Chapter III

METHODOLOGY

In this chapter, the procedure followed towards the selection of subjects, selection of variables, experimental design, pilot study, criterion measures, reliability of data, reliability of instruments, tester and subject reliability, test administration, collection of data and statistical techniques.

3.1. Selection of Subjects

The purpose of this study was to construct the skill tests and compilation of norms for selected field hockey skills. To achieve the purpose of the study, five hundred field hockey players were selected from various institution in Tamilnadu state at random and their age ranged from 18 to 28 years.

SELECTION OF SUBJECTS

Sl.No.	Name of the Institution	Place	Numbers of players selected
1.	DP Jain College	Chennai	60
2.	Nazarath College	Chennai	40
3.	Pachaiappas College	Chennai	50
4.	Loyola College, Chennai	Chennai	50
5.	SRM University	Chennai	60
6.	Tamilnadu Narayana College	Chennai	40
7.	YMCA College of Physical Education	Chennai	60
8.	Kasinadar College	Chennai	40
9.	Vivekanada College	Chennai	60
10.	Gurunanak College	Chennai	40

3.2 Selection of variables

"The enemy advances, we retreat; the enemy camps, we harass; the enemy tires, we attack; the enemy retreats, we pursue." This quotation from Chairman Mao was hung in the locker room of England's 1966 World Cup soccer team. (England won that competition for the first and only time in 1966). If this is true in both war and soccer, then why not also in hockey? On this very philosophy the Great Britain hockey team played under the guidance of the manager, Roger Self, and coach, David Whitaker to win the 1988 Seoul Olympic hockey gold medal. European teams very much apply these concepts to dominate the world of hockey. No wonder all three men's medal-winning teams at the 1998 Utrecht World Cup were European sides, and two of the women's teams too, were from Europe, only Australia being able to break that mould. Every successful team needs three vital elements: a high level of skilled, gifted and determined players to execute that skill, backed up with a sound game plan. There is no substitute for basic skills; without a high skill level, no matter how good a game plan a team has, the chances of winning are bleak. The same is also true regarding tactics: a high level of basic and advanced skills will not succeed if the game plan is weak (***http://www.fieldhockey.org/Articles/Coaching/Tactics-ShivJagdayfiles/Tactics-ShivJagday.htm***).

In field hockey, the attacking players, or forwards, provide most of the offense, racing upfield to threaten the other team's goal. Effective attackers prefer lightweight sticks weighing between 19 and 20 oz. to maneuver quickly in tight areas. Shorter, lighter sticks allow for quicker ball dribbling and snappier shots. Attackers also favor sticks with smaller heads, with the shorter hooks creating a more centered sweet spot for improved shot accuracy and power. The midfielder in field hockey can be one of the most demanding position. In the game of Field Hockey, attackers try to score and defense along with the goalie defend your goal. Midfielders are responsible for playing both offense and defense though in their position on the field. They

must assist the attackers moving the ball upfield, and try to assist the defenders trying to stop their opponent from scoring. Here are some important skills for midfielders to have when playing field hockey. The skills a midfield player must possess are those necessary in every other line on the field; midfielders, though, must have them *all*: Defensive skills: **Tackling**: Channeling, jabbing, block tackling, and reverse stick tackling, **Marking:** Man-to-man and zonal, **Defensive stick skills:** Stopping and hitting, Offensive skills: **Elimination (dodges)** : Pulling right, left, and back; spinning, popping, and chopping the ball, **Shooting angles:** Conceptual strategies, such as switching the point of the attack and maximizing scoring angles in the offensive zone, Midfield skills: **Gaining possession of the ball:** Interceptions, winning 50-50 balls, and maintaining possession of the ball**.** Defenders, sometimes called backs, carry heavier, longer sticks to disrupt opposing attacks. A typical defender's stick will weigh up to 24 oz., with the extra weight making it more rigid and powerful when challenging for ball possession. While attackers often use sticks 36 inches or shorter in length, defenders will opt for sticks of 38 inches to provide extra reach. The defender's stick head will also be a larger, more dramatic J-shape for more stopping area to intercept passes and block shot. Defenders at this level are expected to consistently execute the following skills at a high standard: Ability to distribute the ball at speed in all circumstances, Sweep Hit (accurate, flat, fast, consistent, deception), Hit (accurate, flat, fast, consistent), Push Pass (accuracy, snap with deception, fast, consistent, lifted), Reverse stick passing, Scoop ability, Receiving skills: Stationary and Moving under pressure, Ball control and possession, Elimination skills in small and crowded spaces, Winning the Ball back: Tackling (Poke, Lunge, Block, Upright reverse) Channeling and Double Defense Skills, Defensive and offensive decision making in 2v1 and 3v2 situations, Off-ball positioning to provide support with and without team ball possession, Defensive positioning on Penalty Corners and Offensive role on Penalty Corners. Forwards: Characteristics of a good forward include the ability to recognize,

