A COMPARISON OF QATARI AND CHINESE CADET TABLE TENNIS PLAYERS: ANALYSIS OF ASIAN CHAMPIONSHIP TEAM COMPETITION

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Video analysis was performed during the Asian Cadet Table Tennis Championships to determine playing style and patterns of top and lower ranked nations. China and Qatar were chosen for analysis based on their performance during the tournament (1st/2nd playoff and 7th/8th playoff respectively). Notational analysis techniques were implemented to analyze 3 matches for each nation. Significant ($p < 0.05$) differences were identified in serve and return placement and shot choice. Chinese players used a higher proportion of long return placement and a higher percentage of topspin shots compared to Qatari players. This preliminary study suggests that at cadet level, Chinese players exhibit a more attacking style of play than Qatari players.

KEY WORDS: Table Tennis, Cadet, China, Qatar.

INTRODUCTION: Table tennis has a strong tradition in Asian nations who have dominated the senior international stage. This dominance is mirrored in the cadet age category of the game with 19 of the top 20 male (<15 years) players coming from the Asian continent (http://www.ittf.com). Previous work, conducted with methods established to analyse performance of other racket sports, has already attempted to identify differences in playing patterns between elite and non-elite nations. One area of table tennis which has been explored is differences in shot type on both an individual and group level (Djokic, 2002; Drianovski & Otcheva, 2002). Zhang, Liu, Hu, and Liu (2013) established that the Chinese elite players were "excellent" in all the technique areas examined, whereas other countries were "general" with regard to their techniques. Malagoli Lanzoni, Di Michele, and Merni (2013) recently investigated serve placement and shot selection in 14 Asian and 6 European elite players. Their study suggested that the Asia based players used a more attacking style, selecting shots which were viewed as having more offensive intent. In addition, the analysis of Malagoli et al. (2013) revealed that serving patterns used by Asian players reduced the counter attacking possibilities of the opponent, suggesting a higher effectiveness of this serving strategy. While previous work seems to suggest clear differences in patterns and style of play in senior players, there is a lack of information on younger age groups. Therefore the aim of this preliminary work was to investigate the difference between the most successful nation at cadet level (China) with one of lower ranking (Qatar).

METHODS: Data were collected at the 19th Asian Cadet Table Tennis Championships, Doha, Qatar. The cadet team final (China vs. Taipei) and 7th/8th playoff games (Qatar vs. Sri Lanka) were selected for analysis. Video data were recorded (Casio EX-ZR1000, 60 Hz) from two elevated positions to capture shot characteristics. Live hand and electronic notation were used to record shot characteristics (Easytag, Dartish), point outcome and work/rest ratios (iCODA, Sportstec Ltd.). In order to identify specific areas of the table, a virtual grid dividing the table itself into six equal areas was superimposed to the videos so that the serve and return could be characterized to be either short or long and left, right or middle. Shot types were grouped using a modified version of a previously established classification system (see table 1; Malagoli Lanzoni et al., 2013), and expressed as a percentage of the total shots played. Shot outcome was deemed to be either a win or loss and further characterized subjectively as a forced or un-forced error following instruction from an experienced (more than 30 years) international Head Table Tennis Coach. A forced error
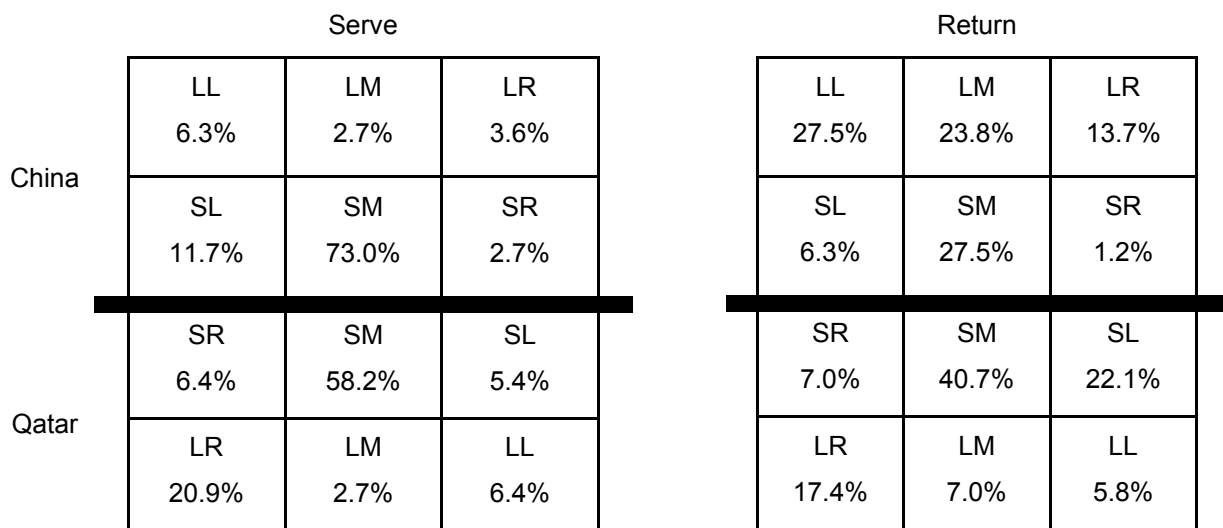
was identified as when a player was unable to return the ball to the opponent's side of the table as a direct result of the previous shot from the opponent. An un-forced error was defined as a point where the player did not succeed in returning the ball through an error of their own. All data were recorded by the same investigator who was able to consult the Head Table Tennis Coach if he was unsure of error classification for any point. Work was determined from first ball contact until the point was won outright and rest time was any duration that was not deemed work between points.

