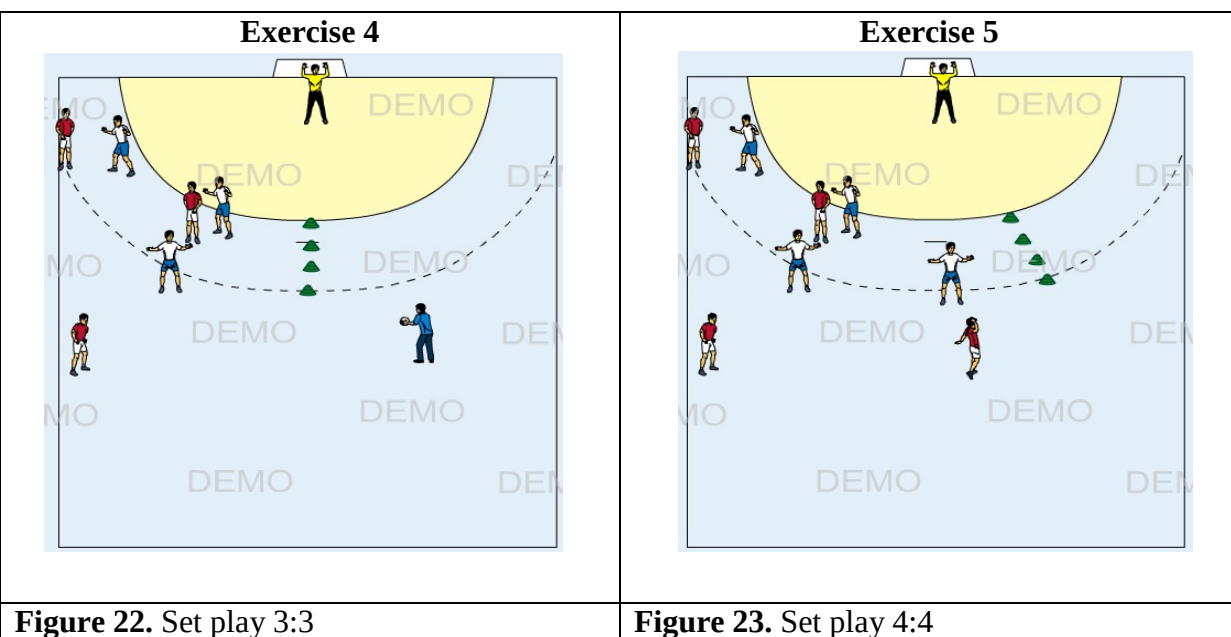
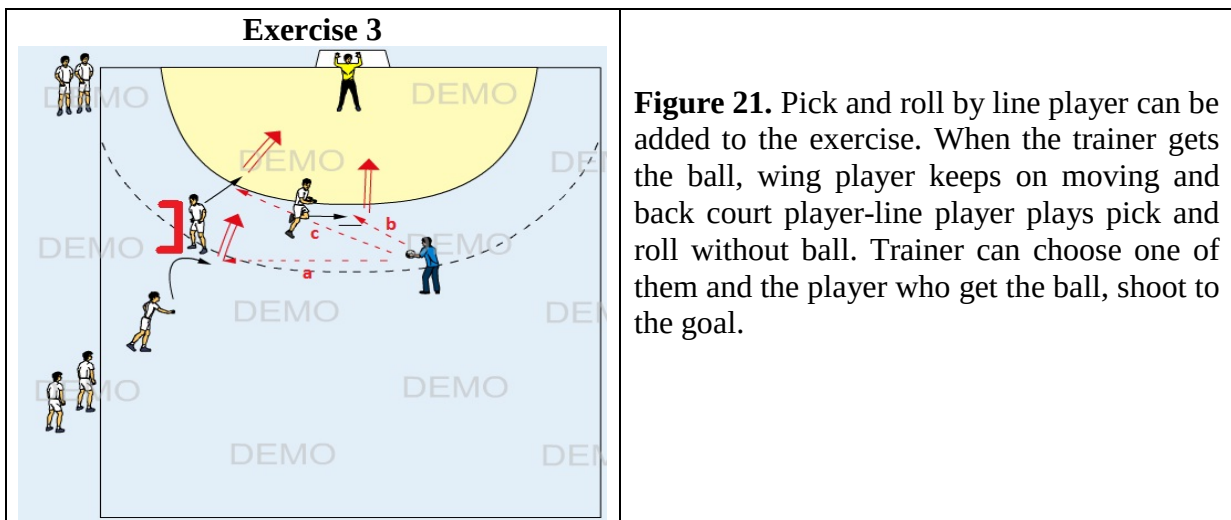
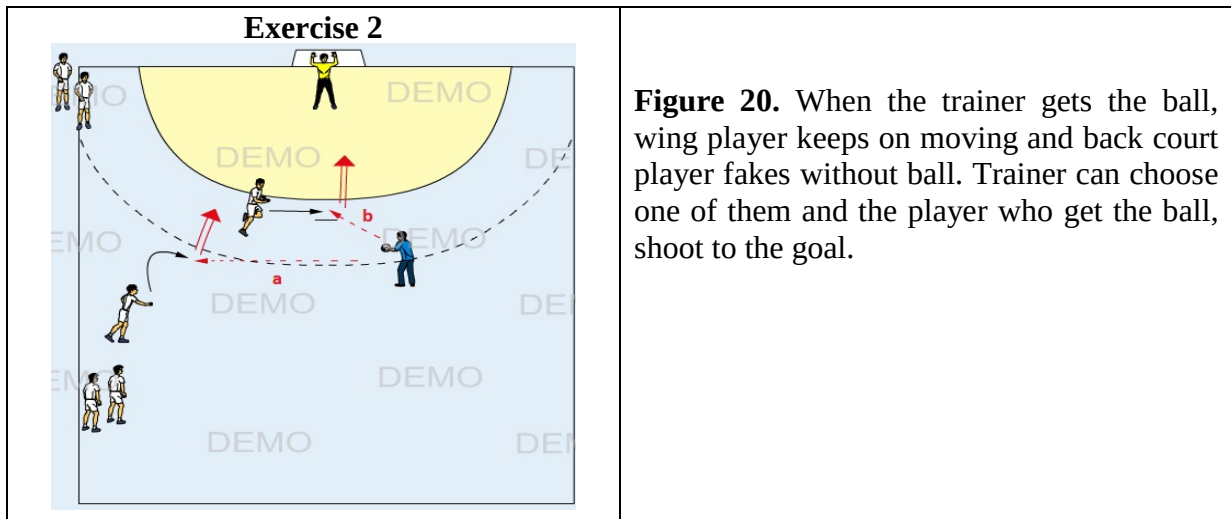


