## 28th ECSS Anniversary Congress, Paris/France, 4-7 July 2023

Effect of different starting techniques on sprint speed and lower extremity muscle activation for 50 m sprint

Huang, B.X., Hsu, T.M., Nai, H.F., Lin, J.Z.

National Taiwan University of Sport

## **INTRODUCTION:**

The block start position has long been regarded the best starting method for sprints. From the block start, the runner can more quickly enter the optimal running mode than from a standing start and achieve a faster start speed in the shortest time [1]. However, in recent years, the three-point start has been used in the 4\*100 m relay, where those running second to fourth legs can choose to start in a standing or three-point starting position. Most of the studies have compared the differences in sprint performance between block and standing starts, but the three-point start has rarely been considered. Examining the process of sprinting is limited during field experiments, as effectively analyzing the muscle activation mode during each phase is challenging. Therefore, the purpose of this study was to explore the instant step point and lower extremity muscle activation of different starting techniques for 50 m sprinting.

**METHODS:** 

We recruited 16 college athletics sprinters. The participants performed a maximum-effort sprint of 50 meters with block, three-point, and standing starts, and three sprints were performed. We used Optoiump and 5 Witty to record the real-time sprint step and time parameters. Used 8 Noraxon wireless EMG sensors to record the signals. The action phase was considered as: the crouched "set" position; 200 ms after the starting gun fire; the 1, 3, 5, 9, and maximum speed steps. The phase divided into pre-landing, initial contact, stance, and recovery. The statistical method used was One-way repeated measures ANOVA. **RESULTS:** 

In the first 10 m sprint time and speed, and the results show that the block start was significantly faster than the three-point and standing start; the three-point start was also significantly faster than the standing start. In the lower extremity muscle activation section, the results show that the MGAS and SOL activation was significantly lower with the block start than with the three-point start.

CONCLUSION:

The sprint time and speed were the fastest in the first 10 m of the block start, and the sprint time of the three-point start was faster than that of the standing start. Therefore, both the block start or three-point start can produce faster acceleration. In terms of muscle activation in the lower extremity, the activation of MGAS and SOL in the block start was significantly lower than that in the three-point start. However, the action patterns of the two were similar, and the three-point start does not provide the starting pedal to supports the ankle joint, so the MGAS and SOL provide more isometric work in the "set" position. We found that the block start produced better sports performance in key indicators such as, sprint time, and speed. The overall movement performance produced with the three-point start was better than that with the standing start. The findings suggest that in the future, during start technique training, the three-point start can be used instead of standing starts.

1. Salo & Bezodis (2004)

Topic: **Training and Testing** 

Presentation

Poster

## European Database of Sport Science (EDSS)

Supported by SporTools GmbH

