Chapter V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

Field hockey has undergone considerable changes in the last two decades. The introduction of artificial playing turfs has changed the physiological and technical requirements of the game at all levels, but in particular at the elite level. The sport of field hockey is played by positional players and the role of each player is well specified. Each player has to develop physiologically to meet the physical standards required at elite level. Competitions like World Cup at junior level too have been introduced which are turning to be very fierce, as it is the dream of every junior player to get into the senior team. After the transformation of junior players to the senior category, they are supposed to possess superior technical skills, morphological characteristics and physical fitness because of their training age, extensive competition exposure as well as the requirements to play successfully at a higher level.

The purpose of the present study was to compare the morphological and motor abilities of Indian elite male hockey players at different positions and levels. The subjects for the study were 106 senior national players and 116 junior national players at different positions viz, goalkeepers, fullbacks, halfbacks and forwards. The subjects were selected from the players who attended the senior national and junior national hockey camps at different centres of Sports Authority of India before various international competitions.
The morphological characteristics were assessed by measuring height, weight, percentage of body fat, lean body mass and somatotype ratings. The motor abilities were assessed by back and grip strength dynamometer, agility assessed by 6 X 10 metre shuttle run, explosive strength assessed by vertical jump and finally, the speed assessed by 30 metre run (standing start).

The morphological and motor abilities of senior and junior hockey players of different positions were compared for significance of difference by using One Way Analysis of Variance (ANOVA) followed by Scheffe’s post – hoc test to establish the significant difference among the groups. Student’s t – test had been applied to test the hypothesis concerning the difference between two means for different levels of players of different positions. The hypothesis was tested for significance at 0.05 level.

The findings of the study revealed significant differences in the morphological and motor abilities of the players of different positions belonging to senior and junior category.

The morphological assessment of the players revealed that in all the players positions in senior category, all the players were found equal in height whereas in junior category, fullbacks were found taller and forwards were found shortest. In senior and junior category, goalkeepers, fullbacks and halfbacks were found equal in height and the senior forwards were found taller than the junior forwards. Senior goalkeepers were found heaviest and halfbacks were found lightest. Where as the juniors in all the positions were found equal in weight. Senior goalkeepers were
found to have highest percentage of body fat followed by senior halfbacks. Similarly, junior goalkeepers had higher percentage of body fat than the junior halfbacks. No difference in percentage of body fat was found between the senior and junior players of different positions. In the case of lean body mass, both seniors and juniors irrespective of their positions were found equal. However, the forwards of senior and junior levels were found significantly different in lean body mass where the seniors were found better in lean body mass. The goalkeepers, fullbacks, halfbacks and forwards of senior category were found to have the somatotype ratings of endomorph mesomorph, balanced somatotype, balanced ectomorph and mesomorph ectomorph respectively. The goalkeepers, fullbacks, halfbacks and forwards of junior category were found to have the somatotype ratings of balanced somatotype, balanced ectomorph, balanced ectomorph and balanced ectomorph respectively. Endomorphic and ectomorphic components of senior and junior players in all the positions were equal where as in mesomorphic component in all the positions, seniors were found superior.

The results pertaining to the motor abilities showed that in back strength, both senior and junior players in all the positions were found equal and between seniors and juniors, the seniors possessed higher back strength than the juniors in all the positions. In grip strength of right and left hands, senior players in all the positions were found equal where as in junior section, goalkeepers had the highest grip strength. Between seniors and juniors, seniors were found superior in grip strength in different positions. In agility, forwards were found superior both in senior and junior categories. Where as between seniors and juniors, all the players were found equal in all the positions. The explosive strength of senior and junior
players of different categories didn’t exhibit any significant difference and the same
trend was observed between seniors and juniors in different positions. As far as the
senior players’ speed was concerned, the forwards superseded the other positional
players. Where as in juniors, all the players irrespective of their position were found
equal. The speed abilities between seniors and juniors have shown that the seniors
were superior in speed compared to juniors of different positions.

**Conclusions**

Within the limitations of the present study, and on the basis of the findings,
the following conclusions may be drawn:

1. All the senior players irrespective of their playing positions were equal in height.
The fullbacks of junior hockey level were found taller than the players of other
playing position of the junior category. However, senior forwards were found
taller than junior forwards. At other playing positions, all the senior and junior
players were found equal in height.