Figure 22. Set play 3:3

Figure 23. Set play 4:4

Conclusion

At the top of Men Handball in the World, every team tries to reach to the success. At the same time the coaches always try to create effective solutions for their teams. Fast break, fast throw-off or set play options were applied by the coaches according to their team performance parameters. Speed in Handball is very effective point for the teams. But the players must not confuse the speed and the hurry.

On the other hand handball teams must be prepared for set plays depending on the players ability.

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THE EFFECT OF BALANCE TRAININGS UPON AGILITY AND STRENGTH PERFORMANCES AMONG THE YOUNG HANDBALL PLAYERS

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Abstract:

Agility and vertical jumping in handball are important parameters while determining performance. It is important to adjust the balance of the body and to preserve the balance. The aim of the study was to explore the effect of six-week training program upon agility performances and strength performances among young male handball players. The participants (n=32) were grouped into balance-training group (n=16) and control group (n=16). The balance-training group performed balance-trainings of 40-50 minutes 3 times a week during six weeks before the daily routine handball trainings. As for the control group; they received no balance-training and attended only routine handball trainings. Balance-training program was composed of one foot and two feet static and dynamic balance exercises. The length and intensity of the trainings were gradually augmented. All of the participants were administered T agility test as a pre-test and post-test, static-dynamic balance test and strength (vertical jumping) test.