Table 1: Shot type definitions adapted from Malagoli Lanzoni et al. (2013)

Shot Type	Definition
Topspin	Attacking stroke imparting topspin onto the ball. Usually played at speed.
Loop	Defensive stroke when the player is far from the table, hitting the ball to a height and slowing play.
Push	Passive stroke imparting back spin onto the ball to place it short over the net.
Slice	Defensive stroke imparting high velocity lateral spin to the ball, slowing it down.
Smash	Attacking stroke characterized with a linear trajectory and no spin. Applied from eye height or above.
Block	Defensive shot, placing the bat in front of the ball. Uses the opponent's ball speed and spin.

Percentages for the total serve and return placements were calculated for both China and Qatar matches. Numerical means (±SD) were calculated for shot selection. A chi squared test was used to test for significant differences in distributions between groups with China used as expected values. Alpha priori level was set as p<0.05.

RESULTS: Serve (China; n=106, Qatar; n=120) and return (China; n=109, Qatar; n=122) placement distributions for China and Qatar were found to be significantly different (p<0.05). China executed 84.7% of their serves so that they landed in either the short middle or short left section of the table with the rest of the sections accounting for less than 7% each (figure 1). Qatar also served a large proportion of the serves short middle (58.2%), however in contrast to China, served 20.9% to the long right section of the table. China hit 65% of their returns into the long sections of the table this in contrast to Qatar who hit only 30.2% and as a result hit the majority of the returns short (69.8%).

Serve

LL 6.3%	LM 2.7%	LR 3.6%
SL 11.7%	SM 73.0%	SR 2.7%

China

SR 6.4%	SM 58.2%	SL 5.4%
LR 20.9%	LM 2.7%	LL 6.4%

Qatar

Return

LL 27.5%	LM 23.8%	LR 13.7%
SL 6.3%	SM 27.5%	SR 1.2%

SR 7.0%	SM 40.7%	SL 22.1%
LR 17.4%	LM 7.0%	LL 5.8%

Figure 1: Serve and return placement. Percentages represent where the ball bounced in the oppositions half of the table. The thick middle line represents the net (SL = short left, SM = short middle, SR = short right, LL = long left, LM = long middle and LR = long right).

Shot selection was also significantly different for China and Qatar (p<0.05). Topspin and push shots were the most frequently selected shots for both China and Qatar, however the

two nations differed in the ratio between these shots. China had a higher percentage of topspin shots compared to Qatar (see table 2) which was in contrast to push shot selection where Qatar had the larger percentage. Loop was the next most selected shot at 4.2 and 4.4% for Qatar and China respectively, followed by block, smash and then slice. Qatar had a higher percentage of forced points won, however they also had a higher percentage of unforced errors causing a lost point. Average work time differed slightly between Qatar and China with the latter having a smaller average time (2.7 s), opposing what is seen in the rest time where Qatar's mean rest time was 6.5 s less than that of China.

