



COMPARISON OF STATIC AND DYNAMIC BALANCE IN COLLEGIATE HOCKEY AND TENNIS PLAYER

Physiotherapy

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ABSTRACT

Background: Balance is considered to be an important aspect of performance of all individuals whilst undertaking various daily activities. Tennis and field hockey are complex and dynamic games in which players make decisions regarding technique selection (e.g. a good shooter needs to understand which technique to use. Forehand and backhand in tennis are the most commonly used strokes in field, similarly push pass and hit in field of hockey, players must be able to handle the ball, and they have to handle it under the pressure of time, limited space, physical exhaustion, and dogged challenges from opponents. The environmental demands and skill requirement in different sports likely induces different challenges to the sensory-motor systems that cumulatively might have influenced the abilities of balance in trained athletes. Thus balance testing becomes imperative to detect how the athletes from different sports perform in balance test.

Aims and Objectives: To study static and dynamic balance in collegiate hockey and tennis players.

Method: 30 hockey and 30 tennis male players of age group 18-25yrs were included in the study. Players were tested for static balance using Standing Stork Balance Test and for dynamic balance using SEBT (SEBT).

Result: study it was found that dynamic balance in tennis players was significantly different than hockey players measured by RSEBT of Hockey with RSEBT of Tennis ($t=4.4860$, $p=0.0001$) and LSEBT of Hockey with LSEBT of Tennis ($t=4.5877$, $p=0.0001$). Comparing RSSBT of Hockey with RSSBT of Tennis the difference was found to be statically insignificant.

Conclusion: Result of the study concluded that there is significant difference in Dynamic balance between Hockey and Tennis players and tennis players have higher dynamic balance than hockey players.

KEYWORDS

Dynamic Balance, Static balance, Hockey, Tennis

INTRODUCTION

To maintain body mass center in the domain of base of support, within a stable body posture, counteracting internal and external conflicts is called BALANCE¹. Human balance results in synchronization between vestibular, somato-sensory and visual input². Evaluation of posture control is crucial measure in geriatric, pediatric as well as in athletic population, in order to have levels of balance and neuromuscular coordination for injury detection, prevention and rehabilitation³. Sports required high level of sensorimotor actions in order to perform desired skills as well as to protect the muscular system⁴.

On field, players are always exposed to various situations in which their balance is balance is dynamically tested, specially performing activities like running, dribbling, stepping, chasing and jumping⁵.

That is why the demands and skill requirements in sports are tremendous, and mostly induces challenges to the sensory and motor systems which in the nutshell influence their balance respectively. Thus, balance testing becomes imperative to detect these features of how the athletes from different sports perform in balance test⁶.

Tennis and field hockey are complex and dynamic games in which players make decisions regarding technique selection (e.g. a good shooter needs to understand which technique to use^{7,8}. Forehand and backhand in tennis are the most commonly used strokes in field, similarly push pass and hit in field of hockey, players must be able to handle the ball, and they have to handle it under the pressure of time, limited space, physical exhaustion, and dogged challenges from opponents⁷. The natural requests and expertise prerequisite in various games likely incites diverse difficulties to the tactile engine frameworks that in total may have affected the capacities of parity in prepared competitors. In numerous games, better parity capacity is essential than accomplish the most elevated aggressive dimension and stay away from lower limb injuries^{9, 10, 11, 12}. Thus balance testing becomes imperative to detect how the athletes from different sports perform in balance test⁶. With this insight of balance testing in the above two different sports, physiotherapist, athletic and fitness trainers may prescribe balance exercises further effectively to prevent injuries and improve performances. Studies comparing balance ability among

athletes competing in different spots are limited. Hence the purpose of this study was to compare static and dynamic balance among collegiate hockey and tennis male players. The study hypothesized that postural balance control would be different among players in these sports.

METHODOLOGY

Potential subjects were apprised of the procedure and its potential risks and benefits. Subjects who fulfilled inclusion criteria and gave their written consent were included in study and prior to test the subjects they were familiarized with the testing procedure. This study included 30 hockey and 30 tennis players within the age group between 18-25yr.

