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Comparative Analysis of Hand Steadiness and Balance Ability Between Male Cricket and Softball Players of Uttar Pradesh

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Abstract

The current study was carried out with the purpose of carrying out comparative analysis of hand steadiness and balance ability in Uttar Pradesh male cricket and softball players. Sixty men were deployed who were subjects and they were cricket (n = 30) and softball (n = 30), and their age groups were between 18 to 26 years. The sample population was chosen through random sampling methods in variety of sports academies and clubs across Uttar Pradesh. The steadiness of the hand was measured using a standardized Hand Steadiness Test and the ability of balance was measured by the Bass Stick Test. The data obtained were examined through descriptive statistics in terms of mean and standard deviation to compare the performance of both groups. Findings also revealed that the hand steadiness of cricket players was higher compared to the same of softball players, whereas there was slightly better balance capacity of softball players compared to those of their cricket counterparts. These results indicate that sport-specific needs can influence the acquisition of psychomotor skills in athletes. The research has a possible value to coaches and trainers who want to develop specific training plans to improve the quality of manual steadiness and hand balance especially among cricketing and softball players.

Keywords: Hand Steadiness, Balance Ability, Cricket, Softball

INTRODUCTION

Physical and motor skills are important in the performance of sports since they help the players make the required skills work, stay calm, and adjust to the changing playing environments (Choudhary, 2019). The most important of such skills are hand steadiness and balance ability which play a vital role in the accuracy, coordination, and balance of the sportsperson on the field (Quatman-Yates et al., 2011; Alves et al., 2012). The balance ability is vital in the aspect of stabilizing and efficient movement, which is important in the proper transfer of force during sports activities, whereas hand steadiness is necessary in activities that need fine motor control like gripping, throwing, and catching (Shekar et al., 2021; Opala-Berdzik et al., 2021).

The importance of these motor skills is exemplified by Cricket and softball, which are rather popular in such regions as Uttar Pradesh, where both sports imply rapid positioning of the body, as well as controlled manual movement and the ability to concentrate (Choudhary, 2019; Quatman-Yates et al., 2011). Fast adaptation and pressure coping, which can lead to a significant influence on the performance of an athlete, require a more thorough investigation of the motor load exerted by a particular sport (Park et al., 2025).

The reason as to why hand steadiness and balance ability should be compared between players of both cricketing and softball can be attributed back to the different techniques and equipment being used in each sport (Choudhary, 2019; Steinberg et al., 2019). Although both kinds of sports may have some of the common principles of motor coordination, variations in the playing styles may cause certain adaptations in the motor skills (Park et al., 2025). The exploration of these differences is crucial to the discovery of their influence on the performance and injury risk factors related to the sport-specific load, especially among regional-level athletes, one of which is poorly studied against the background of elite athletes (Rejc et al., 2024). The enhanced knowledge in these domains can inform practices related to injury prevention, as the better the postural stability and the better the hand control, the more the risks of falls and incorrect landings become mitigated (Shekar et al., 2021; Torres et al., 2025).

It is also relevant to note that there are qualitative differences in motor skill performance with respect to the training experiences in such athletes. These experiences directly affect dynamic balance and proprioception, which is needed by any athlete, but is particularly important in those who take part in sports according to which the need to respond to a rapid change of positions (Choudhary,2019).

The main objective behind this experiment is to carry out comparative research of the hand steadiness and balance capability between the male players of both cricket and softball in Uttar Pradesh (Choudhary, 2019). This entails the determination of any sport-specific differences that can exist and what they entail in respect to training regimens and performance (Park et al., 2025). Through this, this study aims at filling the literature gap that exists on the motor skill abilities of regional athletes and provide useful information towards coaches and trainers who want to maximize training programs.

The hypothesized results of the present research should have serious practical manifestations in the life of sport coaches, trainers, and sports scientists as they will present data-driven information on the motor skills required in cricket and softball (Choudhary, 2019; Torres et al., 2025). The information is essential to designing specific training programmes with the focus on addressing the issue of hand steadiness and balance to maximize the performance of athletes and minimise the risks of injury (Quatman-Yates et al., 2011; Rejc et al., 2024). This kind of evidence-based practices can be used to streamline training interventions which will eventually result in improved performance efficiency among athletes in different levels.

This comparative analysis is limited to male cricketers and softball players in the state of Uttar Pradesh giving the scope of the analysis which allows a more in-depth look at the motor skills in a particular cultural and geographic environment (Steinberg et al., 2019). However, the results might not be applicable to all female athletes, players in various parts of the world, or those that play at the highest levels (Rejc et al., 2024). Moreover, the present research focuses on hand steadiness and balance only; thus, it does not include other important aspects like psychological issues or other physical abilities that can also contribute to the athlete performance (Shekar et al., 2021).

