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Comparison of Selected Off-Ice Performance Parameters in Female Ice Hockey and Figure Skating Athletes

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Abstract

The aim of this study is to compare selected off-ice performance parameters between female ice hockey and figure skating athletes. The study was conducted with 20 female athletes (10 ice hockey players and 10 figure skaters) who compete at the national level in Ankara, Türkiye. The athletes underwent anthropometric measurements, vertical jump, reaction time, agility, speed, and coordination tests. The JASP 0.19 software was used for data analysis. Statistical comparisons between groups were performed using the Independent Samples T-Test. Additionally, all obtained data were analyzed using Cohen's d method to determine effect sizes. The significance level was set at $p < 0.05$. The results indicated that ice hockey players demonstrated significantly superior performance compared to figure skaters in agility ($p = 0.013$), speed ($p = 0.008$), right-hand reaction time ($p = 0.022$), and auditory reaction time ($p = 0.019$). However, no significant difference was found between the groups in vertical jump ($p = 0.518$), coordination ($p = 0.192$), or left-hand reaction time ($p = 0.304$). The findings suggest that ice hockey players excel in dynamic and reaction-based skills. This may be attributed to the sport's demands for high speed and frequent directional changes. Additionally, the differences in training structures, physical requirements, and movement dynamics of both disciplines may contribute to these results.

Keywords: Ice hockey, Figure skating, Off-ice performance

Introduction

Ice hockey is a team sport that requires multiple technical skills, such as skating, shooting, and body control, and is organized with game phases interspersed with passive recovery periods (Brocherie et al., 2018). Female ice hockey players require not only strength, power, and agility but also a high level of aerobic and anaerobic energy system capacity (Bigg et al., 2022). Figure skating, on the other hand, is a popular winter sport and an integral part of the Winter Olympic Games (Soligard et al., 2015). It is a unique sport that combines high levels of strength and physical performance parameters with grace and artistry (Lipetz & Kruse, 2000). Figure skating consists of five distinct disciplines: men's singles, women's singles, pairs, ice dance, and synchronized skating. Each discipline offers multiple competitive and testing levels, all of which are built upon similar technical elements. Skaters are not restricted to a single discipline and may choose to train and compete in multiple disciplines (U.S. Figure Skating, 2025). Many successful figure skaters begin training at the age of six. During adolescence, they typically engage in 15 to 30 hours of on-ice training per week, in addition to 5 to 15 hours of off-ice training (Lipetz & Kruse, 2000; Smith, 2000). It is estimated that elite skaters perform approximately 50 to 100 jumps daily (Bruening & Richards, 2006). To achieve success, figure skaters require a combination of physical performance parameters, including flexibility, strength, power, cardiovascular endurance, agility, speed, coordination, and balance (Cabell & Bateman, 2018; Cruz et al., 2021).

Since the combination of performance characteristics may vary between female ice hockey and figure skating athletes, coaches and strength and conditioning specialists can design training programs by identifying athletes' strengths and weaknesses. As on-ice skills become increasingly complex, athletes participate in off-ice training programs and assessments to meet the performance requirements necessary for on-ice execution. The limited number of ice rink facilities in our country can be considered a disadvantage. However, the fact that these facilities are enclosed training venues provides the advantage of year-round training opportunities. This advantage can be utilized to mitigate the impact of facility scarcity and limited on-ice training hours while also supporting the fulfillment of on-ice performance requirements.

Previous studies have demonstrated that athletes' on-ice performance might be enhanced via improving their conditioning competencies (Çömük & Erden, 2010; Dæhlin et al., 2017; Lagrange et al., 2020). However, data on off-ice performance parameters based on ice hockey league levels and figure skating disciplines remain limited. Given this gap, the present study aims to compare the off-ice performance parameters of female ice hockey and figure skating athletes.

Material and Method

Ethics committee permission: This study was conducted in accordance with the latest version of the Helsinki Declaration and involved female ice hockey and figure skating athletes actively competing in Ankara. Ethical approval for the study was obtained from the Ethics Committee of the Faculty of Sport Sciences at Atatürk University (Date: 25.02.2025; No: E-70400699-000-2500070879). Additionally, participants were provided with the necessary information before the study, and they were required to complete an Informed Consent Form.