create, and lead into space, good anticipation, and quick reactions. They must also be able to pressure and channel effectively without getting eliminated and be able to execute on and off the ball at speed. They must also have an instinct to score goals. Forwards at this level are expected to consistently execute the following skills at a high standard:. Push Pass – snap and lifted (accurate, fast, consistent, lifted), Hit (accurate, flat, fast, consistent), Dribbling, Running with the ball, Elimination Skills at speed, Goal Scoring (variety of shots), High quality first touch and ball control, Effective ball control with change of speed and direction, Receiving Skills: Stationary and Moving, open and closed, under pressure Ability to create danger in attack with off-ball movement and leading (timing and anticipation), Channeling, and effective pressure on the ball carrier, Tackling to dispossess Tactical Awareness of Team Offensive concepts (depth, width) and Offensive decision making in 2v1 and 3v2 situations (***http://fieldhockey.isport.com/fieldhockey-guides/how-to-play-midfield-in-field-hockey*).**

Physical capacity is trainable throughout a player's lifetime, but there are critical periods in the development of each capacity during which training produces the greatest benefit to each athlete's long-term development. These sensitive periods vary between individuals as each player is unique in their genetic makeup. While the sensitive periods follow general stages of human growth and maturation, scientific evidence shows that humans vary considerably in the magnitude and rate of their response to different training stimuli at all stages. Some players may show potential for excellence by age 11, whereas others may not indicate their promise until age 15 or 16. Consequently, a long-term approach to athlete development is needed to ensure athletes who respond slowly to training stimuli are not compromised in their development. Training to Win is the final stage of preparation. Athletes now have a full complement of skills and abilities to achieve success. All facets of training have been developed and are now exercised to maximum capacity. Responsibility now falls on an athlete not only for their own individual

performance but that of the team as well. Consistent mastery and execution in all areas of performance must occur. The athlete's physical, technical, tactical, mental, and ancillary capacities should now be firmly established. World-class athletes require world-class training methods, equipment, and facilities that meet the demands of international field hockey. The drag flick is a specialty shot used on penalty corners to take lifted shots on goal. There is no backswing used on a drag flick, so it is technically classified as a type of *push*. Although it can reach high speeds, this is the only type of shot allowed to be lifted on a penalty corner for the initial shot. The move is extremely complicated, so don't be discouraged if it takes a player weeks, months, or even years to perfect.

The investigator had gone through the relevant literature in the area of field hockey skills and its various aspects in association with the guide and other experts in this area. The variables were selected after considering the feasibility and availability of proper techniques and instruments. They were

1. Dribble & Drag push
2. Dribble and Drag Flick
3. Dribble and Drag Scoop
4. Drag and Push
5. Drag and Flick
6. Drag and Scoop
7. Drag Flick

3.3 Criterion Measures

As per the available literature, the following tests were used to collect relevant data on the selected criterion variables and they were presented in the Table I.

TABLE - I

TEST SELECTION.

Variables	Test/Instrument	Unit of Measurement
Dribble & Drag push	Dribble & Drag push	In Points
Dribble and Drag Flick	Dribble and Drag Flick	In Points
Dribble and Drag Scoop	Dribble and Drag Scoop	In Points
Drag and Push	Drag and Push	In Points
Drag and Flick	Drag and Flick	In Points
Drag and Scoop	Drag and Scoop	In Points
Drag Flick	Drag Flick	In Seconds
		In Points

3.4. Reliability of the Instrument

The instruments such as Stop Watch and Apple phone i5 were all manufactured by standard companies and they were maintained in good condition and calibrated. Instrument reliability was also established by test-retest method.

