

## From “Undefeated Winner” to “Cry Wolf”

### —On the Impact of the ITTF (International Table Tennis Federation) Reform on the Chinese Table Tennis Team and the Countermeasures

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**Abstract:** The Chinese table tennis team has long been outshining rivals over the years. Since 2000, the International Table Tennis Federation (ITTF) has launched a series of reforms aiming at saving the global table tennis industry. Since the previous reforms were not thorough enough, they were basically halfway resolved by the powerful Chinese team. Instead, the Chinese team grew stronger! However, the ITTF's 40+ plastic ball reform has moved the real thing, which weakens the lethality of the Chinese team at the cost of limiting the “dynamic element” (the “rotation” factor in particular) and risking technique regress, the great impact force is beyond our envision! The author makes an in-depth analysis of the core technology and non-core technology of 40+ athletes based on the principle of 5 elements of table tennis competition, pleading for countermeasures of the adverse effects brought by the “falling spot” in exchange for “rotation”, “tactics element” improvement and “technique element” compensation, and providing a reference for the Chinese team to step out of the dilemma.

## 1. Introduction

What happened to the Chinese table tennis team? From the long-term undefeated winner, to the recent bewildered lose to foreign competitors by the main force, what is the problem? Some people say that Germany, Japan and Korea have introduced Chinese coaches to push them closer to the Chinese team, others say that there are problems from inside, that flat management does not work properly, and some even believe that things will not be so confounded if Liu Guoliang is still here. While in the author's opinion, it is not the case! Let us first look at the introduction of Chinese coaches by Germany, Japan and Korea, it is actually not new, but why it did not work until now! Let's then take a look at the flat management, which has its originality in being popularized worldwide as an advanced management model, and we have no evidence to doubt about it since we just begun to implement it. Liu Guoliang is a “person”, not a “god”! The Chinese team will get to this point whether he is here or not. The regress is not caused by the progress of Germany, Japan and Korea, nor the flat management or the decline of the Chinese team after Liu Guoliang's departure, but the ITTF's 40+ plastic ball reform, which abruptly draws the super-class Chinese team that once absolutely dominates the world closer to the top teams such as Germany, Japan and Korea. Against this backdrop, the author uses the 5 elements of table tennis competition as the theoretical basis to comprehensively explore the new problems facing the 40+ era, pleading for a solution to the dilemma that the Chinese team is currently undergoing.

## 2. The five elements of table tennis competition and the core techniques of athletes

In order to profoundly reveal the new problems faced by the ITTF's 40+ plastic ball reform, this paper first expounds the 5 elements of table tennis competition and the core techniques of athletes,

and analyzes the connotation and evolution of the core techniques of athletes at various stages of table tennis development.

## **2.1 Five Elements of Table Tennis Competition**

“The quality of each stroke that a table tennis player hits in mutual restraint and counter-constraints is determined by its spatial motion and space-time features. From the perspective of kinematics (physics), the space-time features of a stroke can be described by five concepts: “speed”, “force”, “rotation”, “arc” and “falling spot”, and these five concepts are objective and quantifiable”<sup>[1]</sup>. Therefore, they can be used to describe the stroke level or tactical level. Former national table tennis team’s senior coach Li Xiaodong took the lead in using the five-factor principle to analyze whether the athlete’s “speed”, “force” and “rotation” are able to defeat the opponent, which are together called the “dynamic elements”, and “falling spot” and “arc” are called “guarantee elements”<sup>[2]</sup>. The author considers that “dynamic element” equals to “technique element”, and “falling spot” is also tactical, which is because the quality of the “falling spot” directly affects the tactical effect of the latter hit and they are inseparable. Therefore, the “falling spot” is separated from the “guarantee elements”, which is called a “tactics element”. In this way, each stroke in the game wins through “techniques” or “tactics”, or creating greater possibility for the next hit, and the two are complementary to each other. That is to say, “technique elements” (“dynamic elements”) and “tactics elements” and “guarantee elements” are signs of control skills, tactical abilities and level. The five concepts of “speed”, “force”, “rotation”, “falling spot” and “arc” become the basis for objectively judging a stroke skill, tactical level or quality

It should be emphasized that the 5 elements are an inseparable whole, that is, “technique elements” and “tactics elements” are a whole technique or tactics system, which is characterized by specialty and generality, and the gap between the two should not be too large. There will be a gap, as long as the relationship between the specialty and the short stroke is not formed, but rather be a prominent and slightly inferior relationship.

