

STUDY ON DEVELOPMENTS OF BODY COMPOSITION AND PHYSICAL FITNESS FOR A YEAR IN JAPANESE ADOLESCENT TRACK AND FIELD ATHLETES

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INTRODUCTION: It is well known that physical fitness develops with the increased muscle thickness in adolescent boys especially from 16 to 18 years. Fukunaga et al. (1989) investigated the developments of body composition in Japanese boys and girls, and revealed that the muscle and fat cross sectional area increased with age from 16 to 18 years. Seefeldt et al. (1986) had reported that vertical jump height and maximal running velocity improved linearly with age from 5 to 18 years in boys who had no habitual physical training. However, no studies have investigated development of physical fitness of adolescent athletes. In addition, duration of measurement of longitudinal studies was a year basically. It is necessary to assess physical fitness several times within a year. The purpose of this study was to investigate developments of body composition and physical fitness in Japanese adolescent track and field athletes.

METHODS: Eleven boys (T1: 16.76 ± 0.69yrs., 170.5±4.9cm, 609.0±40.8N, T2: 17.19±0.68yrs., 170.7±4.9cm, 593.0±29.6N, T3: 17.49±0.65yrs., 170.7±5.0cm, 589.7±42.5N) participated in this study. Subjects belonged to track and field club of their high school. Body composition and physical fitness were determined 3 times a year; pre-season (T1), in-season (T2), and the off-season (T3). Measurements of body composition were height, body weight, the limb length, the limb girth, subcutaneous fat thickness(FT), and muscle thickness(MT). Anthropometry measurements, FT, and MT were the same methods described in Fukunaga et al. (1989). We applied test of physical fitness: sprint performance of 100m, jumping performance (counter movement jump, squat jump, drop jump), muscle power of trunk (medicine ball throw), single-joint isometric torque of knee and ankle. Dinn's multiple comparison procedure in incorporating the Bonferroni correction was used to locate significant differences across season. Statistical significance was set at p<0.05.

RESULTS: No significant differences were found in height, body mass, the limb length, the limb girth except waist, subcutaneous fat thickness across seasons. On the other hands, significant difference was found in 100m time between T1 and T2. Moreover, there were significant differences in the torque of knee extension and knee flexion between T1 and T2.

DISCUSSION: Highest sprint performance was achieved in the in-season. Similar tendency was seen in knee extension and knee flexion torque. However, no significant difference was found in body composition for a year. These results indicated that improvement of sprint performance can be caused by the development of specific tension in lower limb muscles or improvement of sprint running skills.

CONCLUSION: Development of physical fitness was seen in the middle of track season in Japanese adolescent athletes.

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