Studies on the velocity of the ball and the accuracy of various strokes in table tennis

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The purpose of this study was to investigate the velocity of the ball and the accuracy of forehand smash strokes in table tennis, especially in the aspect of the motion of an elbow joint during each stroke. Four male subjects participated in the experiment on this study. One of them was Guo Yuehua who was the winner in the World Table Tennis Championships of 1981 and 1983. The others were the members of the table tennis club of Waseda University. The pictures of the motion of an elbow joint and the action in hitting were recorded by a video cassette recorder while the motion of an elbow joint was recorded in an electric oscillograph in synchronism with a video signal.

The results obtained were as follows:

1. Guo Yuehua with the highest accuracy of forehand smash strokes showed the lowest deviation of the motion of an elbow joint and degrees of an angle of an elbow joint at impact during each stroke.
2. Guo Yuehua stroked the ball with his elbow joint fixed from 20msec before impact to the moment of impact.
3. Guo Yuehua’s motion of an elbow joint during smash strokes was same at each hitting point and it stretched widely before impact and flexed sharply and widely after impact.
4. The average degree of an angle of an elbow joint at impact ranged from 108 to 115 at each hitting point of each subject.

From the above results, the following conclusions were obtained:

1. It was guessed that the accuracy of the motion of an elbow joint during smash strokes at each hitting point had a close relation to levels of skill.
2. It was guessed that to stretch an elbow joint before impact, to flex it sharply and widely after impact and to fix it just before impact (ranged from 108 degrees to 115) increased the velocity of the ball and heightened the accuracy of smash strokes at each hitting point.