The Effect of Periodized Strength Training Application on the Korea National Team

Hong-Sun Song\textsuperscript{a}, Dong-Ho Park\textsuperscript{b}, & Dong-Sik Jung\textsuperscript{a}

\textit{Korea Institute of Sport Science}\textsuperscript{a}, \& \textit{Inha University}\textsuperscript{b}, Korea

The purpose of this study to develop and apply a periodized strength training program for the Korea National Swimming Team. Twelve male swimmers (18.50 ± 2.07 yrs) were adopted 4 times a week for 40 weeks to a periodized strength training program. Assessments for body composition, anaerobic power, agility, maximal strength, and jump height, were performed before (pre) and after 3, and 6 months of resistance training performed 4 days per week. During the periodized resistance training elicited significantly increases resulted in there were significant increases in fat-free mass; anaerobic power; grip strength; sergent jump; basketball throw; standing long jump; one-repetition maximum (1-RM) squat, bench press, power clean, and dead left. Percent body fat and flexibility decreased significantly decreased after training. The performance level was also elevated as 6 personal records and 2 Korean records on June, 2006, and 4 personal records, 2 Korean records, and 2 Asian records during Pan Pacific Swimming Championships of Aug. 2006. During Asian Games in December, they established 8 personal, 4 Korean, and 2 Asian records. These results indicated that swimmer-specific periodized strength training may enhanced muscular functions, and performance in elite swimmer.

\textit{key words:} Periodization Resistance Training Elite Swimmer

Introduction

Modern swimming emphasizes performance level through not only training in water but muscle strength training (Costill et al., 1991; Hosston et al., 1981). It is expected that training in water can promote some techniques, speed, and endurance. But the changes of muscular function is obscure by training in water since the stimuli delivered from the water is not sufficient enough compared to dry land.
training (Paul, 2000). It has been reported that the Japanese swimmers obtained successful outcomes during 2004 Athens Olympiad due to an important participations of strength training (田中弘文 & 金久博昭, 1993; 中村礼子, 2004; 細川大輔, 2004). By the time of December 2005, the Korean National Swim Team practiced strength training once a week, and did not exercised in a systemic fashion. It has been perceived that the strength training was not directly beneficial to the performance, and muscle hypertrophy elicited by the strength training limited bodily flexibility. It has been also thought that a greater lean body mass gained during the training may induce a greater weight in the water. These negative perception led an ignorance to strength training at the field. Thus it has been of interest to develop and apply a scientific program to increase muscular function without excessive gaining of lean body mass, minimizing body weight in the water, to promote swimmer’s performance.

The muscular functions such as strength, power, and endurance are the important elements in determining swimmer’s performance, and in particular, the power is highly related to records of short events and speed (Hawley et al., 1992; Jung et al., 1992; Miyasahita & Kanehisa, 1979; Sharp et al., 1982; Troup et al., 1981). Sharp et al. (1982) reported that muscle power and short distance records (25 yards) were highly correlated when 30 swimmers (22 women and 18 men) were tested on swim bench. For the upper limb muscular endurance, the Wingate test revealed a high correlation between peak power, mean power, and fatigue index, and speed of 50 and 400 meter records (Hawley et al., 1992). These indicated a close relationship between muscle function and the swim records.

An event-specific strength training can promote performance by developing appropriate muscular function. Hsu et al. (1997) reported that the inner and outer rotation exercises using isokinetic machines which influence in shoulder rotator cuff can promote speed and propulsions of the swimmers. And the improved power and endurance of knee and shoulder by swimming-specific isokinetic training at 180°/sec and 240°/sec were highly related to the swim records in swimmers of the national team after 16 weeks of program (Jung et al., 1992). Ogita et al. (1993) reported a positive effects of usage of hand paddle during training on performance by elevating stroke efficiency. In addition, a 10-week training program using MAD-system, which made resistance training in water possible, has improved the swim records (Toussaint & Vervoon, 1990). Collectively, previous studies indicated both actual muscle training during swimming in water and swimming-specific training on dry