

Abstract

► **Dapena, J. An analysis of angular momentum in the discus throw. Paper presented at *14th Int.Congress Biomech.*, Paris, France, 1993.**

The distance of a discus throw is determined primarily by the release velocity of the discus. A three-dimensional film analysis of three right-handed male discus throwers (distance thrown: 51.98 +/- 3.12 m) showed that the absolute velocity of the discus was linked mainly to the velocity of the discus relative to the c.m. of the thrower-plus-discus system rather than to the absolute velocity of the system c.m. At release, the discus had counterclockwise angular momentum in a view from overhead (HZ) and also in a view from the back of the circle (HY). These angular momentum components accounted for most of the horizontal and vertical velocities of the discus. The HZ of the thrower-plus-discus system was generated mainly during the first double-support and first single-support phases; its value did not increase in the rest of the throw. Surprisingly, there was little change in the HZ value of the thrower-plus-discus system during the delivery phase. However, there was a marked decrease in the angular momentum of the thrower and a concurrent increase in the angular momentum of the discus during the delivery, indicating a transfer of HZ from the thrower to the discus. The thrower-plus-discus system received HY during the second single-support and the early part of the delivery phase. Most of the HY acquired by the discus was transferred to it from the thrower in the second half of the delivery phase, at a time when the thrower-plus-discus system was not receiving a significant amount of HY from the ground. The most important conclusion of this project was that the first double-support and the first single-support phases of a discus throw are much more important than was previously believed. This is when ground reaction forces give the system most of the angular momentum about the vertical axis that will be transferred to the discus later on in the throw.