A KINEMATIC COMPARISON OF DIFFERENT VARIATION OF THROW-IN IN SOCCER

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ABSTRACT

The reason for thisis to comparison of Different variation of Throw-in in Soccer. The subjects were five male soccer players of intervarsity level. Videography was employed for the biomechanical analysis of throwing the ball. The camera Cannon 70D (30fps) was used for the study. The subjects were photographed at moment release in sagittal plane.The camera was worked by a specialist proficient photographic artist, in view of the photos acquired, stick figures were built to see different biomechanical variable. The stick figures created by utilizing joint-point technique in which the body projections at the joints confronting the camera were thought of. The selected biomechanical variables were angles of ankle, hip, knees, shoulders and height of C.G. Pair t test were calculated between the selected biomechanical variables of angles, C.G. of running and standing throw in soccer. The study found out that C.G. of standing throw in and running throw-in of soccer are found significant. Left hip joints (standing and running position of soccer throw in) are found significant. Both ankles joint (standing and running), both knees joint (standing and running), both hips joints (standing and running), both shoulders (standing and running), and elbows joints (standing and running), were found insignificant. The performance at standing and running in soccer throw-in was found significant.

Keywords: *Standing throw-in, Running throw-in, Sagittal plane, Centre of Gravity, Performance.*

Introduction

Throw in in soccer is one of the techniques to restart of the game when the ball went out from the side-line of the soccer field. Often players use this technique as attacking set play, mainly at the attacking third. The distance between the touch lines and goal area is much larger in distance, so a player who can throw the ball more distance will have better chance of scoring by his teammates. To cover the distance longer the players must release the ball at the appropriate angle as well as at maximum speed of release. In the early days, the throw in was just to restart the game when the ball went out from the side lines but in contemporary football there have been many goals scored from proper use of throw in as set play as well as a long throw can be used like that of corner, sending the ball straight to penalty box areas.

Out of all the studies of biomechanical references of throw in, most of the studies have done on release speed, elements of approach, ball release height from hands, ball projection angle, ball projection velocity. Release of throw to target duration, ball spin, time from release to the first drop on the ground, angles at the release of the ball(Messier, 1986); (Schwirtz, 1988); (Levendusky, T. A., Clinger, C.D., Miller, R.E. and Armstrong, C.W.,, 1985); (Chang, 1979);(Kline, 1982);(Bray, 2004)but none above have compare between the centre of gravity of the subjects as well as the different angles of joints at the time of the release of the ball. (Cerrah, 2011) found out that there is no statistically significant difference in the velocity of throwing and interspace between running throw-in and standing throw-in. On the contrary (Schwirtz, 1988) study found out that the throw-in (running) has vast superiority than throw-in (standing) in term of release speed as well as distance covered by the ball.

So, this led to my study where, I have tried to compare between throw-in (running) and throw-in (standing) in biomechanical variables that is C.G. staggered throw-in (running) position and Square throw-in standing position) and angles of joints (staggered throw-in running position and Square throw-in standing position.

Methodology

The procedure consists of selection of subjects and selection of variables. For this investigation, the researcher has chosen five male University players of 18 to 25 years old,

who had taken part in all India inter University Football Tournament, were chosen as subjects for this investigation. Since the subjects had experienced playing football, it may be viewed as that they would have great known the method of throw-in. The biomechanical variables were C.G.(throw-in running position and throw-in standing position) and joints angles(throw-in running position and throw-in standing position). The subjects were well informed about the study and they were motivated to do their best.

Criterion measures

Performance subjects

All the subjects were instructed to throw the ball from a distinct point. The total distance travelled from the released of the ball to the spot where the ball lands first were measured as performance. The distance travelled by the ball was measured by using a Measuring tape.

Filming Protocol and Analysis

Videography was employed for the biomechanical analysis of the throwing the ball. The camera Cannon 70D (30fps) was used for the study. The distance of the camera was found out to be 6.65 metres from the place where ball was kept, and 1.07 metres was the height from the ground.

Statistical Technique

The statistical tool (Pair T-test) at level of significance 0.05 was used to the comparison of selected biomechanical variables with performance of various soccer throw-in of soccer.

Findings

To compare the selected biomechanical variables namely, C.G. of both standing and running throws, angles of ankles, knees, hips, shoulders and elbows. Pair t-test was used. The results are shown in table 1 below.