2. Senior goalkeepers were heavier than players of other playing positions of the
senior category. Where as all the junior players irrespective of their position
were found equal in weight. Between senior and junior category, the halfbacks
and forwards of the senior level were found to be significantly heavier than the
halfbacks and forwards of the junior level.
3. The percentage of body fat of senior and junior level goalkeepers was more than the players of other positions in both the categories. However, the percentage body fat between seniors and juniors irrespective of their playing position was found equal.

4. The lean body mass of senior and junior players irrespective of their positions and between the senior and junior players was found equal but in case of forwards, senior players had better lean body mass.

5. The senior goalkeepers were found to be more endomorphic than halfbacks and forwards of the senior category. Similarly, the endomorphic rating of the junior goalkeepers was significantly higher than the junior halfbacks. Between the senior and junior players in all the positions, the endomorphic component was found equal.

6. Among the senior players, goalkeepers had the highest mesomorphic component and halfbacks had the lowest. Among the junior players, irrespective of positions, all of them had equal mesomorphic component. Between the senior and junior players in all the positions, seniors had better mesomorphic component compared to juniors.

7. Among the senior players, halfbacks were found more ectomorphic compared to other positions. Among the juniors, all the players in ectomorphic component of somatotyping were found equal. Between senior and junior players in all the
positions, there was no significant difference in ectomorphic component of somatotype.

8. Among the senior and junior categories, all the players irrespective of their positions were found to be equal in back strength. The fullbacks, halfbacks and forwards of the senior category players were found to have more back strength than their junior counterparts.

9. In all the players’ position in senior category, all the players were found equal in right grip strength. Where as in junior category, goalkeepers had the highest right grip strength and the forwards had the least right grip strength. Between senior and junior players, the senior halfbacks and forwards were found to possess more right grip strength than their junior counter parts.

10. In all the players’ position in senior category, all the players were found equal in left grip strength. Where as in junior category, goalkeepers had the highest left grip strength and the halfbacks had the least left grip strength. Between senior and junior players, the senior fullbacks, halfbacks and forwards were found to possess more left grip strength than their junior counter parts. The left grip strength of both the categories of goalkeepers was found equal.

11. The agility of senior and junior forwards was more than other players in both the categories irrespective of their positions. However, the agility between seniors and juniors irrespective of their playing position was found equal.
12. Among the senior and junior categories, all the players irrespective of their positions were found to be equal in explosive strength. Between senior and junior players also, irrespective of their playing position, the explosive strength was found equal.

13. Among the senior and junior level players, all the junior players irrespective of their position were found equal in speed. However, senior forwards had highest speed and the least speed was exhibited by senior goalkeepers. Between senior and junior categories, the goal keepers of both the levels were found equal in speed. However, the fullbacks, halfbacks and forwards of senior hockey level were significantly higher in speed than their junior counterparts.

**Recommendations**

In the light of the findings and the conclusions drawn, the following recommendations are made:

1. Tall players for the fullback position may prove to be better for the team as they have a mechanical advantage of controlling, clearing, hitting or scooping the ball, all of which require more reach and amplitude. Therefore, tall players for the fullback position may be selected.

2. The players selected for halfback position may be lighter than any other positional player because at times they have got to do almost 75 yards of running in attack as well as in defense.
3. The mesomorphic component of all the senior as well as junior players irrespective of their playing position needs to be improved as their foreign counterparts have a very high rating of mesomorphic component.

4. The percentage body fat of all the senior as well as junior players irrespective of their playing position needs to be decreased.

5. The forwards and halfbacks of both levels of players need to have more back strength as these are the positions where the players need to cover large distances very fast. Dribbling while running requires the players to flex their trunks and therefore the back has to be strong. When the players qualify from junior to senior category, they need to improve their back strength and this aspect may be given due consideration and training programmes also may be chalked out accordingly.

6. The coaches and trainers may give more emphasis upon improving the grip strength of goalkeepers during their preparation.

7. The coaches and trainers may give more emphasis upon improving the agility of forwards and goalkeepers during their preparation.

8. Explosive strength of all the players need to be developed as the present day hockey game is faster an explosive in nature.

9. Because speed at the elite hockey level has its due importance, therefore, with the transformation of junior players irrespective of their playing position to the senior category, speed may be developed to a considerable extent as per the
demand of the game. The goalkeepers of senior level hockey players also need
to improve their speed.

10. A similar study may be conducted, employing female subjects.

11. A similar study may be performed by employing more motor ability variables
which are not examined in this study.

12. A similar study may be conducted by including sub – junior hockey players.

13. During the preparation of hockey team, more emphasis may be given for the
fitness development and the fitness components such as speed, explosive
strength and agility should be developed optimally to cater to the demand of
modern hockey.