Research Model

This study, which aims to compare selected off-ice performance parameters of female ice hockey and figure skating athletes, was designed as a cross-sectional study within the scope of quantitative research methods. In the cross-sectional survey model, variables are characterized through a single measurement (Büyüköztürk et al., 2013). This research approach is designed to depict a past or present situation as it exists (Karasar, 2009).

Research Group

The study included 20 participants (10 ice hockey players and 10 figure skaters). The mean age for both athlete groups was 17.40 ± 0.69 years. Additionally, all participants were right-handed individuals who competed in the 2024-2025 season in the junior women's ice hockey league and junior women's figure skating disciplines. They trained regularly at least three times per week and had been actively engaged in ice hockey or figure skating for a minimum of five years.

Tests and Data Collection Procedures Used in the Study

Participants were instructed to refrain from performing intense exercise and consuming performance-enhancing ergogenic supplements at least 48 hours before the measurements. Physical assessments were conducted between 09:00 and 11:00 AM. The test sessions were carried out over two consecutive days:

Day 1: Anthropometric measurements, vertical jump test, and hand and auditory reaction time assessments were conducted.

Day 2: Agility test, 20-meter sprint test, and coordination test were performed.

Before the tests, a standardized warm-up program lasting approximately 15 minutes was applied. The warm-up consisted of two phases:

In the first phase, a low-intensity running session was performed to raise body temperature, followed by general stretching exercises.

In the second phase, a sport-specific warm-up was conducted, where the exercises to be performed were repeated at moderate intensity.

Anthropometric Measurements: The body weights of the athletes were measured using a Tanita BC 730 digital scale (Tanita Health Equipment, Kowloon, Hong Kong), while their heights were recorded in centimeters using a Harpenden stadiometer (Holtain Limited, Crosswell, Crymych, Pembs, United Kingdom). During height measurements, participants stood upright, barefoot, with their heels together, looking straight ahead, and held their breath after deep inspiration. The highest point on the head was measured with 1 mm accuracy. For body weight measurements, participants wore only shorts and a sports T-shirt, and data were recorded once they appeared on the device screen. The Body Mass Index (BMI) was calculated using the formula BMI = body mass (kg) / height² (m²) (Garrow & Webster, 1985).

Vertical Jump Test: The vertical jump performance of the athletes was measured using the Smart Speed electronic system (VALD Performance, Brisbane, Queensland, Australia). The test was conducted following a 10-minute active warm-up. Athletes performed the jump when they felt ready, aiming to reach the highest possible point before landing back on the mat. Jump heights were electronically recorded in centimeters (cm), and the best of three attempts was recorded for analysis.

Reaction Time Test: The athletes' visual and auditory reaction times were measured using the Newtest 1000 device (Data Technical Trade, Çiğli, İzmir). The device provides three types of stimuli: stimuli 1 and 3 are visual (light), while stimulus 2 is auditory (sound). The measurements were conducted in a quiet and well-lit environment. A pre-prepared information form was used to record the measurement results for each athlete. The Newtest

1000 device was positioned 10 cm away from the table, and the participants were instructed to place their dominant hand on the table. Upon hearing the "Ready" command, either a light or sound stimulus was given, and the athletes were required to press the corresponding button as quickly as possible. The results were recorded on pre-prepared measurement sheets. Each participant performed 10 trials for both auditory and visual stimuli. The first five trials were considered practice, and the average of the last five trials was recorded as the reaction time (Tamer, 2000).

