ISSN: 2392-5442
ESSN : 2602-540X
V/12 N/02 Year/2025
P 188 - 204

Sport system journal

International scientific journal published by:
ZianeAchour –Djelfa- Algeria
A ccepted: 2025-07-19 Received:2025-03-08

Effect of Integrated Physical Preparation on the Organization of Offensive Play in Young Handball Players Aged 15-17

Belgouchi Rabah*[1], Hadj aissa Mohamed Tayeb [2], Tebbal Bachir[3].

[1] University Amar Telidji of Laghouat (Algeria),rabah.belgouchi@ lagh-univ.dz.
[2]University Amar Telidji of Laghouat (Algeria), med.hadjaissa@lagh-univ.dz.
[3]Higher College of laghouat (Algeria), b.tebbal@ens-lagh.dz.

Abstract:

The aim of this study was to demonstrate how U17 handball players' technical-tactical rethinking throughout the competition stage is impacted by comprehensive physical preparation.

Over the course of six weeks, from January to February 2024, an experimental investigation was conducted on an experimental sample. (GSP Age: 16.14±0.77 - Height: 172.59±3.35 - Weight: 70.62±2.20) and another control sample (NRKGA Age: 16.21±0.80 - Height: 171.56±1.74 - Weight: 71.24±2.36). They were evaluated in two situations: a technical-tactical observation during two matches (Indicators: Number of fouls-Number of successful counterattacks -Time to complete the counterattack-Total number of counterattacks). (Criteria: Counterattack-Ball rise).

The technical-tactical observation, evaluating the level of organization of the offensive game in counterattack and ball advancement, showed that the physical preparation method integrated during the competitive stage contributed to the organization of the offensive game.

Keywords: Integrated Physical Preparation - Organization of Offensive Play - Reduced Games - Handball.

Belgouchi Rabah

1. INTRODUCTION

Handball is a demanding and energetic sport, marked by short and intense actions, alternating with variable recovery phases. Handball players challenge their VO2 max for between 5 and 10 minutes per match, which underlines the importance of developing maximal aerobic power.(Book, 2006)

Handball is one of the sports that has its own principles and fundamental skills, which are the essential and effective cornerstone for achieving victory for the team. Therefore, the factor of fundamental motor skills in the game is considered one of the most important and sensitive factors, as physical, tactical, and psychological preparation have no value without motor skills. A physically prepared player who lacks skill cannot utilize their physical capabilities without controlling the ball while moving. The primary goal of teaching skills is for the athlete to be able to perform these skills with precision and integration so that they can execute them correctly under any competitive conditions. (bouchama & mertate, 2022, p. 805)

As young athletes grow, it is crucial to identify the optimal periods for acquiring certain physical and technical skills. Understanding the phases of motor and physiological development is essential to provide training adapted to each age group. (Demeter, A, 1981).

Adolescence is often referred to as the "second golden age" of learning, with a rebalancing of body proportions and an increase in intellectual level. It is crucial to preserve the body during this delicate period and to offer appropriate exercises to maximize the development of athletic and motor skills. (Demeter, A, 1981)

Many researchers have demonstrated the effectiveness of adapting the body of children and adolescents to efforts combining strength and speed. These efforts promote the functional capacities of athletes and support their development. (Zatsiorski, V. M., 1969); (Helga & Letzleter, 1983).

1.1. Statement of the Problem:

In team sports, the competition period can extend over several months, making it challenging to stay at your best level of fitness all season long. A decrease in preparation time and an increase in contests puts pressure on training principles.

It is essential to optimize training processes in the short term while developing the athlete's potential according to the demands of his discipline. The goal is to improve efficiency, injury prevention and performance capacity over the entire season.

Integrated physical preparation is part of the final sharpening phase, where the emphasis is on technical-tactical efficiency rather than on the development of physical capacities. (Aubert, F, 2002).

Short games can serve as an integrated training method, combining tactical, technical and physical aspects. They allow to achieve intensities similar to those of short intermittent exercises. (Dellal, Chamari, Impellizzeri, & Pintu, 2008, pp. 118-122) Based on these observations, we asked ourselves the following questions: What is the impact of integrated physical preparation on the organization of offensive play?

