

Suggestions to Improve Scoring Systems Across a Range of Racket Sports

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Current Scoring Systems

| Sport | Match | Game/Set | Final Game/Set | Server in game/set | Serving first each game/set |
|------------------|-----------------|--|--|--|--|
| Badminton | Best-of-3 games | First to 21 points At 20-all, 2 point lead At 29-all, next point | First to 21 points At 20-all, 2 point lead At 29-all, next point | Winner of point | Winner of game |
| Table Tennis | Best-of 5 games | First to 11 points At 10-all, 2 point lead | First to 11 points At 10-all, 2 point lead | Rotates every two points Rotates every point at 10-all | Rotate server |
| Volleyball | Best-of 5 sets | First to 25 points At 24-all, 2 point lead | First to 15 points At 14-all, 2 point lead | Winner of point | Rotate server Coin toss at 2 sets-all |
| Beach Volleyball | Best-of 3 sets | First to 21 points At 20-all, 2 point lead | First to 15 points At 14-all, 2 point lead | Winner of point | Rotate server Coin toss at 1 set-all |
| Snow Volleyball | Best-of 3 sets | First to 15 points At 14-all, 2 point lead | First to 15 points At 14-all, 2 point lead | Winner of point | Rotate server Coin toss at 1 set-all |
| Squash | Best-of-5 games | First to 11 points At 10-all, 2 point lead | First to 11 points At 10-all, 2 point lead | Winner of point | Winner of game |
| Men's tennis | Best-of-5 sets | Game: Deuce Set: First-to-6 games win by two. First-to-7 point tiebreak game at 6 games-all | First-to-6 games At 5 games-all, 2 games lead | Deuce game: Same server Tiebreak game: One player serves the first point and then rotates every two points Set: Rotate server after every deuce game | Deuce game: Rotate server Tiebreak game: Server that served first in the set Set: Receiver from the previous set |
| Women's tennis | Best-of-3 sets | Game: Deuce Set: First-to-6 games win by two. First-to-7 point tiebreak game at 6 games-all | First-to-6 games At 5 games-all, 2 games lead | Deuce game: Same server Tiebreak game: One player serves the first point and then rotates every two points Set: Rotate server after every deuce game | Deuce game: Rotate server Tiebreak game: Server that served first in the set Set: Receiver from the previous set |

Table 1: Current scoring systems for badminton, table tennis, volleyball, beach volleyball, snow volleyball, squash, men's tennis and women's tennis

| Event | Average percentage of points won on serve | Percentage of points won on serve for both players/teams | Percentage of better player/team winning a match | Average number of points played in the match |
|------------------|---|--|--|--|
| Men's tennis | 63% | 65%, 61% | 73.9% | 262.7 |
| Women's tennis | 56% | 58%, 54% | 70.4% | 160.9 |
| Squash | 56% | 58%, 54% | A serve first: 64.6% B serve first: 63.8% | 75.0 |
| Table tennis | 56% | 58%, 54% | 64.3% | 77.1 |
| Badminton | 56% | 58%, 54% | A serve first: 65.8% B serve first: 65.1% | 91.3 |
| Volleyball | 30% | 32%, 28% | 71.8% | 187.6 |
| Beach volleyball | 30% | 32%, 28% | 66.4% | 98.5 |

Table 2: Percentage of the better player/team winning a match and the average number of points played in the match across a range of racket sports

Results

Table 2 represents the percentage of the better player/team winning a match and the average number of points played in the match across a range of racket sports. Note that due to the scoring system of volleyball it can be considered as a 'racket' sport. The average percentage of points won on serve have been estimated, and the percentage of points won on serve for both players/teams are assumed a 2% difference from the average. From table 2 the results indicated that both squash and badminton are "unfair" because it is an advantage to serve first in the match. In squash, the winner of each game serves first in the subsequent game. To obtain "fairness" in squash which doesn't depend on who serves first in the match, would be to rotate the server at the start of each game and the toss of a coin to decide the server in the final game. This is consistent with volleyball. A similar process could also apply to badminton with the extra condition that to win a game a player/team at 20 points-all must obtain a 2-point lead indefinitely (rather than the next point wins at 29 points-all).

The percentages of the better team winning in squash, table tennis, badminton and beach volleyball are less than the percentages of the better team winning in volleyball, men's tennis and women's tennis. Also, the analysis has not been done for snow volleyball but given the scoring system the percentages of the better team winning will be less than beach volleyball. Further, the average number of points played in men's tennis is considerably higher than all the other sports. For the reasons above the proposed scoring systems are given in table 3. Note that the proposed game structure in tennis to replace the deuce game is a 50-40 game; where to win the server must win 4 points and receiver must win 3 points. At most 6 points are played in a 50-40 games. The calculators used to derive the results in table 2 can be obtained from:

<http://strategicgames.com.au/sports.xlsx>

<http://strategicgames.com.au/tennisdeucesim.xlsx>

Proposed Scoring Systems

| Sport | Match | Game/Set | Final Game/Set | Server in game/set | Serving first each game/set |
|------------------|-----------------|--|---|--|--|
| Badminton | Best-of-3 games | First to >21 points At >20-1 all, 2 point lead | First to >21 points At >20-1 all, 2 point lead | Winner of point | Rotate server Coin toss at 1 set-all |
| Table Tennis | Best-of 5 games | First to >11 points At >11-1 all, 2 point lead | First to >11 points At >11-1 all, 2 point lead | Rotates every two points Rotates every point at 10-all | Rotate server |
| Volleyball | Best-of 5 sets | First to 25 points At 24-all, 2 point lead | First to 15 points At 14-all, 2 point lead | Winner of point | Rotate server Coin toss at 2 sets-all |
| Beach Volleyball | Best-of 3 sets | First to >21 points At >20-1 all, 2 point lead | First to 15 points At 14-all, 2 point lead | Winner of point | Rotate server Coin toss at 1 set-all |
| Snow Volleyball | Best-of 3 sets | First to >15 points At >14-1 all, 2 point lead | First to 15 points At 14-all, 2 point lead | Winner of point | Rotate server Coin toss at 1 set-all |
| Squash | Best-of-5 games | First to >11 points At >11-1 all, 2 point lead | First to >11 points At >11-1 all, 2 point lead | Winner of point | Rotate server Coin toss at 1 set-all |
| Men's tennis | Best-of-5 sets | Game: 50-40 Set: First-to-6 games win by two. First-to-7 point tiebreak game at 6 games-all | First-to-6 games At 5 games-all, 2 games lead | 50-40 game: Same server Tiebreak game: One player serves the first point and then rotates every two points Set: Rotate server after every deuce game | 50-40 game: Rotate server Tiebreak game: Server that served first in the set Set: Receiver from the previous set |
| Women's tennis | Best-of-3 sets | Game: 50-40 Set: First-to-6 games win by two. First-to-7 point tiebreak game at 6 games-all | First-to-6 games At 5 games-all, 2 games lead | 50-40 game: Same server Tiebreak game: One player serves the first point and then rotates every two points Set: Rotate server after every deuce game | 50-40 game: Rotate server Tiebreak game: Server that served first in the set Set: Receiver from the previous set |

Table 3: Proposed scoring systems for badminton, table tennis, volleyball, beach volleyball, snow volleyball, squash, men's tennis and women's tennis