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The Impact of Hemsball Training on Balance and Punto (Approaching) Scores in Boccia Athletes

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Abstract

This study aimed to investigate the impact of an 8-week hemsball training on the development of balance and punto (approaching the target) performance in athletes aged 12-14 who play boccia in Bingöl province teams and train for more than 7 hours per week. The sample consisted of athletes who met the aforementioned criteria. The study involved 30 athletes, with 15 in the control group and 15 in the experimental group, who voluntarily played boccia. The experimental group received 60 minutes of hemsball training followed by boccia training, while the control group only received boccia training. Anthropometric measurements, including height, body weight, and BMI, as well as measurements of static and dynamic balance and punto (approach to target) scores, were taken before and after the 8-week exercise period. The data was evaluated using the SPSS 25 package program. The pre-test and post-test distributions of the study data were examined for each group, and normality and homogeneity of variances were determined using the Mauchly Sphericity Test and Levene test. Based on the test results, the dependent variables within each group were compared using the Paired-Sample T-test. The significance of the results was evaluated at a p-value of less than 0.05. The study found no significant difference in the mean values of height, body weight, and BMI of the experimental group after the 8-week hemsball training program ($p>0.05$). According to the data analysis results regarding the static and dynamic balance measurements of the hemsball training application, a significant difference at the $p<0.05$ level was found in the pre-test and post-test comparisons of the experimental group in the majority of the static and dynamic balance variables. No statistical difference was found in the control group and the between-group comparisons. According to the data analysis results regarding the Punto score measurements, a significant difference at the $p<0.05$ level was found in the pre and post-test comparisons of the experimental group in the punto score variable. No difference was found for the control group. Similarly, no statistical difference was observed between the groups. As a result, it can be concluded that training with hemsball has a positive effect on the performance of young boccia athletes in static and dynamic balance and the punto score.

Keywords: *Boccia, Balance, Hemsball, Punto Score*

INTRODUCTION

Boccia is a sport that is inclusive of all genders, ages, and abilities, as noted by Coutinho and Acosta (2009). It encompasses several disciplines, all of which revolve around a common target ball. These disciplines include Volo, Raffa, Petanque, and Grass Ball. The term boccia originated in Italy and is known as 'boules' in French and 'bowls' in English. The discipline of Raffa, developed by the Italians, was later named 'boccia' (Türkmen, 2011; Sood et al., 2016). In Turkey, the game, initially known as the Raffa discipline, gained popularity over time. Therefore, boccia, as the term used to describe these sporting disciplines, is also widely used in Turkey. These disciplines, which have different names and playing styles, offer a rich experience to players (Pagnoni 2010; Türkmen 2011). The Boccia technique involves motor skills such as ball selection, positioning, holding, and releasing. When throwing in the boccia/petanque style, the athlete stands with legs spread in the sagittal plane, lower limbs slightly flexed, and weight evenly distributed between both legs. The distance between the legs can be equal to or greater than the anteroposterior diameter of the chest. The body should be slightly tilted forward with a relaxed, rounded back. The arm holding the ball should be slightly flexed and brought forward while the other arm is extended to the side of the body, with the shoulders parallel to the foul line. According to Balan et al. (2018), the player oscillates the arm holding the ball backward while simultaneously taking a step forward with the back foot. Balance, as noted by Şimşek and Kesilmiş (2022), is a fundamental skill required for this process to proceed smoothly. Boccia requires both strategic thinking and shooting skills. During boccia practice, it is necessary to calculate and determine the placement of the target ball at the start, as well as the

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velocity and direction of the shots. In the game of boccia, the team that starts the game throws the pallino. The goal is to get the ball as close as possible to the pallino. At the end of the round, the team with the most balls closest to the pallino wins. It is a fault if a player makes a hitting shot instead of an approach shot, or is unable to throw the ball in the desired direction and velocity. This requires coordination between the dominant hand, leg, and eye positions, as noted by Arslan (2018). Maintaining balance while throwing the ball is crucial to success in boccia (Sayers et al., 2015). Additionally, Bronikowska et al. (2011) highlight the importance of balance in controlling the body position during the front-back oscillation when throwing the ball.