- Does integrated physical preparation influence the number of faults among athletes?
- Does integrated physical preparation influence the number of successful counterattacks in athletes??
- Does integrated physical preparation influence the time taken to complete counterattacks in athletes??
- Does integrated physical preparation influence the number of counterattacks in athletes??

1.2. Hypotheses:

- According to our hypothesis, a logical selection of a training program according to the physical preparedness method integrated during the competitive stage will have a positive influence on the organization of offensive play among young handball players aged 15-17.
- Integrated physical preparation reduces the number of mistakes made by athletes.
- Integrated physical preparation influences the number of successful counterattacks in athletes.

- Integrated physical preparation reduces the time taken to perform counterattacks in athletes.

- Integrated physical preparation increases the number of counterattacks in athletes.

1.3. Goals:

Our study's objective is to investigate the present drawbacks and benefits of substitutes for intermittent work, such as reduced-squad play and transfer work (integrated physical preparation), in order to confirm that this approach allows for effectively soliciting technical-tactical commitment during the competitive period.

1.4. terminology:

- **Integrated physical preparation:**

Integrated The integration of global practice, through reduced games, allows to bring a specific dominant to the work of young athletes. These games can be designed to emphasize aspects such as speed, endurance or muscle strengthening. This approach is essential in the training of young athletes, because it allows them to prepare by repeating tactical sequences and improving their technical gestures.

This integrated training method offers a variety of specific forms, such as games, fights or exchanges, which allow young athletes to develop their skills in a comprehensive manner and adapted to their discipline. (Hadj aissa & et all, 2011, pp. 11-12).

- **Reduced games:**

Small-sided games can be defined as game situations where the rules have been modified compared to a standard match. These adjustments could be made to the pitch's size, the number of players, the goals' measurements, the goalkeeper's presence or absence, or the amount of goals that must be scored. In this context, the numerical opposition may be balanced or unbalanced, thus offering a variety of tactical and physical situations for the players. (Hadj aissa & et all, 2011, p. 11)

- **The Operational Definition:**

Integrating small-scale games into overall practice helps improve athletes' physical abilities, particularly in terms of speed, endurance and muscle

strengthening. These games, in their specific forms such as games, fights or exchanges, offer a dynamic and participatory learning environment, particularly suited to young athletes. Indeed, small-scale games have the advantage of creating a more engaging and interactive learning context, thus promoting children's involvement and motivation.

This approach is an effective alternative to traditional training methods, offering a more engaging learning experience tailored to the needs of young athletes. Small-scale games combine physical and tactical aspects, while stimulating children's active participation, making them a valuable tool for their sports development.

- **Handball:**

In 1919, handball was introduced as an Olympic team sport in Germany. There are currently about 60 million players across approximately 800,000 teams playing it worldwide. This exciting sport pits two teams of seven players on the field and seven substitutes against each other in two 30-minute halves. The playing field, which is 40 metres long and 20 metres wide, is the stage for this intense competition. The objective is simple: In order to win, each team wants to score one more goal than the opposition. (Hadj aissa & et all, 2011, p. 12)

- **The organization of the Offensive game:**

The game's structure establishes the players' positions, duties, and responsibilities. It can be analyzed from the device and the game system in attack and defense. We speak of individual or collective organization. (Costantini, 2005, p. 14).

2. Previous Studies:

1. **Book, M.**"Small-person games and sprint repetition for the development of cardiorespiratory capacities in handball: valid alternatives to intermittent work in shuttle running,"*Approach to Handball*, No. 100, Faculty of Sports Sciences, France, 2007.

Aim: Comparing the cardiorespiratory reactions during brief small-handed play (HB) sessions with those during an equivalent amount of time spent intermittently running shuttles, which serves as a benchmark for the development of maximal aerobic power.

Results: Small-sided play has proven to be a valid alternative to intermittent work in shuttle running, with lower lactate levels and perception of exertion.

2. **Dellal, A., Chamari, et al.**"Evolution of HR during reduced-strength play and intermittent exercise in high-level footballers,"*11th National Sports Science Day*, ACAPS, Brussels, Belgium, 2007.

Methods: Work carried out in 8 against 8 with and without a goalkeeper.