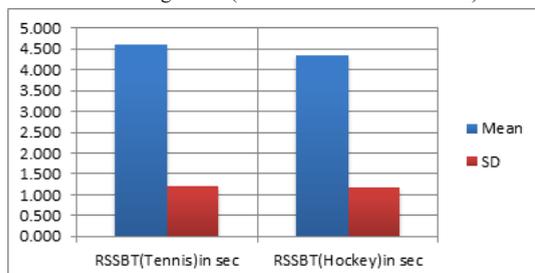
Balance Testing

Selected players were made to undergo **Standing Stork Balance Test**^{13,14,15}. In this test player stands comfortably on both feet with their hands on their hip, he lifts the right leg and places the sole of the right foot against the side of the left kneecap. The Therapist gives the command "GO", starts the stopwatch and the player raises the heel of the left foot to stand on their toes. Player has to hold this position for as long as possible. The Therapist stops the stopwatch when the player's left heel touches the ground or the right foot moves away from the left knee. Therapist records the records the time. Again the player will perform the test by raising the right heel off. Dynamic balance was measured by **Star Excursion Balance Test**¹. It requires the floor to be marked with a star pattern in eight directions, 45° apart from each other with the help of protractor, anterior, posterior, medial, lateral, posterolateral, posteromedial, anterolateral and anteromedial directions, extending 120cm in each direction. Player was asked to place one foot in the middle of the star pattern. The player was instructed to reach as far as possible. Player made a light tap on the floor, and then returned the leg to the centre of the star. The distance from the centre of the star to the tap was measured. Test was performed in all directions to allow side to side comparisons from each leg i.e. Right SEBT Scores (RSEBT) and Left SEBT scores (LSEBT). The trial was nullified and was repeated if the subject committed any of the following errors; made a heavy touch, rested the foot on the ground, loses balance, or could not return to the starting position under control. The starting direction and support leg were chosen randomly. Three trials were performed. Because of the significant correlation between SEBT and leg length in a majority of the directions, excursion values

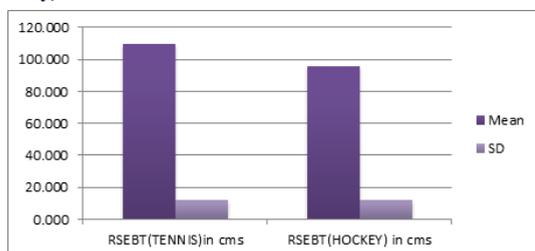
have to normalize to leg length, measured from the ASIS to the medial malleolus. SEBT reach distances and limb length was examined, then the distance scores (cm) for each direction of the SEBT grid was averaged over the trials and normalized to leg length. The normalized distances in each direction was then summed for both legs separately. The data that was collected and used for analysis through statistical method.

RESULTS

A total of 60 college level male players playing tennis and hockey were recruited for this study. 30 hockey players with mean AGE, BMI of 23.07 ± 1.84 (in years), 21 ± 1.9083 kg/m² and 30 tennis players with mean AGE, BMI of 22.63 ± 1.87 (in years), 23 ± 1.6041 kg/m² were tested for static balance using Standing Stork Balance Test and for dynamic balance using SEBT (Star Excursion Balance Test).



Graph 4.1: Comparison between RSSBT (tennis) and RSSBT (hockey)



Graph 4.2: Comparison between RSEBT (tennis) and RSEBT (hockey)

DISCUSSION

The purpose of this study was to compare static and dynamic balance in collegiate hockey and tennis players. Our study included total of 60 college level male players playing hockey and tennis with mean age, height, weight of mean age, height, weight of 22.63 ± 1.87 (in years), 170 ± 10.98 (in cm), 67.77 ± 6.56 (in kg) and 23.07 ± 1.84 (in years), 167.4 ± 7.58 (in cm), 59.63 ± 7.30 (in kg) respectively, were tested for static balance using Standing Stork Balance Test and for dynamic balance using Star Excursion Balance Test. The data collected was normalized and used for purpose of statistical analysis.

In the results of the study it was found that dynamic balance in tennis players was significantly different than hockey players measured by RSEBT of Hockey with RSEBT of Tennis ($t=4.4860$, $p=0.0001$) and LSEBT of Hockey with LSEBT of Tennis ($t=4.5877$, $p=0.0001$). The tennis group showed significantly higher dynamic balance score than hockey players [(mean left SEBT score of tennis 109.9387 ± 12.4592 ; mean left SEBT score of hockey 95.7090 ± 11.5493 ;) and (mean right SEBT score of tennis 109.9070 ± 12.3834 ; mean right SEBT score of Hockey 95.65550 ± 12.2249) respectively]. The study by P. RatanKhuman et al in 2014 stated that there is significant difference in static and dynamic balance between three different sports players of soccer, cricket and volleyball, where the soccer players demonstrate higher balance compared with volleyball players. The balance scores differences among players in this study may be due to differences in joint strength, and the difference in dynamic balance in the present study may also be due to the same.

The study conducted by Alpaslan Kartal (2014) showed that tennis players have higher standing balance than Soccer, Basketball and Volleyball during unipedal stance (non dominant leg). The repeated tennis drill, executed by tennis players in unipedal stance with the left leg used in pivot, should modify proprioceptive factors and/or neuromuscular control and/or strength and stiffness generated around the joints and tendons of the non-dominant leg.

Therefore results of present study show that tennis players have significantly higher dynamic balance than hockey players, hence experimental hypothesis "There is significant difference of static and dynamic balance in collegiate hockey and tennis players." Stands accepted.

CONCLUSION

Result of the study concluded that there is significant difference in Dynamic balance between Hockey and Tennis players, and tennis players have higher dynamic balance than hockey players.

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