In recent years, balance training has become increasingly important in training programs and in improving athletic performance. Sports require the performance of high-level motor tasks while maintaining static and dynamic balance (Erkmen et al. 2007; Kucuk and Erim, 2021; Şahin et al., 2022; Pekel et al., 2023). It is important to note that balance requirements may vary from sport to sport. Therefore, it may not be possible to acquire a general balance skill that provides a good balance in all sports or situations. In other words, balance is specific to the skill being practiced and may vary depending on the sport (Singer, 1980).

Hemsball is a low-cost game with simple rules that can be played both indoors and outdoors. Good hand-eye coordination and concentration are important for serving and ball-handling skills (Işık and Zorba, 2020; Sever et al., 2016). Unlike traditional training methods, hemsball is a game that can be enjoyed by people of all ages. It can be easily adapted and played by children, adolescents, the elderly, and people with disabilities. The study conducted by Şentuna et al. (2020) and Avcı et al. (2022) suggests that hemsball training can be used for kinaesthetic and physical development.

This study aimed to investigate the impact of hemsball training on the balance and punto scores of boccia players, as well as to assess its effect on the development of their balance and punto performance.

MATERIALS AND METHODS

Research Model

The study employed an experimental method with a pre-test and post-test model with both experimental and control groups. The sample consisted of athletes between the ages of 12 and 14 who actively play boccia teams in Bingöl province and train for more than 7 hours weekly according to the training plan. The athletes, 15 in the control group and 15 in the experimental group were divided into two groups. The study lasted for 8 weeks and the experimental group received 60 minutes of hemsball training followed by boccia training, while the control group only received boccia training. Anthropometric measurements, including height, body weight, and BMI, as well as measurements of static and dynamic balance and punto (approach to target) scores, were taken from the participants before and after the training period. The study was carried out in accordance with the Declaration of Helsinki. An informed consent form was obtained from the participating athletes, indicating that their participation was voluntary. To eliminate the effects of learning on the test results, all athletes, including the control group, were informed of the training and testing procedures before the study. Approval to conduct this research was obtained from the Ethics Committee of Bingöl University Institute of Health Sciences on 18.10.2022, number 22/18, decision: 10 (see Appendix-1).

Data Collection Tools

Anthropometric measurements were used to determine the height, body weight, and body mass index (BMI) values of both the experimental and control athletes.

Table 1. Age, Height, Body Weight, and BMI values of the participants

Variables	Group	N	$\bar{x}$	Sd
Age (years)	Experiment	15	12.93	0.96
	Control	15	12.86	0.91
Length (m)	Experiment	15	1.57	0.11
	Control	15	1.61	0.08
Body Weight (kg)	Experiment	15	44.18	9.73
	Control	15	46.81	9.22
BMI (kg/m2)	Experiment	15	17.80	2.33
	Control	15	17.76	2.76

Table 1 presents the arithmetic mean and standard deviation values for both the experimental and control groups. The experimental group had a mean age of 12.93±0.96 years, a height of 1.57±0.11 m, a body weight of 44.18±9.273 kg, and a BMI of 17.80±2.33 kg/m2. The control group had a mean age of 12.86±0.89 years, a height of 1.61±0.08 m, a body weight of 46.81±9.22 kg, and a BMI of 17.76±2.76 kg/m2. As seen in Table 1, there were no differences in the means of the descriptive data for age, height, body weight, and BMI values between the athletes in the experimental and control groups before the training program, which indicates a homogeneous distribution between the groups.

Static Balance Measurement

The study employed the Pagani TM brand stabilometric platform (Elettronica Pagani, Italy) to measure static balance. This non-invasive method records body oscillations while standing. The system comprises a 50x50 cm platform that continuously calculates an individual's body weight and the position of the centre of gravity. The platform is connected to a computer system for data analysis. The athletes were instructed to stand on the platform with their feet at a 30-degree angle and a 2 cm distance between their heels. They were then asked to count slowly while maintaining an upright and comfortable position, with their gaze fixed ahead. The evaluation lasted for a total of 90 seconds, with 30 seconds allocated for each foot and an additional 30 seconds for both feet. The assessment was conducted without any visual or auditory distractions to avoid interfering with the child's attention (Carini et al. 2017).