Results: Different physiological incidences were observed (80.30% of the reserve FC had a goalie, while 71.20% did not). Every component needs to be taken into account. (Dellal, Chamari, Impellizzeri, & Pintu, 2008)

3. **Allen, JD., Butterfly, R., Welsh, MA., Wood, R.**"The physical and physiological value of 5-a-side soccer training to 11-a-side match play,"*J Human Movement Studies*, 1998.

Methods: Assessment of physical and physiological demand during 5-on-5 and 11-on-11 games.

Results: The distances covered were similar, but the players' activity was significantly higher in 5v5. The number of contacts with the ball was also greater, favoring tactical work. (Allen & el all, 1998, pp. 1-11)

4. **Chamari, K., Hachana, Y., Caouech, F., Jeddi, R., Moussa-Chamari, I., Wisloff, U.**"Endurance training and testing with the ball in young elite soccer players,"*Br J Sports Med*, 2005.

Methods: Using the Hoff test, assessing aerobic capacity through a specific exercise of ball handling and individual dribbling. Players had to cover the greatest possible distance in 10 minutes. (Hoff, 2002, pp. 218-221)

Results: Distance traveled was significantly correlated with VO2 max. **Conclusion**: The ability to drive the ball influences the cardiovascular and cardiorespiratory systems.

2.6.1.Analysis:

The studies presented aim to evaluate the impact of small-sided football games on players' physical capacities, in comparison with other types of training. These studies focus particularly on cardio-respiratory capacities and endurance.

a. Similarités :

- **Common goal**: All studies seek to assess the impact of small-sided football games on physical capacities, with a particular emphasis on cardio-respiratory capacities.

- **Methodology**: They compare players' performance in small-sided games with other exercises, such as intermittent running or specific tests like the Hoff test.

- **Results**: Studies generally show that small-sided games can be an effective alternative to traditional training, providing increased motivation and contributing to the development of various physical abilities.

b. Points of divergence between studies

- **Focus on physical abilities**:
  - **Martin and Buchheit**: Focus on the comparison between small-group games and intermittent running in terms of cardiorespiratory response and perception of effort. (Buchheit, 2007)
  - **Dellal et al.**: Study the impact of the number of players on the field (with or without goalkeeper) on heart rate.
  - **Allen et al.**: Compare 5v5 and 11v11 games in terms of distance covered and physical activity.
  - **Chamari et al.**: Focus on the relationship between endurance capacity during football (Hoff test) and maximal aerobic capacity.
- **Comparative physical activities**: Each study uses different physical activities to compare them to small-person games.
- **Players**: The studies differ depending on the type of players participating (professionals, amateurs, different age categories).

c. Main résulte

- **Effectiveness of small-sided games**: All studies indicate that these games can be an effective alternative to traditional training for developing cardio-respiratory capacities.

• **Diversity of responses**: Physiological responses vary depending on the type of reduced game and the number of players.

• **Importance of tactical elements**: Allen et al.'s study highlights that small-sided games promote the development of tactical elements in addition to physical abilities.

• **Relationship between endurance and aerobic capacity**: The study by Chamari et al. confirms the importance of endurance during football exercise to develop maximal aerobic capacity.

d. Conclusion

These studies provide strong evidence that small-sided football games can be an effective training tool to develop players' physical capacities, particularly cardiorespiratory capacities. However, It is necessary to adjust the training intensity and the kind of small-sided game to the players' physical capabilities and the training goals.

3. Methodology:

3.1. Human resources (Sample):

As part of our research, we chose to focus on a population of handball players aged 15 to 17. This study targets two distinct groups: an experimental group and a control group, each composed of 14 handball players. The participants come from two sports associations, the Groupe Sportif Pétrolier (GSP) and the NRKGA sports association. The selection of subjects was based on precise inclusion criteria, including the age of the players, which had to be between 15 and 17 years old, as well as a weekly training volume of 4 to 6 hours, in addition to their regular participation in competitions.

The experimental group and the control group which represent our sample have respectively the following characteristics:

Table 1. Characteristics of the subjects studied.

Average Teams	Age (years)	Size (cm)	Body weight (kg)	Effective
GSP	16.14	172.59	70.62	14
NRKGA	16.21	171.56	70.24	14

3.2. Research methods:

3.2.1. Bibliographic analysis:

Theoretical analysis serves as the foundation for any research, while bibliographic analysis brings together a set of information organized in a methodical manner, thus allowing an in-depth understanding of the subject studied.