3.5.Standardization of Tests

The standardization of tests was evaluated with the reliability of the tester by analyzing the performance of 500 subjects on the constructed tests and criterion tests taken under identical condition during the pilot study for significance. The correlations were high and satisfactory to the level 0.05.

3.6.Validity of the Tests

Test validity refers to the degree to which the test actually measures what it claims to measure. Test validity is also the extent to which inferences, conclusions, and decisions made on the basis of test scores are appropriate and meaningful. Validity is an estimate of the degree to which a test measures the factor or factors for which it was designed. Four ways of determining whether a test is valid have been employed depending upon the nature of the test, the availability of acceptable criteria and the particular use to which the test results will be subjected.

The four ways are ;

(i) Construct validity

(ii) Content validity

(iii) Concurrent validity

(iv) Predictive validity

Construct validity refers to "the degree to which a test measures what it claims, or purports, to be measuring. content validity (also known as logical validity) refers to the extent to which a measure represents all facets of a given social construct. Concurrent validity is a type of evidence that can be gathered to defend the use of a test for predicting other outcomes. Concurrent validity is demonstrated when a test correlates well with a measure that has previously been validated. The two measures may be for the same construct, but more often used for different, but presumably related, constructs. Predictive validity is the extent to which a score on a scale or test predicts scores on some criterion measure. The investigator, in his study, used concurrent validity to ascertain genunity of the test. The author had proposed the newly constructed test as a substitute for another criterion test. Concurrent validity is the degree to

which a test correlates with (is related to) a criterion test, which has already been established as a valid test of the attribute of interest. (**Safrit,1990**).

3.7.Reliability

Three months before the commencement of the pilot study, the reliability of the data was established by using 10 subjects at random. To ensure reliability, test and re-test method was executed. In between the test and retest, one-day rest was given to all the subjects. The same testing personnel by using the same equipments under identical conditions tested all the variables selected in the present investigation twice on the same subjects. The intra class co-efficient of correlation was used to find out the reliability of the data and the results are given in table II.

TABLE II

INTRA CLASS CO-EFFICIENT OF CORRELATION ON SELECTED VARIABLES

Sl.No.	Variables	'R' value
1	Dribble & Drag push	0.89*
2	Dribble and Drag Flick	0.91*
3	Dribble and Drag Scoop	0.93*
4	Drag and Push	0.92*
5	Drag and Flick	0.91*
6	Drag and Scoop	0.92*
7	Drag Flick	0.93*

**Significant at 0.01 level. (Table value required for significance at 0.01 level of confidence is 0.77)*

Since the obtained 'R' values were much higher than the required value, the data were accepted as reliable in terms of instrument, tester and the subjects.

3.8.Objectivity

The objectivity of tests was established by correlating Intra-class correlation formula. The two sets of test scores conducted by two testers, the research scholar and the field hockey coach on the same 500 subjects and correlations obtained have been presented in Table 3.

TABLE - III

OBJECTIVITY CO-EFFICIENT CORRELATION OF TEST ITEMS

S.No	Test Items	Co-efficient of Correlation 'R'
1	Dribble & Drag push	0.81*
2	Dribble and Drag Flick	0.65*
3	Dribble and Drag Scoop	0.81*
4	Drag and Push	0.79*
5	Drag and Flick	0.84*
6	Drag and Scoop	0.64*
7	Drag Flick	0.77*

* Significant at 0.05 levels $r_{0.05}$ (48) = 0.23; (N=50)

From Table III, it is evident that tester reliability was significantly high thus establishing the competency of the scholar to administer the test.

3.9.Validity of the Test

The investigator used the method of concurrent validity to establish the validity of the new test. For this purpose, researcher selected tests namely dribbling, dribble and hit, dribble and push, scooping and drag flick were measured by using as external criterions. They were subjected to test-retests which were then proved to be valid and reliable.

