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## THE BIOMECHANICS OF THE FOREHAND LOOP SHOT IN TABLE TENNIS

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The techniques of four internationally ranked Chinese table tennis players (2 male, 2 female) were compared with four Australian players (1 senior, 3 junior) as they hit forehand loop shots. Players were required to serve the ball and then to hit two types of shots; an off-forehand loop (3rd ball) and a cross-court smash (5th ball) as the shots were returned by an expert player at the other end of the table. This method was chosen in preference to a ball machine in order to maintain ecological validity of the study. Players were filmed by two phase locked high speed cine (Chinese players) or video (Australian players) cameras. A calibrated space frame was filmed prior to the filming of the subjects to allow reconstruction of the movement of the joint centres of the upper limb in three-dimensional space (Abdel-Azis, 1971). A minimum of eight acceptable trails of each subject was filmed but only five trials of each subject performing both shots were digitised. The upper limb was modelled as a system of three linked rigid members connected by frictionless joints. **Digitised** data were smoothed with a Butterworth second order, recursive digital filter and kinematic and timing data were generated from the smoothed data using standard biomechanical techniques. Differences in total downswing times, intervals within the downswing and velocities of the segment centres of mass at selected times during the shot were evaluated using repeated measures analysis of variance. Significant differences ( $p.01$ ) in velocity of all three segments were found for the smash shot with the Chinese athletes showing higher impact velocities than their Australian counterparts. Smaller coefficients of variation (Winter, 1980) were found for the Chinese players compared to the Australians indicating much greater shot consistency.