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METHODS AND SUBJECTS

Subjects

A total of 120 male players from Uttar Pradesh were recruited, including 60 cricket players and 60 softball players. All participants had a minimum of 4 years of competitive experience and were free from injuries affecting performance.

Measures

Hand Steadiness: The stability in hands was measured by using the Hand Steadiness Test that was done through a standardized apparatus (hole type: MEDICAID ST320). The device was a metallic plate with a set of graduated holes attached to an electronic timing interface. The participants were required to put a stylus in a specific hole and keep it in place without meeting the periphery. Any unintended contact with the edge was registered automatically by the device. A time piece was used to record the success of successful stabilization. The metric resultant of the hand steadiness was the time taken in seconds.

Balance ability: Balance ability was measured using Bass Stick Test using a standardized Bass Stick Test box. The device was made up of a thin stick or beam of wood attached to a firm base. The subjects were instructed to stand on the stick using one foot and hold the equilibrium without any external support. The amount of time within which a balance was maintained was recorded. Balance duration was measured with the help of a stopwatch, and the balance ability score was presented in seconds.

Procedure

Hand Steadiness Assessment- Testing procedure.

The subjects were seated to a comfortable position in front of the hand steadiness tester (hole type: MEDICAID ST 320). After a brief demonstration, participants have been asked to insert the stylus to the designated hole and hold it stationary without touching the sides. Once the stylus was inserted the test was started and when there was any edge contact, this was automatically recorded by the apparatus. The device and a stopwatch were used to record the time when the stylus stood and when it went out of position. The last hand steadiness score was measured in seconds.

Test Procedure Bass Stick Test.

The participants were ordered to place their bare feet on the Bass Stick Test box. Following a thorough explanation and demonstration, the subjects stood and put one foot on the stick and tried to stand on their own. The test commenced when the free foot was raised above the ground, and its test was discontinued when there was a loss of balance, or when there was contact with the ground, or the aid of support. Sustained balance was measured using a stopwatch, and the score of balance ability was in the form of the seconds.

Statistical Tools

The data were summarized using descriptive statistics whereby the mean and the standard deviation of each of the selected variables were calculated. The independent samples t -test was the method used to determine the presence or absence of a statistically significant difference between the mean score of two independent groups on the selected variables.

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Analysis of Variance (ANOVA) was conducted. ANOVA helped to establish whether there were significant differences between the means of groups as per the chosen variables.

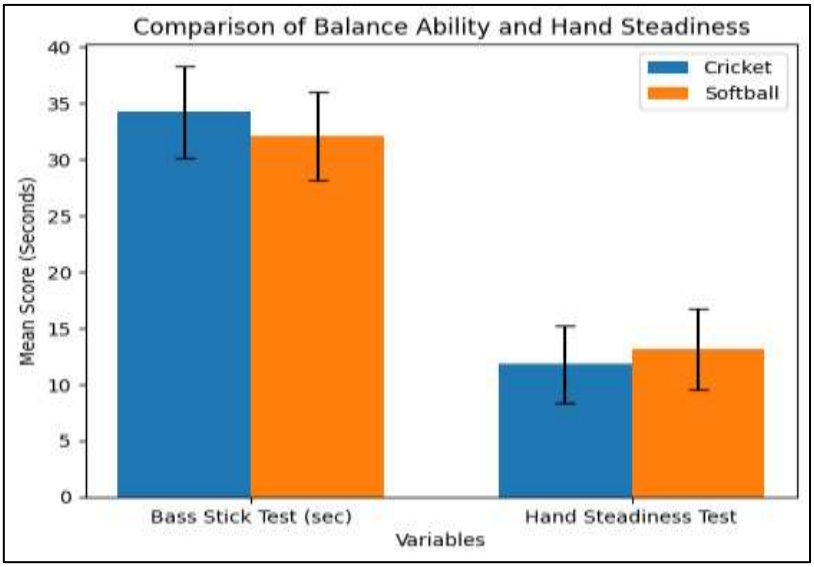
DATA ANALYSIS AND RESULT

Table-1: Comparison of Coordination and Hand Steadiness Variables between Cricket and Softball Players (Mean ± SD).

Variable	Cricket (Mean ± SD)	Softball (Mean ± SD)
Bass Stick Test (sec)	34.2 ± 4.1	32.1 ± 3.9
Hand Steadiness Test	11.8 ± 3.4	13.1 ± 3.6

The table gives the average and the standard deviation (Mean ± SD) of two psychomotor variables; Bass Stick Test (a measure of balance ability) and Hand Steadiness Test, of male players in cricket and softball players. In Bass Stick Test, the mean time of 34.2 ± 4.1 seconds was observed amongst cricket players, and a slightly lower mean of 32.1 ± 3.9 seconds was observed among softball players, which means that the performance in balance ability was a little higher among softball players. On the hand steadiness test, the score of cricket players was 11.8 ± 3.4 and that of softball players was 13.1 ± 3.6 with an indication that cricket players displayed a slight better hand steadiness. The standard deviation of the two tests is similar and the variability in each group is similar. Generally, the results point to the idea that cricket players are more likely to have good hand steadiness or that softball players have a slight lead in terms of balance ability, but statistical significance testing would be required to determine whether the difference is significant or not.