3.2.2.Experimentalmethod:

- **The experimentalprotocol:**

In this type of study, the ideal would have been to test the athletes directly during a handball match, both during the preliminary and final periods, in order to place them in real competition conditions, taking into account the physical, emotional and mental loads inherent in a match. Although the situations in which performance is deployed are rich in lessons, they are also the most difficult to observe due to their complexity. The lack of adequate equipment, necessary to collect data by telemetry, as well as the difficulty of having access to the athletes during the competitions, forced us to resort to technical-tactical observation.

- **Chronology of the experiment:**

This exploratory investigation lasted for six weeks, from January to February (2024), during which we applied 6 work modalities. The experimental group "GSP" worked with ball integration, while the control group "NRKGA" performed exercises without ball integration. The common points between the modalities were as follows: Each series lasted 7 minutes and 40 seconds, with 10 seconds of work followed by 20 seconds of passive recovery rest, and the rest

between sets was 7 minutes. The technical-tactical evaluation was carried out in two stages: a preliminary phase, which takes place during the competitive period before to the program's application, and a final phase, which takes place during the competitive period following the program's application.

3.2.3. The systematic observation method:

The systematic observation method gives rise to an observation system, described by **Dussault (1973):**as a (system which allows us to name, describe, classify, quantify various observable phenomena).

Programming will have to be based more strictly on observations made in competition in order to focus the work on the collective and relational aspects of the game and the failing individual behaviors. (Martinet & Pagès, 2007, p. 14)

- **Presentation and choice of aspects to observe:**

The question that arises is what to observe and analyze. Regardless of his level, the player always has a main concern that guides him towards an action at a given stage. The typical behaviors of each stage of training allow the coach to anticipate and identify these characteristic elements. This theoretical framework responds to the usual characteristics of players of this age and level. Knowledge of the level of play guides the observation by anticipating the elements to be taken into account. From this, we have adjusted our observation and evaluation tool more precisely.

On the technical level, we observed the number of fouls related to individual ball control. On the technical-tactical level, we evaluated the number of successful counterattacks and the time taken to complete them, which reflects collective ball control and good organization of the offensive game, particularly during the ball advance and counterattacks. In addition, we analyzed the total number of counterattacks, indicating the orientation of the game towards the ball advance and the counterattack, modern trends in handball. A video observation was carried out to judge the quality of the organization of the offensive game, with an objective evaluation using an evaluation grid.

3.2.4. Method of anthropometric measurements:

The variables studied regarding morphological characteristics include some anthropometric measures that allow to characterize athletes. We have selected

parameters that reflect the most marked morphological differences between individuals:

✓ **The stature:**In contrast to sitting height, standing height is the distance between the ground and the vertex. A measuring rod is used to determine height (in centimeters).

✓ **Weight:**The weight is measured using a medical scale of the Kuhen and Fleichel type, which has an accuracy of + or - 0.50 grams.

3.2.5. Statistical analyses:

We used this method to ensure the reliability and relevance of the technical-tactical data collected during our evaluation. This approach allows us to give a more precise quantified meaning to the results. For this, wewill use the followingstatistical indices:

- The arithmeticmean.
- The standard deviation.
- Student's test.

4. Result of the technical-tactical observation:

Table 2. Comparison of the results of the technical-tactical observation.

Settings	Periods	Preliminary	Final	T student	Meaning
GSP	N Faults	1±0.82	0.42±0.51	2,479	S*
	N Ca R	2±0.82	3.75±0.96	-2.782	S
	Time/Ca	8.71±3.55	5.45±1.84	3.412	S*
	N Ca	3.25±0.96	5±0.82	-2.782	S
NRKGA	N Faults	0.79±0.80	1.06±0.56	-1.117	NS
	N Ca R	1.75±0.96	2.25±0.5	-0.926	NS
	Time/Ca	8.7±3.24	7.65±2.59	1.002	NS
	N Ca	3.25±0.96	3.5±0.58	-0.447	NS

Significant, $p < 0.05$. * significant, $p < 0.01$. ** highly significant, $p < 0.001$.

- **N Faults:** number of mistakes.
- **N Ca R:** number of successful counterattacks.
- **Time/Ca:** time to carry out the counterattack.
- **N Ca:** number of general counterattacks.

