Effects of Concentration Training with Brainwave Biofeedback on Tennis Performance

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Abstract
This article presents evidence of effectiveness of 12-week concentration training program with brainwave biofeedback on concentration ability and tennis performance. Eight male tennis players were divided into two groups (Experimental and Control). Experimental group (n = 4) completed a series of training program using the Q-Jump computer system. Experimental task was one-set tennis singles with no-ad scoring system. The participants responded to the Korean version of the Test of Attentional and Interpersonal Style (TAIS) before and after the experiment. The results revealed that the concentration training program (a) was effective in improving concentration intensity and duration, (b) led to significant

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impact on attentional style, and (c) helped to improve tennis performance. Correlational analyses revealed negative relationships between concentration indices and unforced errors. Overall, these findings suggest that concentration is critical mental skill in tennis and can be improved through systematic training program.

**Key Words: Concentration training, Brainwave, Biofeedback, Tennis**

I. **Introduction**

Ability to focus or concentrate is one of the critical characteristics of successful athletes. Empirical evidences from studies with elite athletes support that concentration is associated with peak performance. Specifically, successful athletes are absorbed in the present with no thoughts about the past or future. In addition, they are mentally relaxed with high degree of concentration (e.g., Garfield & Bennett, 1984). Comparisons between successful and less successful athletes also suggest that ability to concentrate is important in discriminating the two groups (Gould, Eklund, & Jackson, 1992). These findings appear to have cross-cultural generality. For example, research with Korean tennis players revealed that successful athletes are more likely to maintain high level of focus, as opposed to becoming distracted by irrelevant thoughts (e.g., Bae, 1999).

Relative to the importance of concentration in successful sport performance, it is surprising that little effort has been directed to demonstrate efficacy of concentration training programs for athletes. There exist many attentional training programs developed to help athletic performance (e.g., Nideffer, 1985). However, little work has been done to