Figure-1: Comparison of Balance Ability and Hand Steadiness between Cricket and Softball Players (Mean ± SD)



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The bar graph illustrates the comparison of Hand Steadiness and Balance Ability between cricket and softball players. Mean values with standard deviation are represented by error bars.

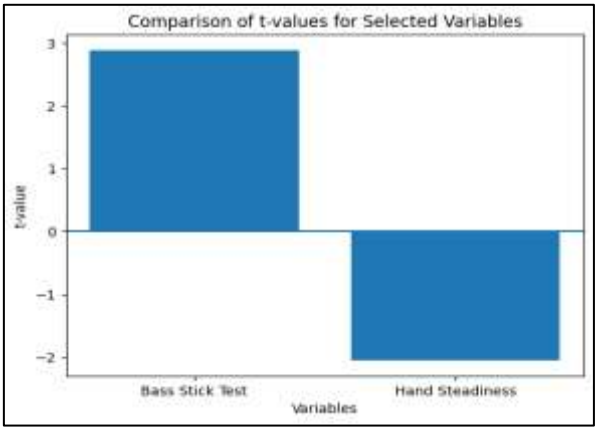
Table-2: **Comparison of Hand Steadiness and Balance Ability between Cricket and Softball Players using independent t-test.**

Variable	t-value	p-value	Result
Bass Stick Test	2.89	<0.01	Significant
Hand Steadiness	−2.05	<0.05	Significant

Level of significance was set at 0.05.

The t-value of 2.89 means that the difference between the two values in the Bass Stick Test was 2.89 times the standard error. The p-value is below 0.01 and therefore, it is statistically significant at the 1% level. This implies the low likelihood that the difference observed was because of chance error (less than 1%). As such, one can conclude that both groups under comparison have statistically different performance in the Bass Stick Test. The t -value of 2.05 means that the difference in the mean of Hand Steadiness is 2.05 multiplied by the standard error and the negative value means that the difference is in opposite direction. The p-value is not more than 0.05, which means that it is significant at the level of 5 percent. This indicates that the difference between the Hand Steadiness of the groups is statistically significant where less than 5 percent chance of chance occurrence exists. Bass Stick Test as well as Hand Steadiness demonstrates statistically significant differences in the groups. The Bass Stick Test is very important ($p < 0.01$) whereas Hand Steadiness is important at a conventional level ($p < 0.05$). This implies that these psychomotor variables are influenced by the actions of interventions or group attributes under investigation.

Figure-2: t-Values for Comparison of Balance Ability and Hand Steadiness between Cricket and Softball Players



The bar graph represents the t-values obtained for the Bass Stick Test and Hand Steadiness Test. The horizontal reference line at zero helps in understanding the direction of difference between groups. Bass Stick Test registered a t-test of 2.89 which indicates that the difference is statistically significant at the 1 per cent level. However, the test of Hand Steadiness gave a

negative t-value of -2.05, which means that there was a statistically significant difference at the 5 per cent of significance. The statistically significant differences in the variables are between groups.

Table-3: Analysis of Variance (ANOVA) showing Differences in Selected Psychomotor Abilities between Cricket and Softball Players.

Variable	F-value	p-value	Result
Balance Ability	8.35	$p < 0.05$	Significant
Hand Steadiness	4.2	$p < 0.05$	Significant

These findings demonstrate that there exist major differences in the balance capacity, wherein softball and cricket players are found to be inefficient in this regard thus supporting the research results of past studies. Moreover, the research highlights the importance of having cricket players undergo specific training interventions to improve their balance as well as hand steadiness. These results imply that individual training programs are necessary to help cricket players enhance their balance and stability, thus making their performance more like the softball players. The findings will reveal a better idea of the specific training of the cricket players that requires an emphasis on the improvement of the balance and hand steadiness to introduce the improvement of the overall performance. These findings also make it clear that it is more than ever that cricket athletes need to embrace sport-specific training programs that can improve their control and balance skills, which are more in line with those of softball players. It is expected that the results might affirm that the introduction of Game Specific Skill Practices can have a great impact on improving hand-eye performance and balance in the athletes involved in cricket and hence on their overall performance in sports. The proposed research will offer practical recommendations on what coaches should consider in order to create effective training programs that will deal with these critical performance areas. Not only will the expected outcomes strengthen the current literature, but they will also provide feasible recommendations to coaches who want to adopt effective training approaches to meet specific needs of a particular sport. It is expected that the findings made within the study will promote the significance of combining sport-specific forms of training to improve both the steadiness of the hand and balance in players of cricket, which will, in turn, improve their competitiveness.