“For the athletes, it is quite difficult or even impossible to highlight all the five elements. However, there are bound to be more excellent and more prominent elements and they will become a key technique or special skill to defeat the opponent. The author calls it the “core techniques” of table tennis players; and the weaker elements can be called “non-core techniques” or “general techniques”<sup>[3]</sup>.

By the way, the so-called “non-core techniques” are just a bit inferior, but they may still be strong relative to others<sup>[4]</sup>.

Generally speaking, a top high-level athlete should have at least three to four extra strong elements among the five elements to be in an invincible position and be expected to climb the peak of the world table tennis world. In other words, those who can well integrate the “technique elements” and “tactics elements” into the “core techniques” of athletes will master the winning rules of table tennis and grasp the initiative in the field.

## **2.2 Core Techniques of Door-In-The-Face (DITF) Chop Play in the Early 38mm Small Ball Era**

In the early days of table tennis (1926-1951), which was also the heyday of European table tennis, “DITF” chop play was the most popular and most powerful play. Chop play mainly relies on the friction properties of rubber to create “rotation”. Therefore, its play features outstanding “rotation”, “arc” and “falling spot”, less deficient in “speed” and “force”, the first 3 items can be roughly regarded as “core techniques”, and the last 2 as “non-core techniques”. During this period, chop play is technically based on a robust chop, while tactically threatening the opponent by the change of “falling spot”, causing the opponent to fumble.

## **2.3 Core Techniques of The “Preemptive Strike” Quick Attack in the Middle and Late Period of the 38mm Small Ball Era and of the Loop Period**

In 1952-1959, the Japanese invented the sponge bat and used the pen-hold grip to play the middle-long table long-distance play, and the “preemptive strike” offensive new play highlighting

“speed” and “force” is first created. With the changes in equipment and rules, “preemptive strike” play developed rapidly, which has outstanding “speed” and “force”, and slightly inferior in “rotation”, “falling spot” and “arc”. The first 2 items can be roughly regarded as “core techniques”, and the last 3 as “non-core techniques”. The core techniques of the offensive new play are more advanced and powerful than that of the defensive chop, because the former holds 2 dynamic elements (“speed”, “force”), while the latter holds only 1 dynamic element (“rotation”). Since then, the Japanese have completely ended the chop play that had been dominated by the Europeans for 25 years. Obviously, “dynamic elements” shine in this period by relying on equipment. What’s more, the technique elements dominate the victory of the game, but the tactics elements have little effect.

However, since 1959, the Chinese table tennis team has rapidly emerged with a more advanced “close-table quick attack” new play. In the early 1960s, when the Japanese invented the “loop”, later they incorporated the “rotation” element, which enabled the “preemptive strike” play to be supported by a complete set of “dynamic elements” (“speed”, “force” and “rotation”), core techniques became more comprehensive. Obviously, the new play and technique innovations have spurred the continuous development of table tennis.

In the 1970s, the Europeans made a comeback. They developed the two most advanced plays - “loop-fast attack” and “fast attack-loop” by combining the Chinese “close-table quick attack” with the Japanese “loop” technique, “speed”, “force” and “rotation” became more prominent. “Arc” is also good, but its “falling spot” is slightly insufficient. The first 4 items can be roughly regarded as “core techniques”, and the last 1 as “non-core technique”. During this period, Europeans have better mastered the loop technique, which integrates the shakehand grip with “speed”, “force” and “rotation”, forming a powerful main play featuring balanced super-strength “rotation” that breaks through the quick attack play merely focusing on “speed”, and therefore leading the world. Since then, the advantages of “preemptive strike” play have been maintained until the end of the 38mm small ball era in 2000.

From the above analysis, the “dynamic elements” basically dominate the 38mm small ball era. The “preemptive strike” play relies on power to win, with few round-trip balls, and there are not many tactical opportunities except in the first three strokes.