Dynamic Balance Measurement

The dynamic balance stability was measured using a Libra (EasyTech) device. The balance platform has a large support area and consists of 3 interchangeable plugs with varying degrees of structural difficulty (40 cm = high; 24 cm = medium; 12 cm = easy). The participants were instructed to fixate their gaze on the computer screen, which was positioned 3 meters away at eye level. The level of difficulty was set to medium using the 24 cm plug. The dynamic balance test was conducted using a dynamic balance platform in the double-leg position. Two 30-second measurements were taken, and the best degree was recorded. Four parameters are calculated based on the dynamic balance result oscillating in a balanced position (Boccolini et al. 2013).

Punto (Approaching) Score Measurement

The 'Boccia Raffa Game Punto Score Scoring' application, developed by Tükenmez (2018), was utilized in the study. Accordingly, pre-test and post-test approach angles, as well as three throws at 10m, 11m, 12m, and 13m before and after 8 weeks of training were measured, and the Means were calculated. According to Tükenmez (2018), the scoring system awards 10 points for marbles approaching 50 cm in diameter, 7 points for those approaching 100 cm, 5 points for those approaching 150 cm, 3 points for those approaching 200 cm, and 0 points for marbles larger than 200 cm in diameter.

Hemsball Training Practice

The experimental group underwent an 8-week hemsball training, with each training session lasting 60 minutes and occurring 3 times a week, following the principle of continuity. During the informing phase, the athletes in the experimental group were provided with an overview of the history of the hemsball sport, the structure of the materials and field information, and the rules. Additionally, the experimental group was taught hemsball 1st-level throwing styles and training techniques. During the 8-week practice, the experimental group was presented with a program that included warm-up exercises, basic hemsball techniques, and tactics, shooting and reception techniques, as well as competition and training games. At the end of the study, the hemsball program was completed and evaluations were conducted. The control group continued their existing boccia training without any training program.

Data Analysis

The data collected from boccia athletes was analysed using the SPSS 25 package program. The pre-test and post-test distributions of the data were examined for each group, and the normality of the distributions and homogeneity of the variances were determined using the Mauchly Sphericity Test and Levene test. Based on

the test results, a Paired-Sample T-test was conducted to compare the dependent variables within each group. Sequential measurements were also taken. Graphs were created using the Excel program. All test results were presented as arithmetic means with standard deviations ($\bar{x}\pm$sd). The significance level was set at $p<0.05$.

FINDINGS

Table 2. Static Balance Comparisons between Experimental and Control Groups

Variables	Groups	N	In-group comparisons					Inter-group comparisons	
			Pre-test $\bar{x}\pm$Sd	Post-test $\bar{x}\pm$Sd	t	p	In-group difference (%)	F	p
Right-Left Standard Deviation (mm)	Experiment		-0.09±0.41	0.00±0.12	-0.943	0.362	-0.09(100)	0.069	0.794
	Control		0.02±0.42	0.09±0.32	-0.960	0.353	-0.07(-350)		
Forward-Backward Standard Deviation (mm)	Experiment		-0.03±0.33	-0.01±0.11	-0.284	0.781	-0.02(66.66)	0.370	0.548
	Control		-0.19±0.44	-0.12±0.31	-1.408	0.181	-0.07(36.84)		
Right-Left Mean Oscillation Velocity (mm/s)	Experiment		1.24±0.52	0.85±0.40	**4.285**	**0.001**	0.39(31.45)	2.672	0.113
	Control		1.25±0.52	1.04±0.43	**3.042**	**0.009**	0.21(16.8)		
Forward-Backward Mean Oscillation Velocity (mm/s)	Experiment		1.27±0.47	0.87±0.43	**8.038**	**0.000**	0.4(31.49)	**4.957**	**0.034**
	Control		1.26±0.41	1.07±0.33	**2.467**	**0.027**	0.19(15.07)		
Pressure Centre Analysis (mm)	Experiment		38.88±11.54	32.90±12.00	**3.255**	**0.006**	5.98(15.38)	**6.197**	**0.019**
	Control		37.16±12.80	35.78±12.84	**7.140**	**0.000**	1.38(3.71)		
Oscillation Area (cm2)	Experiment		9.51±9.58	7.52±8.63	**3.319**	**0.005**	1.99(20.92)	**6.491**	**0.017**
	Control		5.02±4.55	4.65±4.14	1.691	0.113	0.37(7.37)		

