

A technical investigation into the ITTF Large Ball Tournament in Suzhou

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1 Introduction

With the development of table tennis equipment and the players' techniques, the ball's speed and spin have been increased greatly, which makes the rallies for each point short. The ordinary spectators find difficult to appreciate, and gradually, they have lost their interest in table tennis matches. It is very disadvantageous for the further development of table tennis world wide because losing the spectators is equal to losing the sports "Gods", and this will reduce entertainment-value and its market disappear. Undoubtedly, it is very important for our sport to take an active attitude to add up more attractiveness and to draw the spectator' attention to table tennis.

In order to increase the sports attractiveness, the International Table Tennis Federation for a long time has been doing its best to carry out reforms such as having different combine rubbers on the two sides of one racket, the co-existence of the white balls and yellow ones, and some regulations on service. But these measures haven't much improved the attractiveness of table tennis to the spectators due to the lack of scientific evidence on their effectiveness.

Therefore in 1996, the council of the ITTF adopted a proposal to carry out experiments on 40mm balls based on the presumption that the speed and spin be reduced to increase the rally for each point. From then, the speed and spin of 40 mm and 38mm balls were dynamically measured and the comparative studies were done by the CTTA. The feasibility of large balls became a hotly debated topic all over the world for the purpose of obtaining the reactions to the large balls from all walks of lives, an international tournament using 40mm balls was proposed by the ITTF and organized by the CTTA in 1998 in Suzhou China in connection with the ITTF EC meeting. Also, a questionnaire investigation was carried out by a research group of the CTTA.

2 Subjects and methods

2.1 16 world ranked players; 8 males, 8 females; 14 right-hand, 2 left-hand; 11 shake-hand grip, 5 penhold grip; 12 attackers, 4 defenders

2.2 8 ITTF EC members, among whom 75% often watch table tennis tournaments and championships and 62.5% play table tennis.

2.3 38 Chinese spectators, among whom 92% often watch the table tennis competitions and have played the game for half an hour each week for about 20 years.

3 Results and analysis

3.1 On speed

During the tournament, the reaction of the players, ITTF officials, and spectators on the speed was investigated (Table 1). Statistics showed that most of them felt that the 40mm ball's speed is lower than the 38mm ball's.

In table tennis matches, speed is one of the important winning factors. It makes players because they do not have enough time to hit the ball back. It is self-evident that slower speed is favorable to the increase of the rallies, which will give the spectators more chance to enjoy the game.

The dynamic experiment also showed that the speed of the large balls is slower than that of the 38mm balls (Table 2 and 3). The highest difference between them is 13 % which shows significance ($p < 0.05$).

Table 1. The speed of 40mm against 38mm balls

	players		officials		spectators	
	n	%	n	%	n	%
Slower	15	93.8	5	62.5	25	66
Faster					1	3
no difference			2	25	8	21
hard to say	1	6.3			3	8

Table 2. Comparison on the speed of forehand smash

	Diameter (mm)	Weight (g)	N	X	S	T	P	unit: m/sec
								Reduction (%)
A	38	2.51	9	17.8	1.2	AB=1.9	>.05	BA=4
B	40	2.79	9	17	0.4	BC=7.6	<.05	CB=9
C	40	2.49	9	15.4	0.5	AC=5.6	<.05	CA=13

Table 3. Comparison on the speed of forehand attack

								Unit: m/sec
	Diameter	Weight	N	X	S	T	P	Reduction(%)
	(mm)	(g))
A	38	2.51	10	10.6	0.2	AB=1	>.05	BA=2
B	40	2.79	11	10.4	0.6	BC=2.6	<.05	CB=6
C	40	2.49	10	9.8	0.4	AC=5.7	<.05	CA=8

3.2 On spin

Compared with the other sports, the spin of table tennis is the strongest. Often it is too complicated for the spectators to understand. Sometimes the audiences are upset by the 'easy' faults of players caused by unpredictable spin, which they cannot see or understand. Without question, if the spin were less, the spectators would be more relaxed in thinking when they watch the table tennis competitions.