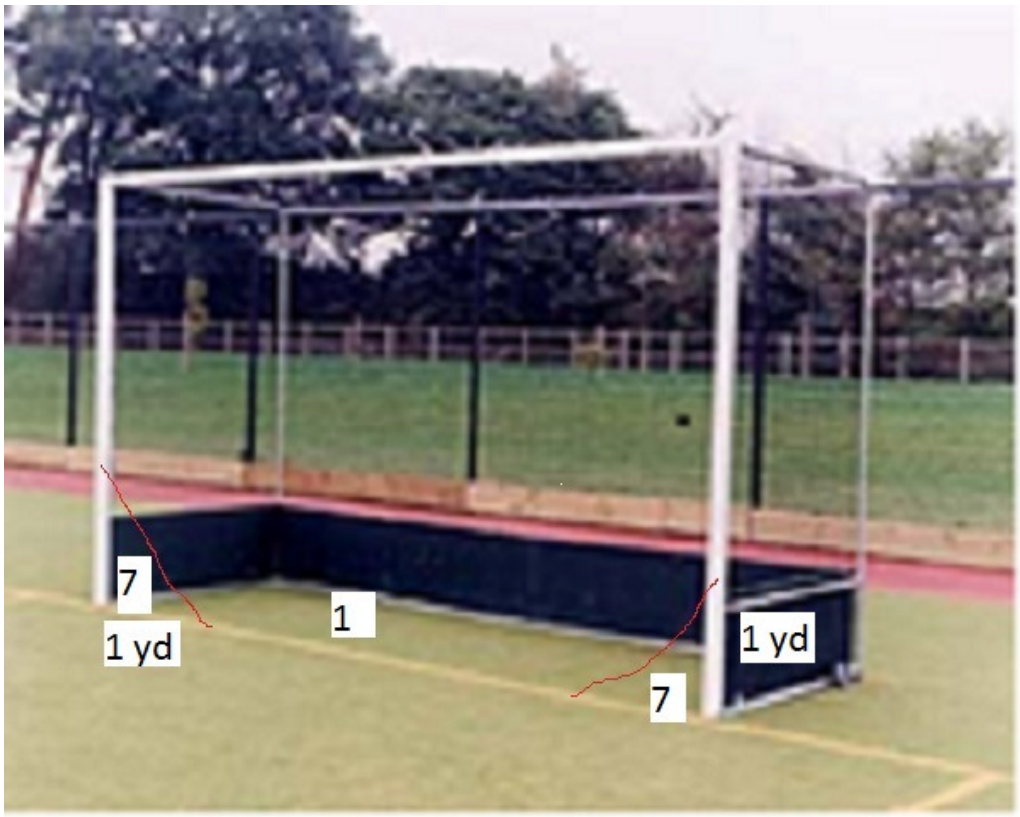
3.10. Test administration

3.10.1.Dribble and Drag Push

Purpose

To determine the dribble and drag push ability in field hockey players.

Field Marking



Execution

The subject was instructed to stand behind the 16 yds circle and on the commend ready start the subject executed one dribble and enter the 16 yds circle and executed the drag push towards the target. Three practice trials are given to each subject, and then three consecutive balls are attempted towards the target.

Scoring

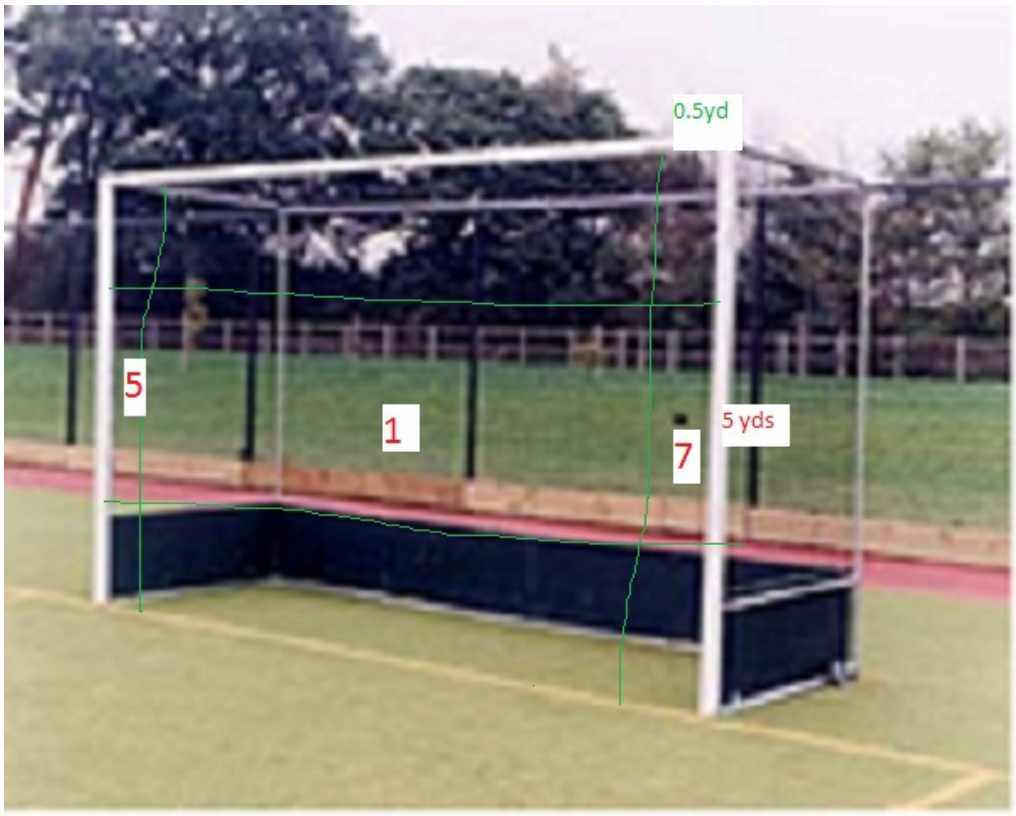
7 points are awarded for two lower side targets and one point are awarded for in-between the two lower side targets. Total of three trials are considered as the test score.

