

THE CONTRIBUTION OF LOWER LIMB SEGMENTS BY PRE-MOVEMENT IN TAEKWONDO ROUNDHOUSE KICKING

Tae-Woon Jung and Hyo-Gu Cho

Yongin University, Yongin City, Korea

KEY WORDS: Contribution, Kinetics

INTRODUCTION: Investigation of the roundhouse kick is necessary due to its high frequency of use and application in diverse aspects of sparring. The kick can be analyzed by dividing it according to pre-movement and by analyzing relationship of dynamic variables. The purpose of this study is to offer data necessary for coaching skills and enhancing talent in players, by dividing roundhouse kicking according to pre-movement, and by calculating contribution of lower limb segments to final foot velocity.

METHOD: This study targeted 10 University Taekwondo athletes, and was shot with 6 cameras (60Fields/sec). Kicking was divided into standing, forefoot back, and roundhouse kicking with both-feet back. The Fore-Foot-Back was added 5 types(0° , 22° , 45° , 67° , 90°) of comprising the extension line in both feet and x-axis. And, the Both-Feet-Back was divided type of a change in the moving distance by adding 4 pieces during reducing(1type) or adding(3 types) by 30% to the mean distance. The Calculation of Contribution Method was used Yun Chang-jin(1997)'s formula that was used and arranged the formula by Chung(1988), and Ginsberg & Genin(1977). The video data and Raw data were calculated by using Kwon3D XP, and were analyzed by using Excel.

RESULTS: First, the contribution of toe velocity in every kick when the knee angle in the kicking leg is minimal was indicated to be thigh rotation, trunk rotation, whole-body central movement, and trunk central movement in order. Second, with a minimal angle of knee and at the time of hitting, the Fore-Foot-Back was increased angle of movement with getting faster in the toe velocity (=tiptoe speed). However, there is no difference between the types of Two-Feet-Back within the distance change of movement. Third, the contribution at the hitting moment was in order of thigh rotation or calf rotation, trunk rotation, whole-body central movement, trunk central movement, and foot rotation. Unlike when the knee angle in the kicking leg is minimal, the contribution of the thigh rotation dropped steeply, and the whole-body central movement and the trunk rotation lowered. On the other hand, the contribution of the thigh rotation was indicated to be very high. Fourth, becoming the form of rushing forward rather than relying only on rotation based on forefoot axis when standing roundhouse kicking is considered to induce improvement in contribution of the whole-body and trunk central movement in hitting. Fifth, given examining types in forefoot-back roundhouse kicking in hitting, it is judged that the smaller moving angle leads to depending on the trunk rotation and the thigh rotation, and that the bigger moving angle leads to depending on the whole-body and trunk central movement and on the thigh rotation.

DISCUSSION: Unlike the results of the preceding research, the contribution by the central movement in the whole body and the trunk was indicated to be high in this study. It is judged to use roundhouse kicking in the form of running forward by one step. In conclusion, when carrying out the roundhouse kicking, the hitting foot starts as if kicking the surface at the angle that the extension line in both feet becomes more than 2/3 between x-axis and y-axis. Making the body central movement large leads to enhancing contribution of the whole-body and the trunk central movement regardless of the moving distance before kicking, and to forming the sequentially energy transition from the segment toward the body to the segment toward the distance, thereby being thought to be effective hitting in competition.

REFERENCES:

- Chung, C. S.(1988) Three-dimensional analysis of the shoulder and elbow joints during the volleyball spike. Ph.D. Dissertation, Indiana University.
Ginsberg, J, H. & Genin, J.(1977). Statics & Dynamics(2nd ed.). New York : John Wiley & Sons.