The result of the questionnaire for the players in the tournament showed that 75% felt the 40mm ball's spin after the player's hitting is not as strong as the 38mm balls' and only one player (6.3%) felt there is no different between them.

The dynamic experiment is showed that the 40mm balls' spin are much less than that of the 38mm balls (table 4). The greatest difference is 21% and is statistically significant ($p < 0.05$).

Table 4. Comparison on the loop spin

								Unit: rotation/sec
	Diameter	Weight	N	X	S	T	P	Reduction
	(mm)	(g)						(%)
A	38	2.54	8	133.5	8.4	AB=3.5	<.05	BA=13
B	40	2.65-2.80	11	116.5	11.5	BC=1.8	>.05	CB=10
C	40	2.40-2.53	5	105.8	9.2	AC=5.6	<.05	CA=21

3.3 On rallies

The numbers of rallies in table tennis matches may be the standard of the excitement. It is reported that if the players hit the ball coming and back on each point more than 7-8 there will be some light applause, and if there are more than 10 rallies the spectators will acclaim joyfully. So we can say the increase of the rallies is the key point for table tennis attractiveness.

In this questionnaire, most people including players, officials and spectators agreed that the 40mm balls can indeed produced more rallies than that of the 3

8mm ones. Please refer to the Table 5.

Table 5. The rallies of 40mm against 38mm balls

	players		officials		spectators	
	n	%	n	%	n	%
Longer	8	50	6	75	26	68
Shorter	3	18.8			3	8
no differ	5	31.3	1	12.5	9	24

3.4 On popularization

The attitude to the use of the 40mm balls in future competitions is different among the players, officials and spectators (Table 6).

The Table 6 shows that the players' opinions on the 40mm balls are not positive. The reason behind this is very simple. They have not got used to the large balls. None of them has ever used the 40mm balls before the tournament. Among 9 players giving reasons for hitting mistakes, 66.7% said not being need to it, and such factors as the strange sound of bounce .On of the bounce as if the ball is broken, he could not easy to drive player felt that playing the 40mm ball not send a long distance to the end of the table, but it always falls in the middle near the net, which made his game not as powerful as playing the 38mm balls.

Table 6. Preference between 40mm and 38mm balls

	players		Officials		spectators	
	n	%	N	%	n	%
40mm ball	2	12.5	5	65.5	25	66
38mm ball	12	75	1	12.5	11	29

Most of the officials and spectators seem to prefer the 40mm balls. 66% of the spectators and 50% of officials think that the matches of the 40mm balls are more exciting and attractive. 32% of spectators and 12.5% of officials think that there is no difference between the two kinds of the balls. Among them, 42% of spectators and 37.5% of officials can distinguish the balls by the hitting sound and 39% and 50% respectively by eyes. Some officials also think the 40mm balls are eager to watch on TV screen.

As to the impact of the various playing styles, among 12 players questioned, 33% thinks the 40mm balls affect the players with loop the most; 25% thinks it

does to the choppers; 41.7% thinks it is the same to all players. The results of this tournament show that the 40mm balls are fair to every player regardless of their play. The 2 titles for men's single and women's singles went to Kim Tak Soo KOR and Wang Nan from CHN, both of whom are the best in the world rankings in this tournament. It is unquestionable that the technical ability is the most important for the players' performances.

3.5 On development

The investigation showed that for the development of table tennis all over the world it is very necessary to make reforms but the direction of the reforms should be oriented prudently. The increase of the ball's diameter is just one of the choices. Everyone must always keep an open mind to this table tennis revolution (Table 7).

Table 7. The attitude of the reform

	players		officials		spectators	
	n	%	n	%	n	%
need	4	25	7	87.5	27	71.8
no need	3	18.8			1	3
other way	8	50	3	37.5	8	21

4 Conclusions

The investigation shows that using the 40mm balls in matches can reduce the speed and spin and increase the rallies in favor of the match excitement and the attractiveness for spectators, but the players need more practice. More experiments are needed before a final decision is reached.