*p<0.05

Upon examining Table 2, no significant difference was found in the pretest-posttest comparisons of the experimental and control groups for the 'Forward-Backward Standard Deviation' value. Additionally, there was no statistically significant difference between the groups. Furthermore, no statistically significant difference was observed in the intra-group comparisons of both the experimental and control groups in the variable 'Forward-Backward Standard Deviation'. The pretest-posttest comparison between the experimental and control groups showed a statistically significant difference at the $p<0.05$ level in the 'Left-Right Mean Oscillation Velocity' value. However, no statistically significant difference was found in intergroup comparisons. In the pretest-posttest inter-group comparison, a statistically significant difference was observed at the $p<0.05$ level between the experimental and control groups in the 'Forward-Backward Mean Oscillation Velocity' value. A statistically significant difference at the $p<0.05$ level was found in inter-group comparisons. The 'Pressure Centre Analysis' showed a significant difference at the $p<0.05$ level in the pretest-posttest comparisons of the experimental and control groups. Additionally, a significant difference was found in inter-group comparison. Upon examination of the 'Oscillation Area' variable, a statistically significant difference was observed at the $p<0.05$ level in the inter-group comparison of the experimental group. Conversely, no significant difference was found in the control group. Furthermore, in inter-group comparisons, a statistically significant difference was observed at the $p<0.05$ level.

Table 3. Dynamic Balance Comparisons between Experimental and Control Groups

Variables	Groups	N	In-group comparisons					Inter-group comparisons	
			Pre-test $\bar{x}\pm$Sd	Post-test $\bar{x}\pm$Sd	t	p	In-group difference (%)	F	p
Dynamic Stability Performance (s)	Experiment	15	4.23±3.46	3.02±3.39	**5.629**	**0.000**	1.18(28.09)	0.765	0389
	Control	15	5.70±3.41	5.04±3.66	1.124	0.280	0.66(11.57)		
Right Oscillation Area	Experiment	15	44.94±21.12	39.60±16.82	1.555	0.142	5.34(11.88)	0.963	0.335
	Control	15	50.00±27.43	48.12±25.56	**2.255**	**0.041**	1.88(3.76)		
Left Oscillation Area	Experiment	15	10.21±5.19	7.82±5.16	**7.279**	**0.000**	2.39(23.40)	3.120	0.088
	Control	15	18.98±13.66	18.02±13.12	1.301	0.214	0.96(5.05)		
Right External Oscillation Area	Experiment	15	4.19±4.24	2.26±4.00	**3.813**	**0.002**	1.93(46.06)	1.060	0.312
	Control	15	7.76±7.89	6.98±7.30	0.786	0.445	0.78(10.05)		

Left External Oscillation Area	Experiment	15	0.42±0.50	0.07±0.14	**2.523**	**0.024**	0.35(83.33)	1.068	0.310
	Control	15	0.74±1.01	0.62±1.05	0.750	0.466	0.12(16.21)		
Right Oscillation Reaction Time	Experiment	15	2.32±2.39	1.66±2.25	0.978	0.344	0.66(28.44)	0.003	0.957
	Control	15	3.62±3.24	3.00±2.87	1.981	0.068	0.62(17.12)		
Left Oscillation Reaction Time	Experiment	15	0.81±0.57	0.23±0.29	**3.650**	**0.003**	0.58(71.60)	0.083	0.775
	Control	15	0.98±0.90	0.47±0.62	**2.550**	**0.023**	0.51(52.04)		

***p<0.05**

Upon examining Table 3, a comparison of dynamic balance between the experimental and control groups was conducted. The variable 'dynamic balance performance' showed a significant difference at the p<0.05 level in the experimental group's in-group comparisons. However, no significant difference was found in the control group or inter-group comparisons. Statistically significant differences were found at the p<0.05 level in the pretest-posttest comparisons of the control group when the 'Right Oscillation Area' was analysed. However, no significant difference was found in the experimental group. Additionally, no statistically significant difference was found in inter-group comparisons. Upon analysis of the 'Left Oscillation Area', no statistically significant difference was observed in the control group. However, a statistically significant difference was observed at the p<0.05 level in the pretest-posttest comparison of the experimental group. No significant difference was found in intergroup comparisons. There were no significant differences found in inter-group comparisons. When analysing the 'Right External Oscillation Area', a statistically significant difference was found at the p<0.05 level in the pretest-posttest comparison of the experimental group, while no statistically significant difference was found in the control group. No statistically significant difference was found in the control group when analysing the 'Left External Oscillation Area'. However, a statistically significant difference was found at the p<0.05 level in the pretest-posttest comparison of the experimental group. Additionally, no significant difference was found in inter-group comparisons. No statistically significant difference was found in the in-group comparisons of both the experimental group and the control group when analysing the 'Right Oscillation Reaction Time' variable. No significant difference was found between the groups. However, in-group comparisons of both the experimental and control groups showed a significant difference in the 'Left Oscillation Reaction Time' variable at the p<0.05 level.