Agility Test: The T-test is a widely used method for assessing agility performance (Pauole et al., 2000). In this study, the BlazePod device (BlazePod, Miami, Florida, United States) was utilized for the T-test. BlazePod is a modular training tool designed to enhance agility, balance, power, endurance, reaction time, and speed. This innovative training system incorporates sensors and light waves as visual stimuli, offering over 100 interactive exercises that can be performed anytime and anywhere. Additionally, it enables the measurement of performance statistics with millisecond precision (Mohamed Prince, 2019). The test begins with the athlete standing behind point A in the starting position. Upon receiving the command, the athlete sprints 10 meters to reach the first designated area (point B) and touches the illuminated button, turning off the light. After the light goes out, the athlete moves 5 meters to the right to point C using lateral shuffle steps, touches the lighted button, and turns it off. The athlete then moves 5 meters to the left to point D using lateral shuffle steps, touches the button, and turns it off. Finally, the athlete runs 10 meters backward to return to the starting point A, touches the button, and completes the test (Steff et al., 2024). The test is considered invalid if the athlete fails to touch the lighted button or does not turn off the illuminated signal, and this rule applies to every contact point. The BlazePod system is synchronized with an application-based interface that provides real-time feedback on touch count, reaction time, and errors for each participant after every test. Athletes were given a 15-second rest period between sets of the same test and a one-minute rest before proceeding to the next test in the sequence.

20-Meter Sprint Test: For the 20-meter sprint test, a straight 20-meter track was designated inside the sports hall. The SE-167 Photocell Electronic Chronometer System (Seven Electronics, Istanbul, Türkiye), which measures with a ±0.01-second precision, was placed at the start and finish points to ensure accurate timing. Measurements were recorded electronically as athletes completed the sprint.

Coordination Test: The athletes' coordination was assessed using The Wall Toss Test, in which a ball was thrown from one hand towards a wall from a 2-meter distance using an underarm motion, and the athlete attempted to catch it with the opposite hand. The total number of successful catches within 30 seconds was recorded (Rashid & Lian, 2019; Szabo et al., 2021; Assar et al., 2022). Initially, the ball was thrown with the right hand and caught with the left, followed by a throw with the left hand and a catch with the right. This sequence was recorded as one complete action.

Data Analysis

The analysis of the data obtained in the study was conducted using the JASP 0.19 software (University of Amsterdam, Nieuwe Achtergracht 129B, AMS, NL). To determine whether the data followed a normal distribution, the Shapiro-Wilk test was applied. The results indicated that the data were normally distributed. Additionally, Levene’s test was conducted to assess whether the assumption of homogeneity of variances was met. The results showed no significant difference in variances, confirming that the variances were equal. Based on the findings of the Shapiro-Wilk test and Levene’s test, it was determined that parametric tests were appropriate for data analysis. Accordingly, statistical comparisons between groups were performed using the Independent Samples T-Test. Furthermore, all obtained data were analyzed using Cohen's d method to determine effect sizes. The significance level was set at p < 0.05.

Findings

Table 1. Comparison of selected physical descriptive parameters of participants using the independent samples t-test

Parameters	Group	n	Mean±SD	t	p	Cohen's d
Height (cm)	Ice Hockey	10	167±3.93	2.652	**0.016***	0.520
	Ice Skating	10	161±6.25			
Body Weight (kg)	Ice Hockey	10	61.80±11.72	1.946	0.067	0.488
	Ice Skating	10	52.36±9.88			
Body Fat Percentage (%)	Ice Hockey	10	23.76±4.99	0.645	0.527	0.452
	Ice Skating	10	22.32±4.99			
Body Mass Index (%)	Ice Hockey	10	21.82±3.78	1.137	0.270	0.461
	Ice Skating	10	19.92±3.68			

*p<0.05

As shown in Table 1, the selected physical descriptive parameters of ice hockey and figure skating athletes were compared using the Independent Samples T-Test. Height was recorded as 167±3.93 cm for ice hockey players and 161±6.25 cm for figure skaters. This difference was found to be statistically significant (t = 2.652, p = 0.016, Cohen's d = 0.520). Body weight was recorded as 61.80±11.72 kg for ice hockey players and 52.36±9.88 kg for figure skaters. This difference was not statistically significant (t = 1.946, p = 0.067, Cohen's d = 0.488). Body fat percentage was recorded as 23.76±4.99% for ice hockey players and 22.32±4.99% for figure skaters. This difference was not statistically significant (t = 0.645, p = 0.527, Cohen's d = 0.452). Body Mass Index (BMI) was recorded as 21.82±3.78 for ice hockey players and 19.92±3.68 for figure skaters. This difference was not statistically significant (t = 1.137, p = 0.270, Cohen's d = 0.461).