It was found out in the current study that six-week training program improved not only balance performances but also agility performances and vertical jumping performances in a statistically satisfactory way. In light of these data; it is recommended that handball trainers support the improvement of agility and strength using balance-trainings among the young handball players.

Key Words: Agility-Training, Proprioceptive, Strength

Introduction:

Many of the players of the team sports may have to change the direction while running for defense or attack. Players need an advanced speed, muscle force and agility in highly heavy sports like handball, football, basketball and hockey (10, 40, 34). As a result, not only fast-running but also movements that require quick direction changes play a key role in

performance (41). The aim of the study was to examine the changes in agility and vertical jumping performances of the handball players using static and dynamic balance trainings. It is understood after the analysis made that with repeated sprints fast direction change is the determinant factor in handball. Touching in response to a stimulus, such as an opposing player's movements or the movement of the ball, fast movements of whole body, sprints with direction change, acceleration and deceleration constitute physical part of the agility performance. The basic movement patterns of handball require the player to perform many diverse activities such as jogging, sprinting and jumping (15, 18).

More recently it has been suggested that agility contains both a change of direction movement and a perceptual and decision making component, since changes of direction and speed are often performed in response to an opponent's actions (16, 17). The studies conducted indicate the importance of agility ability as an important performance criterion in handball. Agility is the ability to change direction fast (35, 1). In another definition, agility is the ability to change direction fast without speed loss together with the preservation of the balance (22). Speed, strength, muscle force, balance, flexibility are important factors of agility. Agility performance can be improved if one or all of these trainable factors are treated well using a well-organized exercise protocol (7). In a study made, it was observed that balance-trainings improved agility performance among the non-athlete subjects (36).

Ability to keep postural balance is important in sportive performance (28). For many sportive activities; balance plays a crucial role in body control and performance perfection (2). Ability to keep postural balance is important in prevention of injuries and sportive performance (29). As mentioned above; it is important to keep balance during agility performance and it is understood that there is a close correlation between balance and agility. Since agility is an important factor determining the performance in handball, it is necessary to examine the factors that have effects upon agility performance. Heavy sports such as handball, football, basketball and hockey require an improved speed, muscle-strength and agility (10, 40, 34).

During the agility performance; dynamic balance should be preserved in order to adjust body's center of gravity with minimum deviation and to change the direction without speed loss. Balance is the preservation of body's center of gravity with minimum movements in a static position and is the dynamic continuation of body's stabilized position (38).

Balance is affected by somato-sensoric, visual, auditory systems which are created by sensorial information and coordination, movements, flexibility and strength that affect the

balance as a motor reaction (13,14). Balance trainings that are performed in order to increase performance should be started on smooth surface under the feet with two-leg standing positions and as the time goes by one leg standing positions and unstable movements should be used on movable surfaces (styropor boards, balance board, wobble board, air cushion, etc.). Gradually, combined movements, squat, jumping, bouncing, throwing ball, catching ball and resistance exercises may be started within balance-training (31). In the studies conducted, it is reported that balance trainings have great effects upon somato-sensoric and proprio-receptive control system (30,6,23). It is observed that training lower extremities with balance-exercises improves positively reaction time, proprio-reception and muscle activation between muscles (30,6,23). As the result of balance trainings and with the advanced neuromuscular control; it is thought that strength and muscle force will be increased (9).

In the present study, the effects of balance training upon agility and vertical jumping were investigated and the correlation between balance improvement and agility and vertical jumping was examined.

