

# Journal of Coaching Education

## Using Sport Science to Improve Coaching: A Case Study of Paralympic Track and Field F44 Discus Throw Gold Medalist Jeremy Campbell

Lawrence W. Judge, Ph.D., CSCS

Department of P.E., Sport and Exercise Science

Ball State University, Muncie, IN

David Bellar, Ph.D., CSCS

Department of Kinesiology

University of Louisiana at Lafayette, Lafayette, LA

### ABSTRACT

The discus throw is a complex track and field event combining linear and angular motion. Success in the discus throw necessitates being strong and explosive; but due to the complexity of the event, throwers must be technically sound. The basic throwing technique employed by all discus throwers is similar, but variations are present due to anthropometrics, physical abilities, training, and error influences. Working with a Paralympic discus thrower, that has a physical disability, is a unique coaching challenge that makes it important to individualize the technical model to meet the physical abilities of the athlete.

Jeremy Campbell was born without a right fibula but was very active in high school sports. In high school, he was all-district in basketball, track and football. He was introduced to amputee athletics at the Endeavor Games in 2004. Jeremy Campbell wanted to be the first disabled athlete to throw a discus 60 meters and win a gold medal in London. However, in 2011, he had a personal best of just over 55 meters and finished 2<sup>nd</sup> in the IPC World Championships in Christ Church, New Zealand.

The purpose of this paper is to examine the World Record performance of a Paralympic discus thrower that integrated physical capacity development and technical interventions based on a quantitative biomechanical analysis.

Two digital video cameras (Canon Elura 60) running at 60 Hz were placed to view Jeremy Campbell's best throws. JES Deinterlacer version 3.3.3 was used to de-interlace the existing video footage and export at 60Hz. Video was also passed through a mild adaptive noise reducing filter, then de-interlaced and exported as an uncompressed .mov file. This was imported into Measurement in Motion version 3.1 and was used to place event markers into the edited video based upon the actions (lift off, touch down) of the right foot.

The results of the biomechanical analysis of the world record thrower were as follows. The total time from right leg lift off at the beginning of the movement to release of the implement was calculated to be 1.13 seconds. The time from right leg lift off to touchdown in the center of the ring was 0.6 seconds with the right foot angled 270 degrees from the direction of the throw. The left leg returned to the ground 0.30 seconds later. The delivery phase of the throw represented 21 % of the total time duration. The discus was rotated approximately 276 degrees from the direction of the throw on left leg touch down. The discus was released at 34.3 degrees with no



# Journal of Coaching Education

---

appreciable difference between the angle of incidence and the angle of release.

Jeremy Campbell has recorded the best discus throw (63.46 meters) all-time by an F44 thrower. This success is the result of an efficient technical pattern and a balanced approach to training that included the proper mix of biomotor training and training adaptations based on his physical ability.

## Authors' note

Lawrence W. Judge, Ph.D., CSCS, is an associate professor of Physical Education and is the coordinator of the Graduate Coaching Program at Ball State University. He recently served as a national track and field (ambulatory throws) coach for team USA at the London Paralympics. He personally coached gold medalist, Jeremy Campbell, in the F44 discus. He can be contacted by the following: 765-285-4211 (O); 765-285-3485 (F); lwjudge@bsu.edu.

David Bellar, Ph.D., CSCS, is an assistant professor in the department of Kinesiology at the University of Louisiana-Lafayette. He can be contacted by the following: 337-483-5642 (O); 216-374-2590 (C); davidbellar@mac.com.