## **2.4 Core Techniques of the 40mm Big Ball Era**

During this period, the core techniques and tactical abilities of “preemptive strike” play did not change much compared with the 38mm small ball era, which features outstanding “speed”, “force” and “rotation”. “Arc” is also good, but its “falling spot” is slightly insufficient. The first 4 items can be roughly regarded as “core techniques”, and the last 1 as “non-core technique”. It can be seen that in this period, the core techniques of “preemptive strike” play are not comprehensive enough. The “falling spot” is lacked in “tactics elements”, that is, the “tactics elements” are not integrated into the core techniques, leading to strong offensive skills and weak tactical abilities (mainly reflected in the first four strokes). The winning is relied on technique elements, while “tactics elements” are not fully developed and used.

The “core techniques” of “DITF” features outstanding “rotation”, “arc” and “falling spot”, and improving “speed”, but less deficient in “force”. The first 4 items can be roughly regarded as “core techniques”, and the last 1 as “non-core technique”. It can be seen that its core techniques tend to be balanced, including “technique elements” and “tactics elements”, accounting for 4 elements among the 5. The offensive initiative is strong, and the overall strength is higher, forming a new situation that can attack and defend. Therefore, during this period, Ding Song and Zhu Shihe, who were represented by the men's “DITF” and “attack-chop” play, rose rapidly and won the men's World Table Tennis Championships - men's team champion and the World Table Tennis Championships – men's singles runner-up. As for women's “DITF” “non-chop” play represented by Zhang Yining and the subsequent Ding Ning, they both achieved grand slam champions. This shows that masters can reasonably integrate the “technique elements” and “tactics elements” of the five elements into “core techniques” perfectly.

However, the power of chop play is always its weakness in that it is difficult to withstand the

power of “preemptive strike”. Judging from the previous competitions, the “DITF” chop play lost more and won less, indicating that the power of “preemptive strike” play led the game victory in 38mm small ball and 40mm+ big ball eras, which is beyond doubt.

### **3. Case analysis of the impact of the ittf’s reforms on the chinese team**

By reviewing the ITTF's change from 38mm small ball to 40mm big ball and 11-point competition system, unblocked serve and inorganic glue in 2000 to the 40+ era, we can see that the Chinese team receives the biggest impact, especially from the 11-point competition system and 40+ plastic ball reform.

Under the 21-point competition system, the long-term practice of the Chinese team from generation to generation has gained rich technique and tactics play, proving that it is a valuable and invincible asset for winning battles. So once this system is changed, we need to re-create new technique and tactics systems and research, update training methods, which suddenly drew the super-class Chinese team that dominates the world closer to the top teams. However, the ITTF’s reforms are not complete, which did not involve the 5 elements of table tennis competition. After the Chinese team has increased the impact range and strengthened physical training to compensate for the dynamic elements weakening after 40mm+ big ball reform, the “core techniques” were not affected, so they adapted to the rules and quickly recovered, and soon stood at the top of the world table tennis again.

However, the 40+ era reform is completely different from the previous ones. They have taken the real thing and learned from the incomplete reforms of the past. They even weakened the “dynamic elements” as a breakthrough to carry out the 40+ plastic ball reform, resulting in the unprecedentedly weakened “dynamic elements” such as speed, force and rotation of the ball. In especial, the power of “rotation” almost reversed to the era when there had no “strong rotation” before the invention of “loop” in the 1960s, resulting in a significant reduction in “core techniques”. The Chinese team bears the brunt, and the super power conquering the world table tennis world has suffered a setback, forcing the Chinese team to be on the same starting line as the other countries in the 40+ era, once again drawn closer to the leading teams such as Germany, Japan and Korea.

In the new situation, the “core techniques” and “non-core techniques” of “preemptive strike” and “DITF” play have undergone tremendous changes in the 40+ new era. The core techniques of “preemptive strike” play changed to: featuring outstanding “speed” and “force”, less deficient in “arc”, “rotation” and “falling spot”. The first 2 items can be roughly regarded as “core techniques”, and the last 3 as “non-core techniques”. While the core techniques of “DITF” play: featuring outstanding “arc” and “falling spot”, “speed” is also good, but its “force” and “rotation” are slightly insufficient. The first 3 items can be roughly regarded as “core techniques”, and the last 2 as “non-core techniques”.