Methods:

A total of 32 male players who were aged between 15 and 16 and who participated in Turkish Junior Handball competitions were included in the study. 8 players aged 15 were assigned to training group and other 8 players at the same age to control group using random sampling method. Again; 8 players aged 16 were assigned to training group and other 8 players at the same age to control group using random sampling method. Before the study; the pre-test was performed with the 32 players [control group (16 players) and training group (16 players)] and the post-test was performed after the six-week balance training program in field and laboratory. The tests were administered to the subjects every other day and a 24-hour rest was allocated for the players. On the first measurement day, dynamic tests were administered for the subjects. On the second measurement day, the subjects performed vertical jumping tests and on the last test day they only performed agility tests on synthetic surface. All of the measurements were done in the afternoon between 16.00 and 18.00.

In these measurements; agility performances, vertical jumping performances and dynamic balance skills of the players were tested. Dynamic balance tests of both-legs and right leg and

left leg of the players were performed using The Pro-Kin Type B Line Bipedal proprioceptive system (Tecnobody, Levate - Bergamo – Italy) (Figure 1).

Figure 1: The Pro-Kin Type B Line Bipedal proprioceptive system

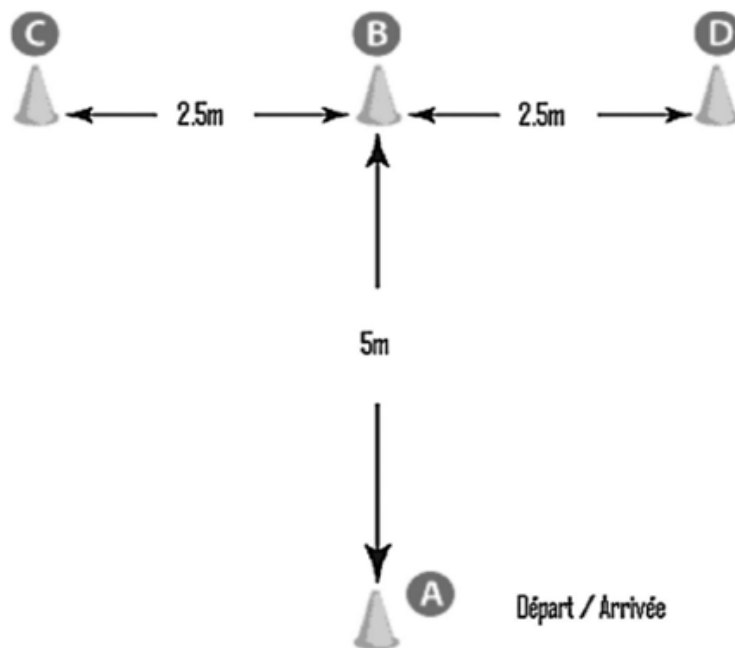


Agility T Test:

3 cones are set two and half meters apart on a straight line. A fourth cone is placed 5meters from the middle cone so the cones form 'T'. The athlete starts at the cone A, forward to cone B and touches B then side steps to the left cone C, touches that cone then side steps 5 meters to the far cone and touches that one, and then the athlete side steps 2,5 meters back to the middle cone ,touching that one and then the athlete runs 5 meters backwards to the base of the 'T' and touches that cone and records the time (18).

The Agility T-test was performed using the same directives protocol of the T-test, except that the total distance covered and measures of inter cone distance were modified. The number of directional changes were maintained the same (26). Subjects covered a total distance of 20 m on the modified T-test (Figure 2), (15).

Figure 2: Agility T-test



Vertical Jump Test:

Vertical jumping tests of two-legs and right leg and left leg of the players were performed in order to find out their strength performances. With vertical jumping tests, jumping-lengths of the players were measured. Vertical jumping tests were performed using Newtest Power timer 300 System Tyrnava Finland (Figure 3).

