A COMPARISON OF RUNNING KINEMATICS BETWEEN TOP 6 AND HONG KONG ELITE TRIATHLETES IN 2008 ASIAN CHAMPIONSHIPS

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INTRODUCTION: Triathlon is a multi-sport endurance event consists of swimming, cycling, and running in immediate succession between disciplines. A distinguishing feature of running in triathlon is the athlete may need to tolerate fatigue condition and lactate accumulation after exercising two disciplines for an extended period of time. Also, a sudden change of muscle group usage from cycling to running may cause a poor running form in the triathletes. Running is the last discipline in triathlon competition. According to the experience of the coaches, running performance had great effect on the overall result. In order to gather information on the performance of the athletes, on site data collection in high-level competition was conducted. The purpose of this study was to quantify the running kinematics of the triathletes and to determine the running kinematic difference between top 6 male triathletes in running event and HK elite triathletes in 2008 Asian Championships. This information could provide an updated reference on the performance of the Asian top triathletes. Based on the individual result, the strengths and weaknesses in each athlete were identified and specific training program could be provided for skill correction.

METHODS: Measurements were performed during the 2008 Asian Triathlon Championships at Guangzhou, China. Top 6 male triathletes in running event and 5 HK elite male triathletes were investigated at 0.9Km, 3.4Km, 5.9Km & 8.4Km of their 10Km race. The mean age of HK athletes was 26 year old. The average body height and weight were 175cm and 67Kg respectively. Their running motion in sagittal plane was videotaped at 50 Hz with a SONY DCR-TRV950E handycam. The camera was positioned perpendicular to the running plane of the triathletes. The video footages were analyzed by Dartfish TeamPro 4.5.2 software. A single running step was selected in each sampling point for analysis on the following parameters. Running speed (SP), step rate (SR), step length (SL), minimum left knee angle (KAng), left hip angle at touch down (TD) and left hip angle at take off (TO) were measured. TD was defined as an acute angle between heel-hip and the vertical. TO was an extension angle between trunk line and lower limb. SPSS 10.0 was used in statistical analysis. And Independent Sample t-test was employed to determine any significant difference of the data between two groups.

RESULTS and DISCUSSION: The SP of Top 6 and HK Elite were found to be 5.21 m/s and 4.63 m/s respectively. The SR of Top 6 and HK Elite were found to be 3.17 step/s and 2.99 step/s respectively. Moreover, the SL of Top 6 and HK Elite were found to be 1.65 m and 1.55 m respectively. Significant difference was found in SP ($p<0.01$), KAng ($p<0.05$), and TO ($p<0.01$). Although no significant difference was found in SR, the p-value 0.07 was closed to 0.05. The SR may be significant if the sample size could be increased. Significant difference was found in KAng and the mean values of the top 6 male triathletes and HK elite male triathletes were found to be 51° and 58° respectively. Decrease of KAng could reduce the moment of inertia of the leg with respect to the hip joint, thus reducing resistance to hip flexion. On the other hand, result showed that SL and TD were comparable between two groups.

CONCLUSION: This study provided information on the running characteristic of HK elite male triathletes. As SL of HK elite male athletes was comparable to top-level athletes, they should pay attention to their SR. Moreover, KAng and TO of HK elite male athletes should also be improved.