Table 4. Punto Score Comparisons in Boccia/Rafta Game between the Experimental and Control Groups

Variables	Groups	N	In-group comparisons					Inter-group comparisons	
			Pre-test x̄±Sd	Post-test x̄±Sd	t	p	In-group difference (%)	F	p
Boccia/Rafta Game Score	Experiment	15	5.53±2.41	7.46±2.03	**-6.349**	**0.000**	-1.93(-34.90)	4.094	**0.048**
	Control	15	5.13±2.53	6.06±1.79	-1.933	0.074	-0.93(-18.12)		

*p<0.05

Upon examining Table 4 and analysing the 'Punto Score variable, a significant difference was found at the p<0.05 level in the pretest-posttest comparisons of the experimental group. Conversely, no difference was observed in the control group. Additionally, a significant difference was found at the p<0.05 level in inter-group comparisons.

DISCUSSION

This study investigated the effect of an 8-week hemsball training on the balance and punto scores of athletes playing in Bingöl Boccia teams aged between 12 and 14 years. In the boccia, petanque, or bowling technique, the balance of both the lower and upper extremities is crucial for executing and completing the movement. Therefore, it is essential to have a comprehensive understanding of balance performance in both static and dynamic conditions for effective balance training (Şimşek and İnci, 2022). Additionally, the mechanism of 'balance with object' (balance provided by additional equipment) also plays a significant role in boccia/petanque. Despite the importance of balance in boccia sport, there is limited literature on balance assessment (Şimşek and İnci, 2022).

Febrianingrum and Diana (2021) conducted a study on the development of gross motor skills in 30 children aged 4-5 years through boccia practice. The study found a significant improvement in the children's gross motor skills, including strength, agility, balance, accuracy, flexibility, and coordination. In a study examining the effect of balance and physical activity level of master boccia players on team success, Arslan (2018) reported a positive relationship between players' balance, weekly training time, and physical activity.

After an 8-week implementation to determine the effect of balance training on the punto score in the boccia/raffa category, the experimental group showed significant improvement in static balance test results. The right foot increased from 13.90 to 34.00, the left foot increased from 12.80 to 24.00, and the balance scores improved by 117.22%. Specifically, while the right foot increased from 15.40 to 24.60, the left foot increased from 8.10 to 14.70, resulting in a balance score of 67.33%. The study revealed that the experimental group showed a significant improvement in static balance compared to the control group. This represents a 49.89% increase in favour of the experimental group (Tükenmez, 2008). McGrath and Cassel (2002) reported that balance is a crucial factor that affects player performance, and it is necessary to protect against fall injuries, especially during shooting.

Evaluations of physiological and physical effects should be compared with similar branches and training programs. Various studies have revealed the effects of multimodal games and sports on velocity, reaction, strength, and balance (Sever et al., 2016). Korkusuz (2019) carried out a study on students aged 12-14 years and reported an improvement in their motor skills, attention, balance, and back-leg strength development as a result of playing hemsball. Sever et al. (2016) conducted a study titled 'The effect of 8-week hemsball training on balance, reactive agility and lower extremity strength'. The study involved 50 primary school students with a mean age of 8.82 years who played hemsball for 8 weeks. The researchers measured the students' static and dynamic balances at the end of the study and found that hemsball training had a statistically significant positive effect on both types of balance.

Todorova et al. (2014) observed that regular hemsball activities strengthened the connection between special physical equipment, existing movement skills, and some physical processes in individuals with disabilities. Işık (2016) investigated the impact of the hemsball game skill development program on the motor competence levels (balance, bilateral coordination, and upper extremity coordination) of mentally disabled children aged 12-16 years. The program was applied three days a week for 60 minutes a day for 12 weeks, with 25 students included in the experimental group. At the end of the application, a significant difference was observed between the pre-test and post-test scores of balances, bilateral coordination, and upper extremity coordination in the experimental and control groups, favouring the experimental group. In Öncel's (2021) study, students aged 12-14 years who practiced hemsball sports showed positive progress in their motor skill development levels. Compared to students who did not play hemsball, those in the experimental group made fewer mistakes in attention and balance tests and were more effective in developing back-leg strength. In their study, Şüyün (2021) focused on a 6-week hemsball exercise program to examine its effect on the balance skills of boys aged 12-13 years. The program was applied for 3 days a week and resulted in a positive increase in balance skills compared to boys who did not play hemsball sport.