Figure-3: ANOVA Results Showing F-Values and Significance Levels for Balance Ability and Hand Steadiness between Cricket and Softball Players

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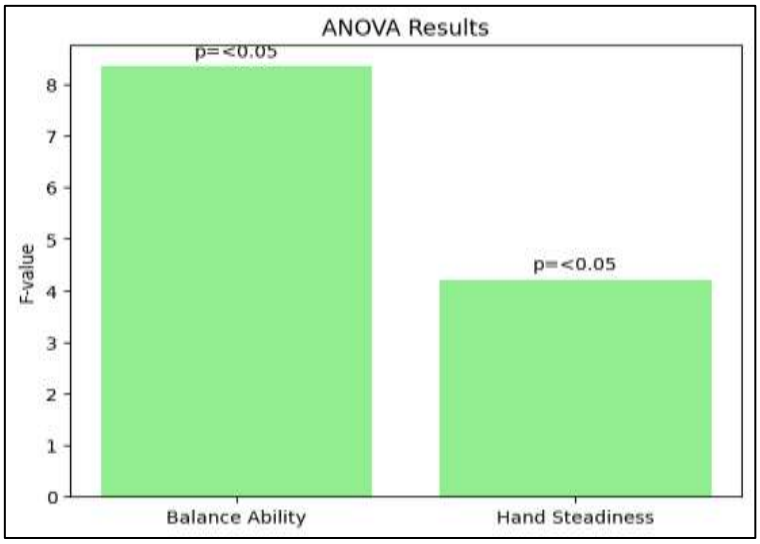

DISCUSSION

The current analysis of the physical fitness variables, which are skill relevant, i.e. balance proficiency, and hand steadiness, of cricket and softball players is a delineation of the sport specific adaptations and highlights the divergent training requirements and physiological reactions. The mean performance time of cricket athletes on the Bass Stick Test, which is a balance test, was found to be 34.2 ± 4.1s, significantly higher than that of softball athletes, whose mean performance was found to be 32.1±3.9s (t=2.89, p=0.01). Such findings incriminate the variability in balance ability that can be explained by the inherent requirements of cricket, where the athletes must take part in constant postural alterations and swift directional changes so that they could play successfully in batting, bowling, and fielding.[15] One-way ANOVA also indicated that there was a significant group effect on the balance ability (F= 8.35, p=<0.05), which supported the idea that balance performance is dependent on the skill sets that each sport inherently has. The unstable demands experienced by cricket athletes amplify protracted stability and motor control, as compared to the relatively weakened balance requirements experienced by softball athletes, which accounts for the existing differences in the performance indicators.

Contrastingly, hand steadiness test had a mean of 13.1 ± 3.6 which is higher than the mean of 11.8 ± 3.4 of the Cricket players. The difference was statistically significant (t= -2.05, p= less than.05) and supported with a one-way ANOVA (F= 4.20, p= less than. 05). Such a difference is consistent with the available literature highlighting the critical nature of hand-eye coordination in the field of softball, where repeated pitching and catching require accurate and consistent movements of hands. The necessary hand steadiness, in its turn, explains the identified performance differences and supports the necessity of the introduction of training programs that would focus on the skills required by a given sport. Taken collectively, these results have relevant implications to coaching and training practices. The practitioners are advised to capitalize on these and develop specific training programmes to improve sport-specific abilities, which can potentially raise the level of athletic performance and reduce the

risk of injury**.** Subsequently, further research is advised to increase the sample size and obtain other aspects to shed more light on the peculiarities of sport-specific adaptations.

CONCLUSION

This comparative analysis elucidates the existence of a significant difference between the degrees of hand steadiness and balance ability between male cricketers and softball players in Uttar Pradesh. Statistical information confirms that, even though both sports require high precision and control, the peculiarities of tactics cause the formation of different psychomotor skills of the participants. Comparison shows significant statistical variation in the equilibrium abilities with softball players doing better than their cricket counterparts, and cricketers showing slightly better hand steadiness. Such results support the urgent need of sport-specific training interventions with the aim of strengthening such essential competencies, thus reducing the performance gap between the two disciplines. The study will aim to initiate the improvement of athletic performance by providing practical guidelines to coaches and trainers on specific training programs to meet the unique biomechanical needs of cricket and softball. The results that were expected do not only validate the available literature, but also represent a paradigm shift that will make coaching practices more efficient in precision-based sport, by incorporating sport-specific approaches. The paper also strives to shed some light on the way the differences in physical features can guide further training regimens among the participants in both sports.

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