3.10.2.Dribble and Drag Flick

Purpose

To determine the dribble and drag flick ability in field hockey players.

Field Marking



Execution

The subject was instructed to stand behind the 16 yds circle and on the commend ready start the subject executed one dribble and enter the 16 yds circle and executed the drag flick towards the target. Three practice trials are given to each subject, and then three consecutive balls are attempted towards the target.

Scoring

7 points are awarded for left side middle targets, 5 points are awarded for right side middle targets and one point is awarded for in-between the two side middle targets. Total of three trials are considered as the test score.

3.10.3.Dribble and Drag Scoop

Purpose

To determine the dribble and drag scoop ability in field hockey players.

Field Marking

Execution

The subject was instructed to stand behind the 16 yds circle and on the commend ready start the subject executed one dribble and enter the 16 yds circle and executed the drag scoop towards the target. Three practice trials are given to each subject, and then three consecutive balls are attempted towards the target.

Scoring

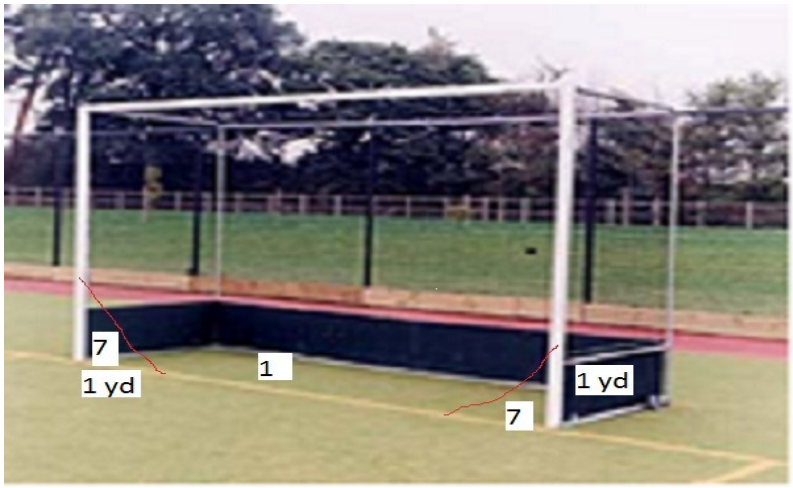
10 points are awarded for right and left side targets and five points are awarded for in-between the two side targets. Total of three trials are considered as the test score.

3.10.4.5 Drag and Push

Purpose

To determine the drag push ability in field hockey players.

Field Marking



Execution

The subject was instructed to stand behind the 16 yds circle and on the commend ready start the subject executed the drag push towards the target. Three practice trials are given to each subject, and then three consecutive balls are attempted towards the target.

