

## THE EFFECTIVENESS OF THREE STARTING TECHNIQUES IN RUNNING Laterally

John Z. Ostarello<sup>1</sup>, Eric Suess<sup>1</sup> and Andrew G. Ostarello<sup>2</sup>

<sup>1</sup>Department of Kinesiology and Department of Statistics  
California State University, Hayward, <sup>2</sup>University of California, Santa Barbara,  
California, U.S.A.

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**INTRODUCTION:** The ability to start quickly and run laterally appears to be important in a number of sports including American football, baseball, volleyball, and tennis. Coaches and teachers vary in their recommendations of the most effective technique for moving laterally. Two techniques are widely accepted: the jab-step and the cross-over step. A third technique that is not as widely recognized is the gravity-step. Four studies compared the efficacy of jab-step and the cross-over step in baseball and slow pitch softball (Israel & Brown, 1981). Chandler, et al. (1975) examined the jab-step and cross-over step in American football. Along with other techniques, Cox, et al. (1982) studied the effectiveness of the jab-step and cross-over step in volleyball while Bragg & Andriacchi (2001) looked at applications of these techniques, and the gravity-step, in tennis. Various measurement methods were used in these studies and they produce equivocal results. The purpose of this study was to examine the efficacy of three starting techniques – jab, cross-over and gravity steps - in lateral running to distances up to 27 m (90 ft).

**METHODS:** In running to the right, the jab step was performed by pushing off the left foot moving the right foot a short distance to the right, pivoting on the right foot and running. The cross-over step was accomplished by pivoting on the right foot and moving the left foot across the front of the right foot. The gravity-step consisted of moving the right foot back behind the left, so that the center of gravity falls outside the base of support. The performer topples in the direction of movement and quickly steps to the right with the left foot. The subjects were 21 male university students ranging in age from 18 to 34 years. Subjects had no known bias favoring any of the techniques. Using a balanced order, each subject received instruction in one technique at a time, practiced until they had sufficient mastery of the technique and, after adequate rest, performed 5 trials. Each trial consisted of running through 6 timing stations set at 2.7, 5.4, 8.1, 10.8, 18, 27 m (9, 18, 27, 36, 60, 90 ft). Subjects were tested in pairs to promote a competitive setting. The subjects returned on subsequent days to perform each of the other techniques.

**RESULTS AND DISCUSSION:** ANOVA, using the last 4 trials for each technique, revealed that the cross-step was significantly faster than the other techniques ( $F=8.54$ ,  $p=0.00$ ). Indeed, the cross-step was faster at every timing station. Means and standard deviations for the cross-over, gravity and jab steps were:  $2.897 \pm 1.245$  s,  $2.943 \pm 1.252$  s,  $2.950 \pm 1.267$  s. There was no statistically significant difference between the jab-step and the gravity-step. Further analysis compared subjects based upon their height. Three groups were created: short, medium, and tall. The short group was significantly slower at all distances. Although the cross-step proved to be faster, the decrease in average time was only 0.05 seconds. While this represents an important difference in base stealing, one has to examine the magnitude of the difference to determine its efficacy in a particular sport.

### REFERENCES:

- Bragg, R.W., & Andriacchi, T.P. (2001). The lateral reaction step in tennis footwork. *XIX International Symposium on Biomechanics in Sports*, San Francisco, 34 - 37.
- Chandler, J.V., Langley, T.D., & Blair, S.N. (1975). Movement times for jab and cross-over steps by high school football players. *Research Quarterly*, **46**, 147 - 152.
- Cox, R.H., Noble, L., & Johnson, R.E. (1982). Effectiveness of the slide and cross-over steps in volleyball blocking – a temporal analysis. *Research Quarterly*, **53**, 101 - 107.
- Israel, R.G., & Brown, R.L. (1981). Response time comparisons among four base running starting techniques in slow pitch softball. *Research Quarterly*, **52**, 324 - 329.