Table 2. Comparison of selected performance parameters of participants using the independent samples t-test

Parameters	Group	n	Mean±SD	t	p	Cohen's d
Left-Hand Reaction Time (millisecond)	Ice Hockey	10	388.00±47.36	-1.058	0.304	-0.473
	Ice Skating	10	409.60±43.89			
Right-Hand Reaction Time (millisecond)	Ice Hockey	10	366.90±42.67	-2.509	**0.022***	-1.122
	Ice Skating	10	415.30±43.60			
Auditory Reaction Time (millisecond)	Ice Hockey	10	313.40±60.04	-2.586	**0.019***	-1.157
	Ice Skating	10	372.90±41.08			
Vertical Jump (centimeter)	Ice Hockey	10	29.80±4.98	-0.659	0.518	-0.295
	Ice Skating	10	31.10±3.75			
Agility Test (T-Test) (second)	Ice Hockey	10	12.01±0.47	-2.770	**0.013***	-1.239
	Ice Skating	10	12.60±0.48			
20-Meter Sprint Test (second)	Ice Hockey	10	3.44±0.20	-2.990	**0.008***	-1.337
	Ice Skating	10	3.70±0.19			
Coordination Test (The Wall Toss Test) (number of catches)	Ice Hockey	10	26.60±2.91	1.354	0.192	0.606
	Ice Skating	10	23.30±7.13			

*p<0.05

As shown in Table 2, various performance parameters of ice hockey and figure skating athletes were compared using the Independent Samples T-Test. Left-hand reaction time was recorded as 388.00±47.36 milliseconds for ice hockey players and 409.60±43.89 milliseconds for figure skaters, with no statistically significant difference between the groups (t = -1.058, p = 0.304, Cohen's d = -0.473). Right-hand reaction time was 366.90±42.67 milliseconds for ice hockey players and 415.30±43.60 milliseconds for figure skaters, and this difference was statistically significant (t = -2.509, p = 0.022, Cohen's d = -1.122). Auditory reaction time was 313.40±60.04 milliseconds for ice hockey players and 372.90±41.08 milliseconds for figure skaters, with a statistically significant difference (t = -2.586, p = 0.019, Cohen's d = -1.157). Vertical jump performance was 29.80±4.98 cm for ice hockey players and 31.10±3.75 cm for figure skaters, with no statistically significant difference (t = -0.659, p = 0.518, Cohen's d = -0.295). T-Test completion time was 12.01±0.47 seconds for ice hockey players and 12.60±0.48 seconds for figure skaters, and the difference was statistically significant (t = -2.770, p = 0.013, Cohen's d = -1.239). 20-meter sprint completion time was 3.44±0.20 seconds for ice hockey players and 3.70±0.19 seconds for figure skaters, and this difference was also statistically significant (t = -2.990, p = 0.008, Cohen's d = -1.337). In the Wall Toss Test, the average number of successful catches was 26.60±2.91 for ice hockey players and 23.30±7.13 for figure skaters, with no statistically significant difference (t = 1.354, p = 0.192, Cohen's d = 0.606).