Scoring

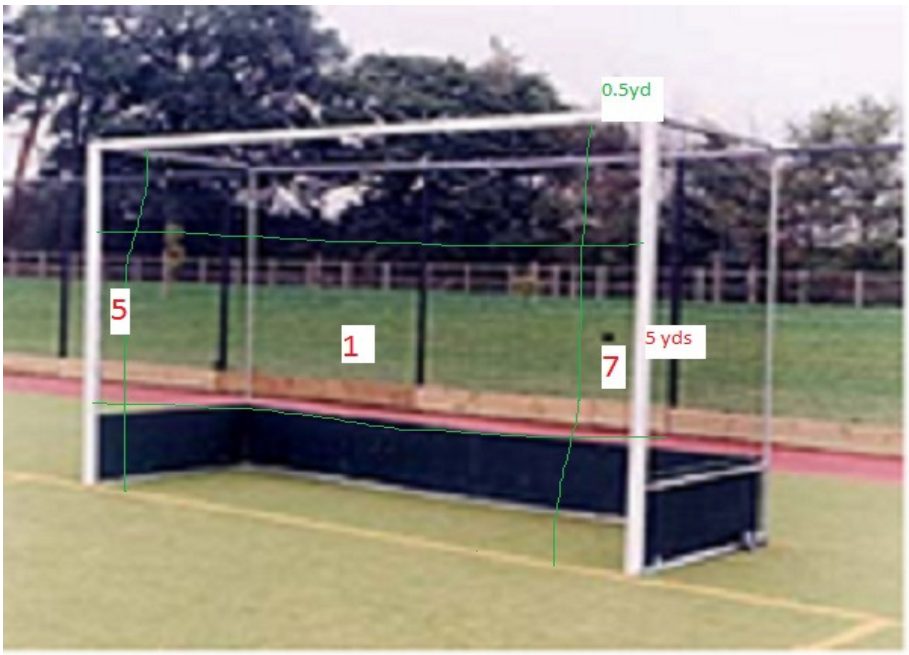
7 points are awarded for two lower side targets and one point are awarded for in-between the two lower side targets. Total of three trials are considered as the test score.

3.10.5. Drag and Flick

Purpose

To determine the drag flick ability in field hockey players.

Field Marking



Execution

The subject was instructed to stand behind the 16 yds circle and on the commend ready start the subject executed the drag flick towards the target. Three practice trials are given to each subject, and then three consecutive balls are attempted towards the target.

Scoring

7 points are awarded for left side middle targets, 5 points are awarded for right side middle targets and one point is awarded for in-between the two side middle targets. Total of three trials are considered as the test score.

3.10.3. Drag and Scoop

Purpose

To determine the dribble and drag scoop ability in field hockey players.

Field Marking

Execution

The subject was instructed to stand behind the 16 yds circle and on the commend ready start the subject executed the drag scoop towards the target. Three practice trials are given to each subject, and then three consecutive balls are attempted towards the target.

Scoring

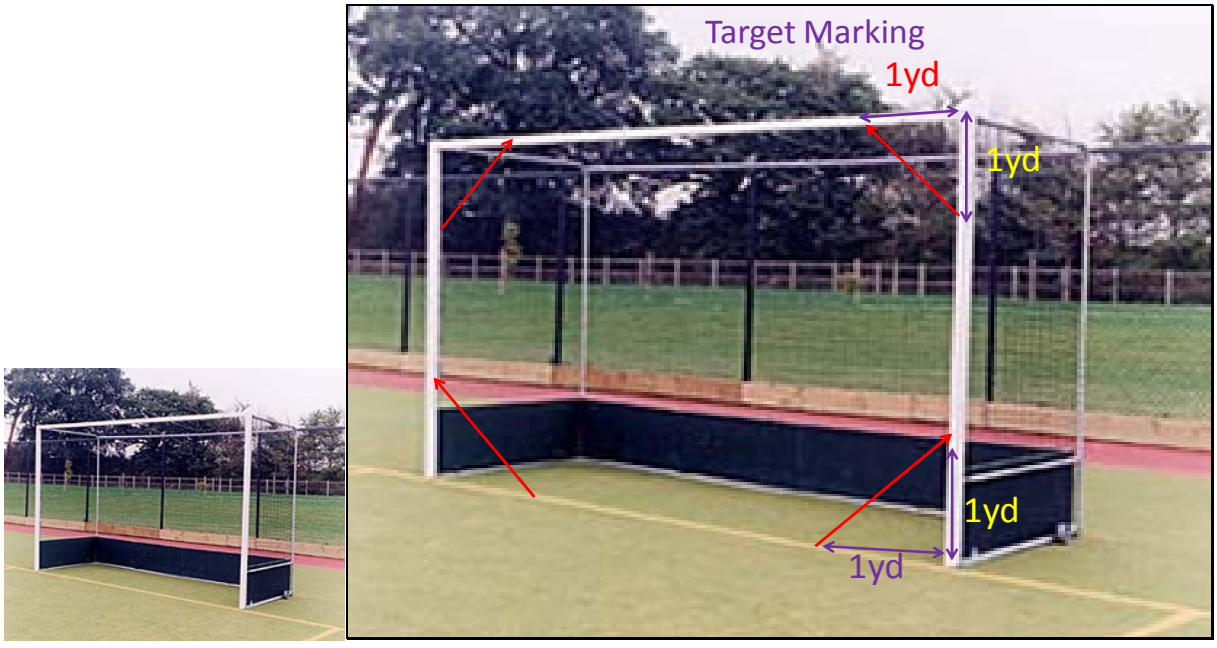
10 points are awarded for right and left side targets and five points are awarded for in-between the two side targets. Total of three trials are considered as the test score.

