NEUROMUSCULAR DETERMINANTS OF PERFORMANCE IN EACH TYPE OF BALL SPIN TENNIS SERVE

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INTRODUCTION: There is a paucity of studies that have used EMG techniques in order to better understand the motor control patterns associated with a quality execution of a mature serve. Some studies have characterized the action of the upper limb muscles in the execution of a flat serve (Behm, 1988; Buckley and Kerwin, 1988; Yoneda and Sahashi, 1995) but just two have used EMG analysis related to different types of serve. Chow et al. (2003) studied the activation patterns in the abdominal muscles for the three types of ball spin tennis serves and reported no significant differences between the three types of actions. Coutinho et al. (2004) found in an EMG analysis of eight upper limb muscles in the flat and the topspin serves, of an elite level player, several differences in the muscle activation patterns and intensity between the two types of serve. The aim of this study is to identify the different muscle activation patterns associated with each type of ball spin tennis serve.

METHOD: Ten male senior players identified by three professional tennis coaches, as having high-performance tennis serve and who could serve with all types of spin, were selected as subjects. Each player performed five quality executions of each type of ball spin tennis serve to a specific part of the service area from the same side of the tennis court – right side for right handed players and left side for left handed players. Data were collected at the Technical University of Lisbon. A four camera video-based system (SIMI) was used to collect kinematic data. This video-based system was linked to a telemetric bipolar active surface system, which was used to collect EMG data from selected muscles. The EMG data were synchronized with the kinematic data using SIMI software. A BIODEX system was used to collect maximum voluntary contraction data for the following muscles selected for analysis: Pectoralis major; anterior deltoid; posterior deltoid; latissimus dorsi; infraspinatus; biceps brachii; brachioradialis;vastus lateralis of triceps brachii; long portion of the triceps brachii.

CONCLUSION: An understanding of activation patterns for each type of serve will assist the development of programs aimed both at injury prevention and performance enhancement.

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