Discussion

In this study, selected off-ice performance parameters of female ice hockey and figure skating athletes were compared. Among the selected physical parameters analyzed, height (p = 0.016) showed a statistically significant difference, indicating that ice hockey players have a taller physical structure compared to figure skaters. However, despite ice hockey players exhibiting higher values in body weight (p = 0.067), body fat percentage (p = 0.527), and body mass index (BMI) (p = 0.270) compared to figure skaters, these differences were not statistically significant. Astrand et al. (2003) emphasized that body weight and body composition are crucial factors, particularly in weight-bearing sports. The physical and anthropometric profiles of elite female ice hockey players in Türkiye were first examined by Karakaş et al. (2019). Their findings revealed that Turkish female ice hockey players had lower body weights but higher body fat percentages compared to elite female athletes from 11 other countries. The first study to report on the physical characteristics of elite female ice hockey players in the United States was conducted by Ransdell and Murray (2011), which found that athletes had an average height of 169.7±6.9 cm, an average weight of 70.4±7.1 kg, and an average body fat percentage of 15.8±1.9%. More recently, Zhang et al. (2024) examined the anthropometric and performance parameters of 31 female ice hockey players from China. Their results indicated that the athletes had an average body weight of 65.12±7.78 kg, an average height of 169.15±5.43 cm, and an average body fat percentage of 22.45±4.81%. Comparatively, the ice hockey players in the present study were found to be shorter, lighter, and had a higher body fat percentage than both American and Chinese athletes. These findings suggest that training programs and nutritional strategies should be reviewed to optimize performance. Additionally, increasing interdisciplinary studies could be beneficial in further understanding the impact of different physical characteristics on athletic performance across various sports disciplines.

Athletes engaged in strength- and power-based sports tend to have higher lean body mass, whereas those participating in aerobic-based sports generally have lower lean body mass. Additionally, athletes whose sports require greater body mass tend to have higher body fat percentages compared to those engaged in aerobic sports (Nemoto et al., 1990). Niinima (1982) reported that figure skaters tend to be shorter, leaner, and have lower body fat percentages compared to their peers. Similarly, Kriemler et al. (1997) found that figure skaters aged 9–17 years had an average body fat percentage of 14.5% and an average body weight of 40.3 kg. Leone et al. (2002) determined the average body weight of figure skaters aged 12–17 years to be 46.6 kg, while Ziegler et al. (2002) reported that figure skaters aged 14–16 years had an average body weight of 51.9 kg and a body fat percentage of 19.2%. However, the data from these studies were not compared with a control group. As noted in the literature, figure skating has both aerobic and anaerobic components (Strength and Conditioning Program for Figure Skating, 1998), which may explain why no significant difference in body fat percentage was observed between the two groups in this study. Kriemler et al. (1997) also reported that figure skaters experienced a pubertal delay of approximately three years, likely due to their lower height and weight compared to their peers. This pubertal delay and low body weight may be associated with training intensity and nutritional habits among figure skaters. Therefore, to ensure long-term athlete health, it is crucial to closely monitor growth and development processes and provide adequate nutritional support.

Upon examining the hand reaction time results of our study, the left-hand reaction time was found to be 388.00±47.36 ms for ice hockey players and 409.60±43.89 ms for figure skaters. Although ice hockey players exhibited superior performance in this parameter, the difference was not statistically significant ($t = -1.058$, $p = 0.304$, Cohen's $d = -0.473$). In terms of right-hand reaction time, ice hockey players recorded an average of 366.90±42.67 ms, whereas figure skaters averaged 415.30±43.60 ms. The superior performance of ice hockey players in this parameter was statistically significant ($t = -2.509$, $p = 0.022$, Cohen's $d = -1.122$). A review of the literature reveals that Gürsoy et al. (2017) compared the hand reaction times of female national athletes competing in short-track speed skating and curling, reporting no statistically significant difference between the two groups. Çınar et al. (2009) found that female handball players had an average right-hand reaction time of 205.17 ms and a left-hand reaction time of 208.34 ms, while female boxers had right-hand and left-hand reaction times of 192.47 ms and 193.33 ms, respectively. Yüksek & Cicioğlu (2004) reported that female judo athletes had an average right-hand reaction time of 237.59 ms and a left-hand reaction time of 243.68 ms. Our findings indicate that ice hockey players demonstrated superior right-hand reaction time performance compared to figure skaters. The statistical significance of this difference may be attributed to the fast decision-making and instantaneous reaction requirements during ice hockey gameplay. However, the absence of a significant difference in left-hand reaction time suggests a possible influence of dominant hand usage. Future research should further investigate the impact of hand dominance and sport-specific training on reaction times in greater detail.