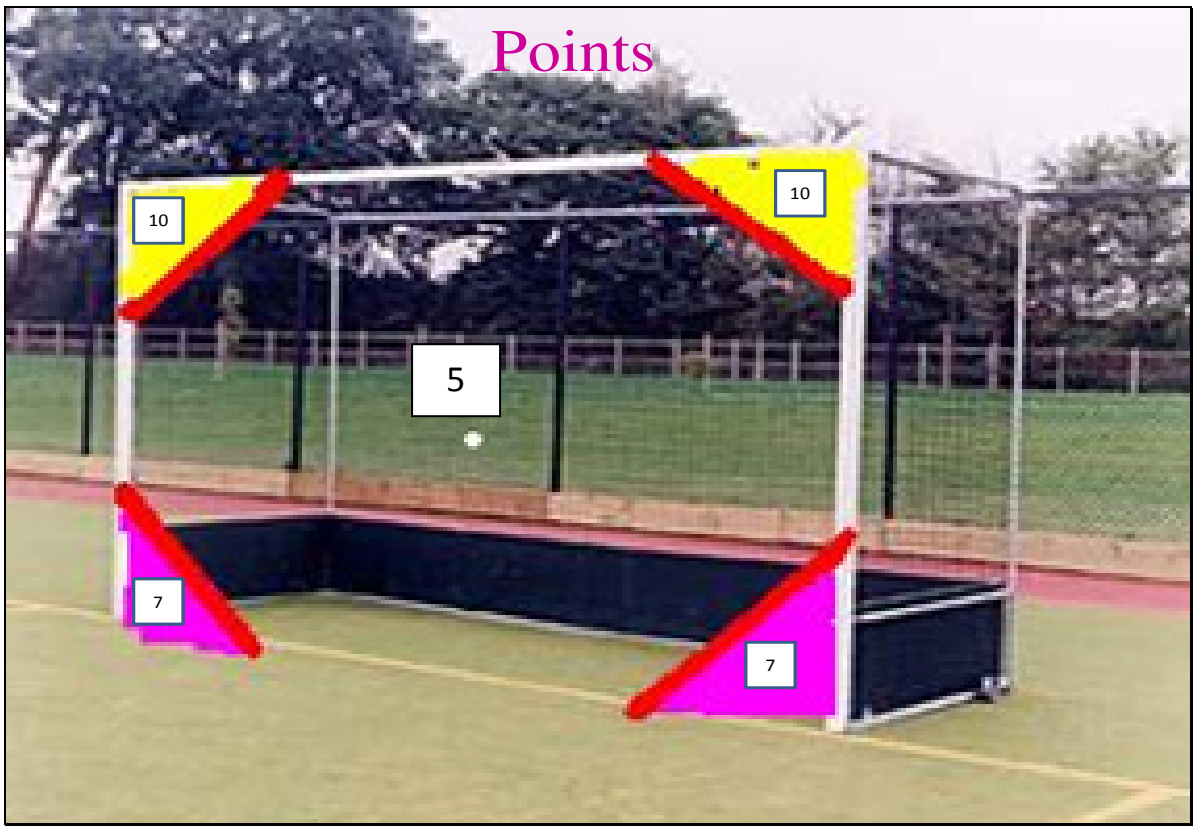
3.10.5.Drag flick

Purpose

To assess the accuracy and speed of the drag flick.

