

# KINEMATIC ANALYSIS OF THE TAKE-OFF IN ELITE CHINESE FEMALE HIGH JUMPERS

Hui Han and Guang Li

Track and field Teaching and Research section, Beijing University of Physical  
Education, Beijing, People's Republic of China

**KEY WORDS:** high jump, women, take-off, speed, angle, joint

**INTRODUCTION:** The purpose of this study was to examine the take off technique of female high jump athletes by biomechanical analysis. The score of the high jump event is usually decided by many factors such as horizontal velocity and vertical velocity of jump-off, duration of jump-off, change of joint angles. In order to determine the differences in performance between experienced Chinese and western high jump athletes, relevant factors were compared. From the data obtained in this study, valuable suggestions can be made to Chinese high jump athletes and coaches.

**METHODS:** Subjects for this study who were selected included 7 elite Chinese female high jump athletes whose average score was  $1.87 \pm 0.04$  m. The comparison group consisted of 9 international high performance female high jump athletes whose average jump height was  $1.96 \pm 0.03$  m.

Two JVC cameras were used with angle included of about 70 degree. Films were taken in same step by the following procedure: three-dimensional frame marked by PEAK system with the frequency of 25p/s, analytic picture was 50 fields/s,

Movement of Chinese women high jumpers with best scores were recorded and analyzed. Following biomechanics analysis, instructed by the theory of ZHAQIAOSIJI (Russia), measurement of those factors mentioned previously can be obtained. Comparison was made between the data obtained from the Chinese athletes with those of the international athletes. an Through statistics analysis some differences were established between the two groups.

## RESULTS AND DISCUSSION:

1. Horizontal jump-off velocity of Chinese athlete was higher than that of western athletes by 0.2m/s on average, but it is considerably reduced prior to jump-off when compared to the international athletes.
2. With regards to vertical speed, an average taking-off vertical speed of 3.958m/s was recorded in Chinese athletes. There was no significant difference between the Chinese speed and that of the world players (3.738m/s).
3. When comparing the last step, the western athletes demonstrated a longer last step than their Chinese counterparts. They also appeared to have a wider range of stretching and swinging. Three joint angles, especially angles of ankles and knees of Chinese athlete are much smaller than those of international athletes. There was significant difference between them. The data also showed that Chinese athletes do not stretch their joints (ankle, knee and hip joint) completely when the foot leaves the board.
4. The results indicated that Chinese athletes have a buffering angle of about 150 degrees. This shows that the descent of their gravity point was small.

It was established from the data that vertical velocity of take-off that is the key factor that could attribute to the difference in performance between Chinese and western athletes. However, the difference in angles of ankle, Knee and hip joints of maybe a factor that may reduce the likelihood of successful performance for Chinese female athletes in the high jump event.

## REFERENCES:

- Aiferd.didk. (1977). Fusbeil high jumps 's in take \_off. *External sports news in brief*, 8.  
Depeina. (1989). Fusbeil high jumps of Bioechanics in Sports. *SHAN DONG sport science And technology Analysis*, 1, 52.