Variables	Mean Standing Position	Mean Running Position	T-ratio
Performance(m)	19	24.2	-6.97*
Height of C.G. (cm)	134.4	127.9	3.3*
Right ankle joint (degree)	110.2	96	1.9
left ankle joint (degree)	110.2	124.2	-1.6
Right Knee joint (degree)	154.2	121.8	2.6
Left Knee joint (degree)	154.2	161.8	-1.6
Right hip joint (degree)	172	173.6	-0.3
Left hip joint (degree)	172	131.4	8.4*
Right shoulder joint (degree)	148	155.8	-1.8
left shoulder joint (degree)	148	155.4	-2
Right elbow joint (degree)	106.2	100	1.1
Left elbow joint (degree)	106	100	1.1

tab $t_{(05)}(4)=2.776$ *=significant at selected level

Table number 1 shows the means, standard deviation, t-value and the significant of various variables such as the performance, the C.G. and the angle of joints of standing and running soccer throw-in.

It was evident that the calculated t value of C.G. at standing and running position in soccer throw-in is 3.3 is more than the tab t value=2.776, so the of C.G. at standing (Squared) and running (staggered) position in soccer throw-in is found significant.

It was evident that the calculated t value of left hips joints at standing and running in soccer throw-in was found significant since the tab values tab t(05)(4)=2.776) is lesser than the calculated t value.

It was also evident that the calculated t value of the performance at standing and running in soccer throw-in was found significant since the tab values tab t(05)(4)=2.776) is lesser than the calculated t value.

Whereas the calculated T values in cases of other variables such as left /right ankles, left/right knees, left/right hips, left/right

shoulder and left/right elbows were found insignificant since the obtained t values were lesser than the required t value=2.776 at the selected level of significance.

Discussion of the Finding

As shown in table 4 the value of t ratio of C.G. joints of standing and running soccer throw-in was significant, it may be because of the longer stride which leads to lesser in C.G. and less extension of the joints.

The angle at the left hip joints of soccer throw-in (standing) and soccer throw-in(running)also defers significantly while execution of throw-in soccer. It may be that due to momentum with running stride the players were unable to attain greater extension.

It was also found that the performance of throw-in (standing) and the throw-in (running) were significant. It may be because of the momentum of the player in running throw-in as well as the difference in the speed hips joints, shoulder joints, elbow joints and wrist joints between throw in of both running and standing, and also because of the more angular velocities of the upper arm, lower arm and joints of elbow as would be expected from the greater joint velocities (Adrian & Kemp, 2005).

Conclusion

Based on the analysis of the study the following conclusions can be drawn.

1. C.G. of standing-throw in and running throw-in of soccer are found significant.
2. Left hip joints (standing and running position of soccer throw in) are found significant.
3. Both ankles joint (standing and running), both knees joint (standing and running), both hips joints (standing and running), both shoulders (standing and running), and elbows joints (standing and running), were found insignificant.
4. The performance at standing (Squared) and running (staggered) in soccer throw-in was found significant.

Recommendations

- The soccer players can make self-assessment with the results of the study.
- Similar studies may be conducted by using sophisticated equipment and subjects of different level and sex.
- The results of the study may helpful to prepare a technique model for the university level soccer players.
- The study may help students who want to conduct similar study in future.

References

1. Adrian & Kemp, M. (2005). A biomechanical analysis of the soccer throw-in with a particular focus on the upper limb motion. Science and Football V: The Proceedings of the Fifth World Congress on Science and Footbal.
2. Bray, K.A. (2004). Modelling the long soccer throw-in using aerodynamic lift and drag. The Engineering of Sport 5 (Vol. 1), 56–62.
3. Cerrah, A. (2011). Relationship Between Isokinetic Strength Parameters and Soccer Throw-in Performance. Research quarterly for exercise and sport. 82., A10-A10.
4. Chang, J. (1979). The Biomechanical Analysis of selected soccer throwin techniques. Asian Journal of Physical Education, 2, 254-260.
5. Kline, L. (1982). Mechanical Analysis of the Soccer throw-in. Soccer Journal 27(2), 27-30.
6. Levendusky, T.A., Clinger, C.D., Miller, R.E. and Armstrong, C.W., (1985). Soccer Throw in Kinematics. Biomechanics in Sports 2, edited by Terauds, J. Barham, J.N.(California:Del Mar), 258-268.
7. Messier, S.A. (1986). Mechanics of Translation and rotation during conventional and handspring soccer throw-ins. International Journals of sports Biomechanics 2, 301-315.
8. Schwirtz, K. A. (1988). Biomechanical analysis of the soccer throw-in . In Science and football edited by Reilly, T., Lees, A Davids, K. and Murphy, W. J. (London:E. & F.N Spon)), 460-467.