

The Relationship between Body Positioning and Badminton Smash Quality

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Abstract : Badminton originated in ancient civilizations in Europe and Asia more than 2000 years ago. Presently, it is played almost everywhere with estimated 220 million people playing badminton regularly, ranging from professionals to recreational players; and it is the second most played sport in the world after soccer. In Asia, the popularity of badminton and involvement of people surpass soccer. Unfortunately, scientific researches on badminton skills are hardly proportional to badminton's popularity. A search of literature has shown that the literature body of biomechanical investigations is relatively small. One of the dominant skills in badminton is the forehand overhead smash, which consists of 1/5 attacks during games. Empirical evidences show that one has to adjust the body position in relation to the coming shuttlecock to produce a powerful and accurate smash. Therefore, positioning is a fundamental aspect influencing smash quality. A search of literature has shown that there is a dearth/lack of study on this fundamental aspect. The goals of this study were to determine the influence of positioning and training experience on smash quality in order to discover information that could help learn/acquire the skill. Using a 10-camera, 3D motion capture system (VICON MX, 200 frames/s) and 15-segment, full-body biomechanical model, 14 skilled and 15 novice players were measured and analyzed. Results have revealed that the body positioning has direct influence on the quality of a smash, especially on shuttlecock release angle and clearance height (passing over the net) of offensive players. The results also suggest that, for training a proper positioning, one could conduct a self-selected comfort position towards a statically hanged shuttlecock and then step one foot back - a practical reference marker for learning. This perceptual marker could be applied in guiding the learning and training of beginners. As one gains experience through repetitive training, improved limbs' coordination would increase smash quality further. The researchers hope that the findings will benefit practitioners for developing effective training programs for beginners.

Keywords : 3D motion analysis, biomechanical modeling, shuttlecock release speed, shuttlecock release angle, clearance height

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