4.1.Number of faults:

- **Number of fouls of both teams GSP / NRKJA (preliminary)**

Regarding the technical index (number of faults), and through the results from the observations that were made on the two samples (GSP and NRKGA) during the preliminary phase, it was recorded that:

A non-significant difference is recorded between the control group and the experimental group at the threshold of $P < 0.05$.

- **Number of fouls of the GSP team (preliminary-final):**

The analysis of the observations of the experimental group during the preliminary and final stages showed us that: The handball players of the experimental group recorded a significant decrease in the number of fouls for $P < 0.01$.

- **Number of fouls of the NRKGA team (preliminary-final):**

The analysis of the student test allowed us to detect a non-significant difference at the threshold $P < 0.05$.

4.2.Number of counterattacks:

- **Number of successful counterattacks by both GSP/NRKGA teams (preliminary):**

Regarding the tactical index (number of successful counterattacks), the experimental group (GSP) recorded a mean of ($X=1.75 \pm 0.82$), while the control group (NRKGA) recorded a mean of ($X=2 \pm 0.96$). The difference is not significant between the two samples for $P < 0.05$.

- **Number of successful counterattacks by GSP teams (preliminary-final):**

The figure shows us a significant increase in the number of counterattacks in handball players in the experimental group at the threshold $P < 0.05$.

- **Number of successful counterattacks of NRKGA teams (preliminary-final):**

Handball players in the control group (NRKGA) recorded an average of ($X=1.75 \pm 0.96$) during the preliminary stage, and ($X=2.25 \pm 0.5$) during the final stage, which can be translated (T student) by a non-significant increase in the number of counterattacks at the $P < 0.05$ threshold.

4.3. Counterattack execution time:

Counterattack execution time of the two GSP/NRKGA teams (preliminary) Concerning the technical-tactical index, the comparison of the means of the counterattack execution time between the experimental (GSP) and control (NRKGA) groups during the preliminary phase reveals a statistically insignificant difference with a threshold of $P < 0.05$.• Counterattack execution time of the GSP team (preliminary-final)The comparison of the means of the counterattack execution time of the GSP group between the preliminary and final phases shows a statistically significant difference for $P < 0.01$.• Counterattack execution time of the NRKGA team (preliminary-final)The comparative analysis, carried out by Student's test, shows a statistically insignificant difference with a threshold of $P < 0.05$.

4.4. Number of counterattacks:

Number of counterattacks of both GSP/NRKGA teams (preliminary)Statistical analysis of the means of the two groups shows a non-significant difference for $P < 0.05$.• Number of counterattacks of the GSP team (preliminary-final)A significant increase in the number of counterattacks was observed in the GSP team, with a mean of ($X=5 \pm 0.82$) during the final stage, significant for $P < 0.05$.

Number of counterattacks of the NRKGA team (preliminary-final)Handball players of the control group (NRKGA) showed a non-significant increase at the P < 0.05 threshold.

5. Discussion of the results of the technical-tactical observation

5.1. Number of faults

The examination of the results regarding the number of fouls during the final phase showed a highly significant difference between the experimental group and the control group at the threshold P < 0.001. Our populace appears to be less proficient in technical skills. The significant regression in the number of fouls in the experimental group at the final stage is mainly linked to the integration of the ball into the physical work (pass-reception-dribble-change of direction at VMA run). This work aims to make the gesture more efficient according to the game, thus improving the quality of the technical gesture in the specific context of handball. Our results are consistent with the work of Guy Dersoir and Frédéric Thétiot, which highlight the importance of individual ball control, anticipation of passes, as well as mastery of transmissions and receptions in different positions, and changes of speed, in the technical-tactical organization of 15-17 year-old handball players. (Frédéric, 2005), (Dersoir, 2009)

5.2. Number of successful counterattacks-Time taken to complete counterattacks:

The experimental group (GSP) showed a significant increase in the number of successful counterattacks, accompanied by a decrease in the time taken to complete these counterattacks. This highlights a better organization of the offensive game, particularly in ball advancement and counterattacks, in the GSP group compared to the NRKGA control group. The collective control of the ball within the game's framework, which is accomplished through reduced games, appears to be the primary relationship between this technical-tactical progression and the players' ability to articulate and coordinate their movements, ensure quick ball circulation, and upset the defense. In addition, the organization of the ball advancement upon recovery of the ball and the adoption of a common language to automate certain gestures (such as the call into near or far space) played a crucial role. Our results corroborate those from Dersoir (2009) And Dellal et al. (2007),

who claim that reduced games allow you to work on both tactics and technique in quality. (Dellal, Chamari, Impellizzeri, & Pintu, 2008)