The study examined the effect of a hemsball game skill development program on the motor competence levels (balance, bilateral coordination, upper extremity coordination) of 50 children with mild and moderate intellectual disabilities aged 12-16. The experimental group (n=25) received a standard hemsball training program for 60 minutes a day, 3 days a week for 12 weeks, while the control group (n=25) did not receive any training. The results showed a significant improvement in motor competence levels in the experimental group compared to the control group. The study found a significant difference in balance levels between the experimental and control groups after the hemsball skill development program was applied. The balance levels of the control group did not show a significant difference between the pre-test and post-test ($p > 0.05$), while the balance levels of the experimental group did show a significant difference ($p < 0.05$). According to Işık and Zorba's (2020) study, the hemsball basic training program was found to be more effective in improving all motor competence tests, including balance, bilateral coordination, and upper extremity coordination, in individuals with moderate intellectual disabilities compared to those with mild intellectual disabilities.

A study was conducted in collaboration with the Sports for All Federation of Turkey and Istanbul Aydın University. Elementary school students were divided into two groups: the experimental group and the control group. The experimental group received intensive hemsball training for 8 weeks, while the control group did not receive any intervention. Balance values were evaluated by comparing the baseline and outcome measurements of both groups. The Stork Balance Test was employed to measure balance. The study's results indicate that hemsball training had a significant impact on balance skills in the experimental group. No significant changes were observed in the control group (Sever, 2017).

Our study found that 8 weeks of hemsball training improved static and dynamic balance development in young boccia athletes (see Tables 2 and 3). The results of the experimental group, which received hemsball training in addition to boccia training, were similar to those of many other studies. Boccia is a strategic sport that also involves shooting skills. According to Arslan (2018), the coordination of the athlete's dominant hand, leg, and eye in their posture position is crucial. At the end of his 8-week study, Tükenmez (2018) found that adding at least 30 minutes of static and dynamic balance training to boccia training improved the balance coordination of athletes and significantly increased their point accuracy rate in the boccia/raffa category. The study data showed that dynamic balance training was approximately 23% effective and static balance training was 3% effective in improving the point accuracy rate. Therefore, the study concluded that balance training is an important factor in achieving success in boccia.

The study titled 'The Effect of Hemsball Shooting on Fine Motor Skills in Hearing Impaired Children' found that hemsball shooting techniques significantly improved the fine motor competence levels of hearing-impaired children, including fine motor sensitivity, fine motor integration, and manual dexterity. The study also found that the effect of hemsball shooting techniques on motor skills did not differ significantly according to gender, and the application had positive effects on both girls and boys (Işık and Kılınç, 2021). Our study found that 8 weeks of hemsball training had a positive impact on the point score performance of young boccia athletes (see Table 4). When comparing the results of the experimental group that received hemsball training in addition to boccia training with the literature, we found that the results were similar to those of many other studies.

CONCLUSION

This study analysed the static balance measurement results of the hemsball training application on young boccia athletes for 8 weeks. The experimental group showed a significant difference ($p<0.05$) in most of the static balance variables between the pre-test and post-test comparisons. However, no statistical difference ($p>0.05$) was found in the control group or inter-group comparisons (see Table 2). Significant differences ($p<0.05$) were observed in most of the dynamic balance variables of the hemsball training practice when comparing the pretest and posttest results of the experimental group. However, no statistical differences were found in the control group or inter-group comparisons ($p>0.05$) (see Table 3).

The data analysis results revealed a significant difference at $p<0.05$ level in the pre-test and post-test comparisons of the experimental group in the punto score variable. However, no difference was found in the control group. Additionally, there was no statistical difference ($p>0.05$) found in inter-group comparisons (refer to Table 4). It was concluded that hemsball training can have a positive impact on the static and dynamic balance as well as the punto score performance among young boccia athletes.

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