Upon examining the auditory reaction time results of our study, ice hockey players recorded an average reaction time of 313.40±60.04 ms, while figure skaters had an average reaction time of 372.90±41.08 ms. The difference in this parameter, where ice hockey players exhibited superior performance, was found to be statistically significant ($t = -2.586$, $p = 0.019$, Cohen's $d = -1.157$). A literature review indicates that Avcı et al. (2023) investigated auditory reaction times in elite and non-elite ice hockey players, finding that elite players exhibited significantly better performance than their non-elite counterparts ($p = 0.02$). Aslan et al. (2022) investigated the visual and auditory reaction times of male and female athletes aged 14–18 years participating in team and combat sports, finding that team sport athletes exhibited more favorable reaction times compared to combat sport athletes. Lodhi and Khakha (2023) reported that volleyball players outperformed basketball players in auditory reaction tests, while basketball players demonstrated superior visual reaction times. Similarly, Tokgöz (2022) found that female volleyball players exhibited better visual and auditory reaction performance compared to basketball players. Our findings indicate that ice hockey players outperformed figure skaters in auditory reaction time, and this dissimilarity was significant on a statistical level. This result is consistent with previous studies suggesting that auditory reaction times tend to be superior in team sports compared to individual sports. The demands of ice hockey, including rapid decision-making, immediate responses to stimuli, and the simultaneous processing of multiple sensory inputs, may contribute to this advantage. Future research exploring the relationship between auditory reaction time and in-game performance could aid in the development of sport-specific reaction training programs to optimize athlete performance.

Our study's vertical jump performance findings indicated that ice hockey players achieved an average jump height of 29.80±4.98 cm, while figure skaters recorded 31.10±3.75 cm. The two groups differed on a statistically significant level ($t = -0.659$, $p = 0.518$, Cohen's $d = -0.295$). A review of the literature reveals varying results in different studies. Ransdell and Murray (2011) reported that female ice hockey players had an average vertical jump height of 50.3±5.7 cm. Zhang et al. (2024) found that female ice hockey players achieved 37.53±4.16 cm in the vertical jump test. Kayışoğlu and Bağcı (2023) observed that female ice hockey players had an average jump height of 24.61±6.71 cm. Janot et al. (2015) recorded an average vertical jump height of 35.7±6.0 cm for female ice hockey players, while Lemoyne et al. (2022) reported that female ice hockey players reached 43.87±6.05 cm in the vertical jump test. In figure skaters, Haguenauer et al. (2006) found that the weight of skates and foot positioning in plantar flexion during jumping negatively affected vertical jump performance. The discrepancies in the literature may stem from differences in training history, testing protocols, and physical characteristics of the athletes. Considering that skate weight and foot positioning could influence vertical jump height in figure skaters, future research should examine these factors in greater detail. Additionally, training programs focusing on quadriceps muscle development, which plays a crucial role in jump performance, may help figure skaters achieve optimal performance levels.

Upon examining the Agility Test (T-Test) results, ice hockey players recorded an average completion time of 12.01±0.47 sec, whereas figure skaters had an average completion time of 12.60±0.48 sec. The difference in this parameter, where ice hockey players exhibited superior performance, was found to be statistically significant ($t = -2.770$, $p = 0.013$, Cohen's $d = -1.239$). A review of the literature presents varying findings on agility performance. Çömük (2009), in a study investigating the postural characteristics and physical performance of figure skaters, found that lower and upper extremity muscle strength, flexibility, muscular endurance, standing long jump, agility, cardiovascular endurance, speed, and reaction time were significantly better in figure skaters compared to the control group ($p < 0.05$). Similarly, Leone et al. (2002) examined the anthropometric and motor performance characteristics of tennis, swimming, figure skating, and volleyball athletes, reporting that figure skaters exhibited superior agility and trunk flexibility. Mathe et al. (2023) emphasized that elite hand-body coordination is crucial for executing running, jumping, catching, changing direction, pushing, shooting, and blocking movements, supporting this claim with empirical data. In our study, the higher agility performance of ice hockey players may be attributed to their greater exposure to training that involves dynamic movements, such as rapid directional changes, acceleration, and deceleration. Future studies should further examine the factors influencing agility performance, contributing to the optimization of sport-specific agility training programs.