Figure 3: Newtest Power timer



Training Program of Balance-Training Group:

The first week of the six week balance training program was composed of static balance trainings while dynamic trainings were used during the following five weeks. Balance-training group performed balance trainings three days a week for six weeks (Monday, Wednesday, Friday; in the afternoon) and after the balance trainings; they attended routine handball trainings together with the control group. The balance-training group performed static balance trainings during the first week. The trainings included two-leg stance, one leg stance and keeping the body statically on a smooth surface. The training lasted averagely for 45 minutes. The warming ups of 10 minutes that included short static stances were done by the subjects before they started the trainings. The dynamic balance trainings were performed for five weeks after the one-week static balance training. The dynamic balance trainings included unstable movements on movable surfaces (styropor boards, balance board, wobble board, air cushion, etc.), two leg stances, one leg stances, walking, jumping, dribbling, passing, holding the ball, shooting and squat, etc. (21,19,20).

The control group continued the routine handball trainings with the balance-training group for six weeks. They did not perform any training regarding strength, agility, speed and muscle force, etc. for six weeks.

Statistical Analysis:

At the end of the six week training, all of the tests were repeated at the same time of the day and the results were analyzed using SPSS statistical software. The analysis of the data was performed with SPSS 15.0 software. Physical and conditional characteristics of both groups were compared with Mann-Whitney U test in order to determine the homogeneity of the groups at the beginning of the study. Mann-Whitney U test was performed to explore whether there was a difference between the groups and to find out -if any- which group was responsible for the difference. The in-group comparisons of the pre-test and post-test results were done with Wilcoxon Signed Ranks Test.

Results:

The results concerning the effects of balance trainings upon balance performances, agility performances and strength performances after the pre-test and post-test were shown below:

Table 1. Initial Values and Statistical Differences of Subjects' Physical Characteristics

	Body Weight (kg)	Body Height (m)	Age	Training Age
Groups	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD
Training (n=16)	65.39 $\pm$ 4.77	172.25 $\pm$ 4.97	15.82 $\pm$ 0.83	3.77 $\pm$ 1.90
Control (n=16)	66.68 $\pm$ 5.48	174.06 $\pm$ 5.65	15.74 $\pm$ 0.91	4.22 $\pm$ 2.27
P	N.S	N.S	N.S	N.S

N.S.:No significant

Table 1 included mean percentages of body-weights, body-heights, ages and training-ages of the participant handball players. When initial values of both groups were compared in terms of subjects' physical characteristics; no statistically significant difference existed between the two groups. Both groups were homogenous in terms of physical characteristics.

Table 2. Means of the first-test values between the groups and statistical differences

Test	Balance	Balance Right	Balance Left	Agility	Jump	Jump Right	Jump Left
Group	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD
Training (n=16)	29.06 $\pm$ 6.43	31.43 $\pm$ 7.81	36.37 $\pm$ 11.21	5.90 $\pm$ 0.13	41.33 $\pm$ 4.29	27.30 $\pm$ 2.86	29.73 $\pm$ 3.54
Control (n=16)	24.00 $\pm$ 6.62	27.31 $\pm$ 5.94	26.93 $\pm$ 5.73	5.96 $\pm$ 0.22	42.99 $\pm$ 4.45	28.13 $\pm$ 3.89	29.64 $\pm$ 2.81
P	0.031*	N.S.	0.003*	N.S.	N.S.	N.S.	N.S.

*p<0.05

Table 2 demonstrated the first-test means and statistical differences related to the measurements of two-leg balance test, right leg balance test, left leg balance test, agility test, two leg vertical jumping test, right leg vertical jumping test and left leg vertical jumping test. When the initial values of the both groups were statistically compared at the end of the first test, a significant difference was found in terms of two leg balance test and left leg balance test (p<0.05) while there was not any difference between the groups in terms of right leg balance test, agility test, vertical jumping test, right leg vertical jumping and left leg vertical jumping (p>0.05).

Balance-training group and control group were homogenous in terms of right leg balance test, agility test, vertical jumping test, right leg vertical jumping and left leg vertical jumping whereas they were heterogonous in terms of two leg balance test and left leg balance test.