Table 2: Percentage shot selections, point outcome and average work and rest times per point

Parameter	Qatar	China
Shot Selection		
Push (%)	30.5	20.2
Topspin (%)	63.3	73.1
Loop (%)	4.2	4.4
Slice (%)	0.0	0.3
Smash (%)	0.6	0.7
Block (%)	1.4	1.3
Won Points		
Forced (%)	43.8	30.9
Un-Forced (%)	56.2	69.1
Lost Points		
Lost – Forced (%)	18.8	30.0
Lost – Un-Forced (%)	81.2	70.0
Work/Rest Ratios		
Work per point (s)	3.2	2.7
Rest per point (s)	13.5	20.0
Work Rest Ratio	1.0 : 4.2	1.0 : 7.4

DISCUSSION: This study analyzed cadet table tennis to discover if any playing differences were present between a lower ranked Asian nation (Qatar) and the highest ranked nation in Asia (China). Through analysis of senior elite table tennis it has been found that players originating from the Asian continent are more attacking when compared to European players (Malagoli Lanzoni et al., 2013). This tactical difference had yet to be established within lower ranked Asian nations and whether it was consistent throughout age groups. The data presented within this study give some evidence to answer these questions. In the current study, cadet players' serve placement values (figure 1) showed that the serve of choice for both nations was a short middle serve. In addition Qatar performed a long right serve 20% of the time. These values may suggest that China don't attempt to mislead their opponent on the serve by varying shot location, rather minimize their opponent's options on the return, which agrees with Malagoli Lanzoni et al. (2013) who suggested better players served to minimize counter attacking possibilities. However using this statement may misrepresent serve performance as Qatar often won the point when using the long right serve and therefore may have more use in Cadet level table tennis than at senior elite level. Return shots show a much more prominent distinction between China and Qatar. China's tendency to return the ball long represents a much more aggressive style of play as by hitting the ball

long the opponent is forced to play a higher risk shot to return the ball. This difference in return placement appears to be one of the key differences between the top and lower ranked cadet table tennis players. The placement alone does not allow for a full analysis of the style of play used due to the difference between playing a passive or active deep return. These terms refer to which shot type is played in order for the ball to land on the long sections of the table and may be an area which future research wishes to focus on due to its important nature within a point of table tennis. In addition to return placement alluding to China's more aggressive playing style, shot selection also provides evidence for increased offensive intent. China had a 73% selection of the attacking topspin shot compared to Qatar's 63%; in addition they had a smaller proportion of defensive shots such as the push shot (20.2% vs 30.5%). This offensive intent from the start may give some explanation to the lower work time per point for the Chinese competitors. The more aggressive nature of the Chinese players' from the initiation of the rally means that the point is won or lost earlier than can be seen for the Qatari players as a result of their more passive tactics. Finally, not all the data suggest a more attacking style for China. The point outcomes show that Qatar had a higher percentage of forced winners (44%) when compared to China (31%). This is accompanied by a higher unforced error percentage for Qatar, meaning that although the Qataris forced more opponent errors, they had a large amount of unforced errors themselves. The technical and physical capabilities of their west-Asian counterparts are such that the Qatari players may attempt relatively higher risk shots to have a chance of winning sufficient points. Iino and Kojima (2009) investigated differences in forehand topspin shot kinematics between skill levels. No differences were observed in racket path, but the time to generate racket velocity was smaller in the more skilled players. In relation to the current study this offers evidence that the higher skilled players (China) are able to perform forehand topspin shots with more velocity under stricter time constraints, such as when the opponent plays a faster shot. In addition, players of lower skill (Qatar) may be susceptable to errors when performing forehand topspin shots when suffcient time to produce adequate racket velocity is not available.

CONCLUSION: The aim of the study was to determine playing style differences between the best cadet players in the world (China) and lower ranked players (Qatar). The data collected suggests that China have a more aggressive playing style and a better technical proficiency when playing attacking shots. This may be used to inform coaches both on tactics when playing the Chinese and for development in terms of practice and tactical intent.

REFERENCES:
Djokic, Z. (2002). Structure of competitors' activities of top table tennis players. In N. Yuza,
S. Hiruta, Y. Iimoto, Y. Shibata & J. R. Harrison (Eds.), *Table tennis sciences* (pp. 74-90). Lausanne: International Table Tennis Federation.
Drianovski, Y., & Otcheva, G. (2002). Survey of the game style of the best Asian players at
the 12th World University Table Tennis Championships (Sofia, 1998). In N. Yuza, S. Hiruta, Y. Iimoto, Y. Shibata & J. R. Harrison (Eds.), *Table tennis Sciences* (pp. 3-9). Laussane: International Table Tennis Federation.
Iino, Y. & Kojima, T. (2009). Kinematics of table tennis topspin forehands: effects of performance level and ball spin. *Journal of Sports Sciences*, 1311-21.
Malagoli Lanzoni, I., Di Michele, R., & Merni, F. (2013). A notational analysis of shot
characteristics in top-level table tennis players. *European Journal of Sport Science*, 1-9.
Zhang, H., Liu, W., Hu, J.-J., & Liu, R.-Z. (2013). Evaluation of elite table tennis players' technique effectiveness. *Journal of Sports Sciences*, 1-8.