5.3. Number of counterattacks

The playing style of the sample under study is depicted by the index of the number of counterattacks executed. According to the findings analysis, the experimental group launched more counterattacks than the control group did. This illustrates how the game is oriented towards the ball's ascent and the counterattack, as highlighted by Landure (2000)in the design of the modern game, which increasingly favours counter-attacks and ball runs. We assume that the experimental group finds more solutions by playing in this way, which is confirmed by the observed success rate.Wolff and Grosgeorge (1998)specify that the players who prevail in matches are those who meet the tactical and technical requirements of the game. (Wolff & Grosgeorge, 1998)

6. General discussion

Specifically adapted physical training allows the development of physical qualities and technical-tactical skills to be combined. We compared the results of technical-tactical observation during short periods of reduced-size play with those obtained during intermittent shuttle running exercises of the same duration, used as a reference to assess the benefits and limitations of reduced-size games. The efficiency in organizing offensive play is one of the points highlighted. The results of technical-tactical observation in young handball players (15-17 years old) showed that the integrated physical preparation applied to the experimental group (GSP) requires tactical, technical and physical aspects at the same time.

7. Conclusion

The results of the technical-tactical observation, which evaluated the level of organization of the offensive game in counterattacks and ball advancement, showed a decrease in the number of fouls, an increase in the number of successful counterattacks, a decrease in the time taken to carry out attacks, as well as an increase in the total number of counterattacks carried out.

In conclusion, we think that we have accomplished our goal and verified the original theories. In the competition stage, the systematic and logical selection of

a training program based on the integrated physical preparation approach has helped to strengthen the offensive game's organization.

8. Bibliography List :

1- Allen, J.-D., & el all. (1998). The physical and physiological value of 5-a-side soccer training to 11-a-side match play. *Human Movement Studies* , 1-11.
2- Aubert, F. (2002). Update on Physical Preparation Methods. *INSEP review* .
3- bouchama, z., & mertate, m. (2022). The effect of a proposed educational program with semi-sports games in reducing the difficulties of performing some basic motor skills in handball activity. *Sport system journal International scientific journal published by: 4-4- Ziane Achour –Djelfa- Algeria , 09*, pp. 804-818.
5- Buchheit, M. (2007). Small-Squad Games and Sprint Repetition for the Development of Cardiorespiratory Capacity in Handball: Valid Alternatives to Intermittent Work in Shuttle Running. Handball Approach, No. 100.
6- Costantini, D. (2005). The Handball Glossary. In Approach to Handball. *FFHB* .
7- Dellal, A., Chamari, K., Impellizzeri, F., & Pintu. (2008). Heart rate responses during small sided-games and short intermittent running training methods in elite soccer players. *J Strength Cond Res* , 118-122.
8- Demeter, A. (1981). Sport im sports and sports activities. *Leipzig: Barth* .
9- Dersoir, G. (2009). projet technique du débutant au sénior Handball. Guy Dersoir, Savoirs Fondamentaux. *l'UFR STAPS de Nantes - FreComité de Hand-ball de Loire-Atlantique* .
10- Frédéric, A. (2005). Handball, the Counter Attack. Approach to FFHB Handball.

11- Hadj aissa, M., & et all. (2011). Effect of Integrated Physical Preparation on physical reflections, in young U17 handball players. *Djelfa scientific journal , 08(03)* , 11-12.
12- Helga, M., & Letzleter. (1983). trainnings grundlagen. *schattauer. Paris: vigot* .
13- Hoff. (2002). Soccer specific aerobic endurance training. *Sports Med* , 218-221.
14- Martinet, J.-P., & Pagès, J.-L. (2007). Handball. *Paris: Vigot.*
15- Wolff, M., & Grosgeorge, B. (1998). Detection, selection and expertise in sports. *Paris: Vigot* .
16- Zatsiorski, V. M. (1969). kibernetika, matematika i sport. *Fiscutura I sport, moscu* .