The 20-meter sprint test completion time was recorded as 3.44±0.20 seconds for ice hockey players and 3.70±0.19 seconds for figure skaters. The difference observed in favor of ice hockey players was statistically significant ($t = -2.990$, $p = 0.008$, Cohen's $d = -1.337$). A review of the literature reveals that Henriksson et al. (2016) reported the 20-meter sprint test performance of female ice hockey players as 3.50±0.18 seconds. Similarly, Kayışoğlu and Bağcı (2023) found that ice hockey players completed the 20-meter sprint test in 3.50±0.25 seconds. These findings suggest that the greater emphasis on explosive power and speed components in ice hockey training may contribute to the superior sprint performance of ice hockey players compared to figure skaters. However, a more detailed analysis of the underlying physiological and biomechanical factors is necessary to develop more effective speed training programs tailored to athletes' specific needs.

According to the The Wall Toss Test (number of successful catches) results, ice hockey players recorded an average of 26.60±2.91, while figure skaters had an average of 23.30±7.13. Although ice hockey players demonstrated superior performance in this parameter, the difference was not statistically significant ($t = 1.354$, $p = 0.192$, Cohen's $d = 0.606$). A review of the literature reveals that Millard et al. (2024) used the Ball Wall Toss Test to assess hand-eye coordination in rugby and netball players. Their results indicated that rugby players recorded an average of 29.91±3.67, netball players 24.23±3.73, and sedentary individuals 20.66±3.15, with significant differences observed both between the athlete groups and in comparison, to sedentary individuals. Vikashpaul and Bhat (2019) compared the hand-eye coordination of volleyball and hockey players using the Hand-Wall Toss Test, finding no significant difference between the two groups. Kaur (2020) assessed hand-eye coordination among male and female hockey players aged 18–25 using the Ball Catch and Throw Test, reporting that men demonstrated significantly superior hand-eye coordination compared to women. Dhatchiyayani and Subramaniam (2017) highlighted that coordinative ability training could lead to significant improvements in the hand-eye coordination levels of ice hockey players. Our findings suggest that ice hockey players outperformed figure skaters in the Wall Toss Test, but the difference was not statistically significant. Studies in the literature indicate that hand-eye coordination can be improved through sport-specific training and that coordination abilities may vary across different sports disciplines. Given the positive effects of coordinative ability training on hand-eye coordination, figure skaters may also benefit from incorporating similar training approaches to enhance their motor skills. Future research should further explore the relationship between hand-eye coordination and sport-specific performance, contributing to the development of sport-specific training programs aimed at optimizing coordination skills.

Conclusion

This study compared the selected physical and performance parameters of ice hockey and figure skating athletes, highlighting sport-specific differences between the two disciplines. The findings indicate that ice hockey players demonstrated better performance in agility, speed, auditory reaction time, and right-hand reaction time, which are dynamic attributes crucial to their sport. This may be attributed to the high-speed and directional change demands inherent in ice hockey. Additionally, the differences in training structures, physical requirements, and movement dynamics between the two sports may have also contributed to these variations.

Limitations and Recommendations

There are several limitations to this study. To begin with, sample size is relatively small ($n = 20$; 10 ice hockey and 10 figure skating athletes) and this may limit the generalizability of the findings. Future studies with larger sample groups would allow for a more comprehensive examination of performance differences between these sports. Second, only specific physical and motor skill parameters were assessed in this study. Future research should incorporate a broader range of tests and analyses to provide a more in-depth evaluation. Additionally, on-ice performance was not evaluated, as the study focused exclusively on off-ice physical and motor skill tests. Therefore, future studies could compare on-ice performance data with off-ice test results to enable a more holistic assessment. Finally, this study employed a cross-sectional design, which does not account for the long-term effects of training programs on athlete performance. To gain a more detailed understanding of performance development, future research should consider longitudinal follow-up studies and experimental research examining the effects of different training methods on athlete development.

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