Goal post Marking





Execution

The subject shoots a stationary ball from inside the 16 yards circle. The subjects execute only drag flick. Three practice trials were given, and then three consecutive balls are attempted towards the target area.

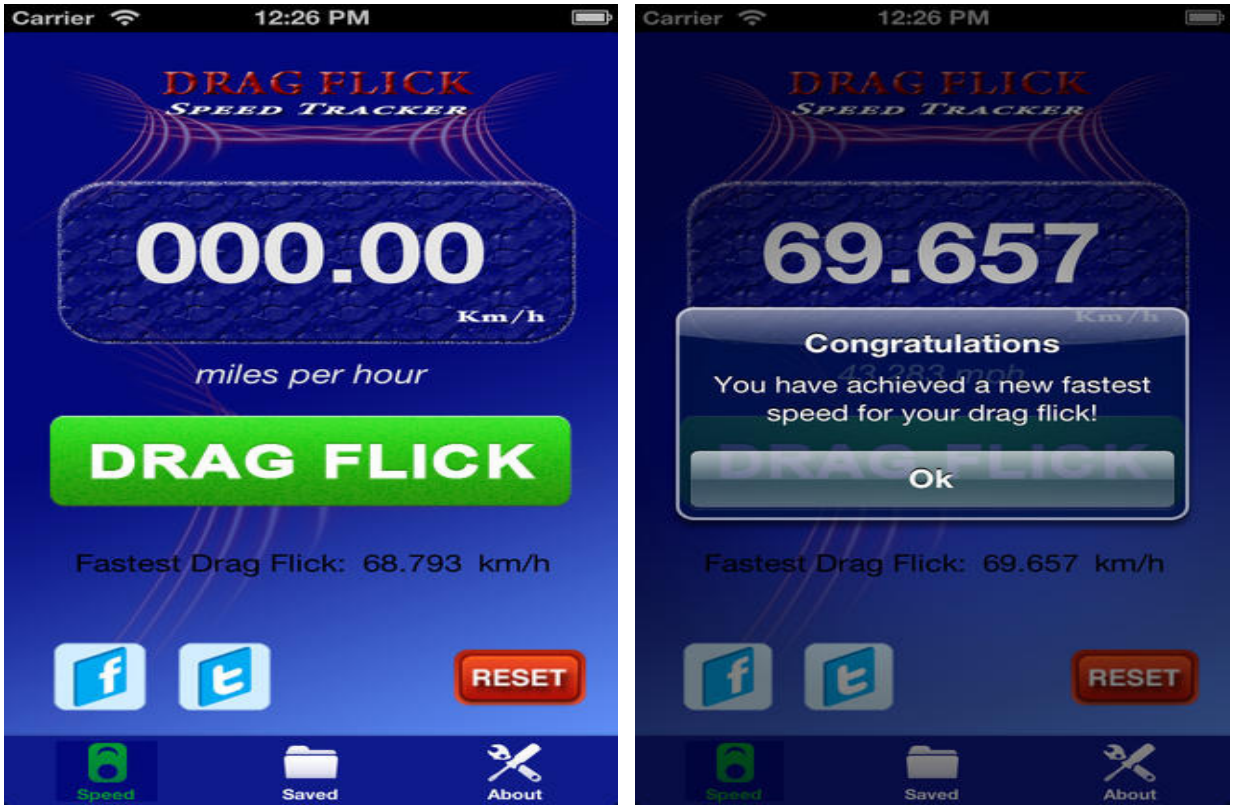
Scoring

Accuracy score:

10 points are awarded for two upper side targets, 7 points are awarded for two lower side targets and 5 points are awarded for remaining areas. Total of three trials was considered as the accuracy score.

Speed score:

Drag flick speed tracker software was used (in Apple i4phone) to calculate the speed score. The time taken to complete the drag flick execution i.e. the time elapses between the subjects' stick touches the ball and to the ball crosses the goal line.



3.11.STATISTICAL PROCEDURE

The prime purpose of this study was construction of norms for the field hockey skills. The mean and standard deviation of the raw scores were computed by using the formula suggested by **Mathew, 1973**. After calculating the mean and standard deviation, the scores were converted into standard score and construct the Hull Scale.