Table 3. Means, Improvement Percentages and Statistical Differences of pre-test and posttest about Subjects' two leg balance, right leg balance, left leg balance and agility

Groups	First Test Mean± SD	Last Test Mean ± SD	Percentage of Development	First-Last Test P	
Training	29.06 ± 6.43	17.06 ± 5.39	39.51	0.000*	Balance Left
Control	24.00 ± 6.63	21.75 ± 5.36	7.43	0.035**	
Training	36.37 ± 11.21	21.06 ± 4.49	38.54	0.000*	Balance Right
Control	26.93 ± 5.73	25.25 ± 4.15	5.11	0.011**	
Training	31.43 ± 7.81	19.93 ± 5.01	35.49	0.001*	Balance
Control	27.31 ± 5.94	23.43 ± 5.41	13.19	0.001*	
Training	5.90 ± 0.13	5.73 ± 0.11	2.81	0.000*	Agility
Control	5.96 ± 0.22	5.95 ± 0.24	-0.06	N.S.	

*p<0.01 ** p<0.05

As seen in Table 3, when the balance test results of balance-training group and control group concerning the pre-test and post-test were examined; measurements of two leg, right leg and left leg showed significant statistical differences (p<0.01; p<0.05). In the agility tests results, there was significant difference in the exercise training group. On the other hand, pre-test measurements and post-test measurements showed no significance in the control group.

Table 4. Means, Improvement Percentages and Statistical Differences of pre-test and posttest about Subjects' two leg jumping, right leg jumping and left leg jumping

Groups	First Test Mean ± SD	Last Test Mean ± SD	Percentage of Development	First-Last Test P	
Training	41.33 ± 4.29	46.34 ± 3.35	12.67	0.001*	Jump
Control	42.99 ± 4.45	42.79 ± 4.31	-0.40	N.S	
Training	29.73 ± 3.54	31.18 ± 3.63	5.05	0.006*	Jump Left
Control	29.64 ± 2.81	29.46 ± 2.29	-0.41	N.S.	
Training	27.30 ± 2.86	30.29 ± 3.33	11.20	0.001*	Jump Right
Control	28.13 ± 3.89	27.80 ± 3.57	-0.98	N.S.	

*p<0.01

As understood from the Table 4, when pre-test and post-test results of the jumping test of the balance-training group and control group were assessed; two leg measurements, right leg measurements and left leg measurements showed statistically significant differences (p<0.01). As for the control group; there was no difference between the groups in terms of two leg measurements, right leg measurements and left leg measurements.

Discussion:

The study investigated whether or not six-week dynamic balance trainings affected agility and vertical jumping performances of the young handball players. Two groups were constituted and the study lasted for six weeks. The first group was called as balance-training group and received balance trainings for six weeks. The second group was called as control group and received no balance trainings. As the result of the six week balance trainings; there were significant improvements in agility performances, vertical jumping performances and balance performances.

When the balance-training group and the control group were compared in terms of improvement-rates in the pre-test and post-test results concerning two-leg dynamic balance; the balance-training group showed an improvement by 35.49% ($p<0.01$) whereas control group demonstrated an improvement by 13.9 % ($p<0.01$) (Table 3).

When the balance-training group and the control group were compared in terms of improvement-rates in the pre-test and post-test results concerning right leg dynamic balance; the balance-training group showed an improvement by 38.54% ($p<0.01$) whereas control group demonstrated an improvement by 5.11 % ($p<0.05$) (Table 3).

When the balance-training group and the control group were compared in terms of improvement-rates in the pre-test and post-test results concerning left leg dynamic balance; the balance-training group showed an improvement by 39.51% ($p<0.01$) whereas control group demonstrated an improvement by 7.43% ($p<0.05$) (Table 3).

In a study, it was reported that sportive branch-related-trainings had no effect upon balance performance (3). In another study, only the effect of sportive branch-related-trainings of the Australian players was examined and no difference was found between pre-season and post-season balance tests (12). In our study, we obtained improvements only in one-leg and two-leg dynamic balance performances among the group that performed sportive branch-related-trainings only; that is control group; which -we thought- resulted not from the effect of branch-trainings but from the effect of learning balance test (27,8). Besides; it is reported that neurophysiological factors leading to improvements in balance performance through balance trainings are the improvement of cortical, subcortical and cerebral structures which control movement changes (33). After the balance trainings, inhibition of muscle contraction reflex may have increased co-contraction of agonist-antagonist muscles that provide joint-strength

and joint-stabilization and thus an improvement in balance performance was reported (37). It is reported that due to the fact that balance performances improve proprioceptive abilities, all of the movements of the body reduce and thus extra movements decrease; as a result, balance performance advances (25).

