

Analysing the Difference in Joint Angular Kinematics between Professional and Amateur Tennis Players

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The study aimed to investigate the differences in shoulder, elbow, and wrist angular kinematics between professional and amateur players during various strokes such as forehand, backhand, serve, and volleys. Four players (two professionals and two amateurs) were asked to perform each stroke, and their readings were collected using the Shadow Motion Capture System. The readings were analyzed using Mokka and MATLAB to calculate the joint angles and performance metrics. Professional tennis players exhibit distinct joint angle patterns compared to amateurs. They have larger shoulder and elbow angles on serves, indicating a more powerful stroke. On forehands, professionals have smaller shoulder and elbow angles, suggesting a more controlled swing. For backhands, professionals have larger angles on the dominant hand and smaller angles on the recessive hand, potentially favouring power and control, respectively. Finally, professionals have smaller shoulder angles on volleys, suggesting a more compact and controlled motion. The study showed that professional tennis players have lower joint angles during serves and strokes, indicating better flexibility, control, and refined technique. In contrast, amateurs display higher, less variable angles, reflecting less control and power generation. Professionals also have a larger shoulder joint angle (101.32 degrees) compared to amateurs (94.32 degrees), suggesting better shoulder positioning or flexibility for efficient backhands. Future research should expand the sample size, analyze leg movements, use controlled environments, and employ multiple high-speed cameras. The knowledge gained from the study can enhance training programs, improving performance for players at all levels.

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