ANALYSIS OF MUSCLE ACTIVITY IN VOLLEY SHOTS OF TENNIS ATHLETES: A KINEMATIC AND ELECTROMYOGRAPHIC STUDY

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ABSTRACT

Forearm muscles play an important role in tennis volley hitting ability as these muscles are responsible for generating the speed and power of the stroke. Surface electromyographic (sEMG) analysis of arm muscle activity in tennis volley strokes is essential to improve understanding of the mechanics of the volley movement, as well as providing useful information to improve volley technique and protect athletes from muscle injury.

Previous studies that have been conducted have helped to improve the understanding of arm muscle activity during volleys. However, there are still many aspects that need to be further researched, such as the influence of volley force, arm muscle strength and flexibility, and movement variations on arm muscle activity. Based on previous research, it shows that there is a lack of research that considers factors that affect volley shots, such as ball speed, volley technique used, and body and foot position and there are still differences in research results between one study and another, which may be caused by differences in methods and tools used, as well as differences in the characteristics of the research sample, so further research is needed involving analysis of EMG activity in the muscles involved in the movement of tennis volley shots. The purpose of this study was to determine the activity of arm muscles in volley shots of tennis athletes.

This type of research is quantitative descriptive research. This study will apply surface electromyographic (sEMG) analysis to find out the activity and muscle strength of tennis athletes when performing volley shots. The subjects of this study were 10 tennis athletes. Movement data and sEMG signals were recorded by the Trigno wireless sEMG recording system (DELSYSINC, Massachusetts, USA). Movement data were collected (148.15 Hz) by eight movement sensors, each of which was attached to the waist, upper arm, forearm and wrist.

The results of this study show that the graph shows the activity of 4 muscles during the tennis volley movement at the preparation, acceleration, and follow through stages. It can be seen that Flexor carpi radialis is the muscle with the longest active duration compared to the other 3 muscles. Based on the results of this study, it can be concluded that the Flexor carpi radialis muscle is the dominant muscle used during volley shots.

Kata Kunci: *surface electromyography (sEMG), tennis, volley*