When the balance-training group and the control group were investigated in terms of in-group values in the pre-test and post-test results regarding agility; there was statistically significant improvement in the balance-training group in terms of improvement in agility performance ($p < 0.01$) but control group demonstrated no significant improvement in terms of improvement in agility performance (Table 3).

Unlike this study, Šimek Šalaj et al. reported that proprioceptive trainings had no effect upon lateral agility performances (36). Yet, it was reported that training lower extremities properly affected reaction time, proprioception and muscle activation between leg muscles (30,6,23). In another study; it was found out that there was a significant correlation between reactive power and running with direction-change (4). In a similar study; it was suggested that reactive power possessed a strong connection with running with direction-change because reactive power included stretch-shortening cycle (11). Since proprioceptive abilities and quality of leg muscle are among the factors that affect agility performance; it is thought that balance-trainings improved agility performance. Also, it was reported in another study that balance-trainings increased muscle activation and decreased amortization time and thus augmented eccentric-concentric movement performance during stretch-shortening cycle (19).

Therefore, balance-trainings contribute proprioceptive and neuromuscular system improvements and thus -we think- improve agility performance as a result of these improvements, too.

When the balance-training group and the control group were compared in terms of improvement-rates in the pre-test and post-test results concerning two-leg vertical jumping; the balance-training group showed an increase by 12.67% ($p < 0.01$) whereas control group demonstrated a decrease by 0.04% ($p > 0.05$) (Table 4).

When the balance-training group and the control group were compared in terms of improvement-rates in the pre-test and post-test results concerning right-leg vertical jumping; the balance-training group showed an increase by 11.20% ($p < 0.01$) whereas control group demonstrated a decrease by 0.98% ($p > 0.05$) (Table 4).

When the balance-training group and the control group were compared in terms of improvement-rates in the pre-test and post-test results concerning left-leg vertical jumping; the balance-training group showed an increase by 5.05% ($p < 0.01$) whereas control group demonstrated a decrease by 0.41% ($p > 0.05$) (Table 4).

Motor unit activation and synchronization and muscle coordination should be improved and agonist-antagonist muscles should work efficiently in order to get satisfactory muscle strength (32,5). It is reported that balance-trainings have significant effects upon improvement of the coordination in muscles and between muscles (32,5). It is thought that with the improved neuromuscular control caused by balance-trainings; strength and muscle power will increase (9). In another study, it was explored that vertical jumping performance increased thanks to stretch-reflex and co-contraction mechanism and increased strength of leg-extensor muscles (24). Unlike these studies; it was found out in a study that balance-trainings performed on half-ball did not increase vertical jumping performance considerably (39). In view of the effects of balance-trainings upon neuromuscular system; we are of the opinion that balance trainings in this study increased vertical jumping because power performance and neuromuscular system were interconnected.

Conclusions – Suggestions:

In light of the study, we found out that balance trainings provided positive improvements upon functional performance (agility and vertical jumping) among young handball players. It was also observed that balance trainings resulted not only in balance improvement but also in better strength performance together with an improved balance. Balance trainings may also be utilized in order to improve functional performance apart from rehabilitation given after injuries. It may be recommended to the trainers that improvement of muscle power and strength may be achieved at a sufficient level using balance-trainings before heavy trainings are implemented for young players. In the future scientific studies upon balance trainings, neurophysiologic causes of the balance trainings may be examined, too. Besides, balance-trainings and a different training method may be compared in term of performance improvement. A similar study may be conducted on different age, sex and league level.

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