

THE BIOMECHANICAL MODELING FOR THE UNDERSTANDING OF THE SHOULDER PATHOLOGY IN OVERHEAD ATHLETES: APPLICATION TO THE SHOULDER OF TENNIS PLAYERS'

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The shoulder plays a crucial role in overhead activity as it funnels the force and energy produced by the legs and trunk first to the upper-limb, and finally to the racket. Its contradictory role of stability and mobility makes it a vulnerable region, where problems commonly occur. The development of comprehensive biomechanical models remains a challenge in tennis because of the large range of motion and of the complexity of the shoulder joint. *B. Elliott and J. Alderson* will open this session through an historical approach by presenting key findings on the shoulder joint during the tennis serve. Then, *C. Martin* will talk about the compromise between performance enhancement and prevention of shoulder overuse injury during the tennis serve. *C. Charbonnier* will next discuss the combination of imagery and motion analysis for the study of shoulder impingements and instability during the tennis serve. *Y. Blache* will finally propose a new implementation of kinematic and musculoskeletal models to limit the classical issues in motion analysis and to estimate muscle force during dynamic movements.