In this way, the Chinese team has reached the most dangerous moment! The “core techniques”与 “non-core techniques” of “preemptive strike” and “DITF” must be reshuffled in the 40+ new era, because the reduction of “rotation” seriously affects the power of technique elements (dynamic elements), and loses the value of “core techniques” and has become a non-core technique. The most obvious example is that before the 40+ era, the Chinese team had obvious advantages (strong power) against Germany, Japan and Korea. After 40+, these opponents can change the path in the first time, which was impossible in the past. Because both in terms of technology and equipment, China’s force mechanism is more scientific than Germany, Japan and Korea, and China’s unique viscous rubber performs stronger rotation than the German and Japanese astringent rubber. In the past, the Chinese team’s “strong top spin” that combines “speed” and “force” to form balanced loop power, which is difficult for the opponent to change path, yet now it is not what it used to be since the “strong top spin” has been greatly weakened.

Since the value of “core techniques” has been lost, the “dynamic elements” in the “core techniques” of “preemptive strike” play are incomplete, leaving only “speed” and “force”. This time, the ITTF’s 40+ reform truly slammed the “core techniques” of Chinese athletes! The power of the

Chinese team is not as good as it used to be! What is the way out for the Chinese team? - Create new “core techniques” by replacing “rotation” with “falling spot”.

#### **4. Countermeasures in the 40+ era**

##### **4.1 Create New “Core Techniques” by Replacing “Rotation” with “Falling Spot”**

Before the 40+ era, “preemptive strike” play dominated the game with “technique elements”, showing strong techniques and less strong tactics. “Tactics elements” are limited to the first four strokes, the reason is that the balls are light in the 38mm small ball era and 40mm+ big ball era, “dynamic elements” had a great effect, and there were fewer round-trip balls. Basically, the battle is solved within the first four strokes, and there are not many opportunities for holding a stalemate except for technical connections and basic skills confrontation, not tactics themselves. However, after entering the 40+ era, the winning rule is no longer led by the “technique elements”, because “dynamic elements”, especially the power of “rotation” is unprecedentedly restricted, and now it is impossible to make up for the further impact caused by the change of 40+ by strengthening physical fitness and increasing the range of hitting like in the 40mm+ big ball era, this way has been blocked by the ITTF, and the era of relying on power is gone. Instead, the round-trip balls increase, and the use of tactics is the right way. Therefore, “tactics elements” have a place to be used, 40+ new era should pay attention to tactical training, “tactics elements” (“falling spot”) should be used as an entry point to strengthen training, “falling spot” should be integrated into core techniques to better combine “technique elements” and “tactics elements”, forming a technique-tactics balanced advanced play. The change of falling spot is an important “tactics element” of table tennis. It is a clever art to win in changes, and it is unpredictable and invincible to win the opponent. To play smartly is better than to play well! This can also be a fierce power. We expect to change the “falling spot” to make up for the power caused by the weakening of “dynamic elements” in the 40+ reform, in this way the Chinese team will continue to dominate the world table tennis by gaining the new power of “technique elements” and “tactics elements” (forming new “core techniques”).

##### **4.2 “Core Techniques” of the 40+ Era**

Given that the “tactics elements” should be highlighted in the 40+ era, the new “core techniques” and “non-core techniques” should naturally be reshuffled to achieve that “preemptive strike” features outstanding “speed”, “force” and “falling spot”, with good “arc” and slightly insufficient “rotation”. The first 3 items can be roughly regarded as “core techniques”, and the last 2 as “non-core techniques”. In a similar way, “DITF” features outstanding “falling spot” and “arc”, with good “speed” and slightly insufficient “force” and “rotation”. The first 3 items can be roughly regarded as “core techniques”, and the last 2 as “non-core techniques”.

See! The new “core techniques” of preemptive strike play can replace the 40+’s previous sole relying on “technique elements” with balanced techniques and tactics by combining the “technique elements” and “tactics elements”. At the same time, the inferior position of a 60-year regress caused by the reform has been reversed. The current “core techniques” are more advanced, and in a sense, this is the forced result by the ITTF. But to be fair, the ITTF’s series of reforms had the greatest impact on the Chinese team, but it had a positive impact on the improvement and development of the techniques and tactics of table tennis. Perhaps this is what the ITTF reform ultimately wants.

##### **4.3 The Tactical Abilities of Athletes in the 40+ Era can Be Improved Through the Training of Connecting Technique**

The “falling spot” is inseparable from the “path”, and the “falling spot” is subject to changes in the “path”.

“Table tennis’s connecting technique” is a basic technique, which is rooted in the combination of the “path change” rules (“footwork not in place” caused by using the “mindset”, “instinctive reaction” in psychology and physiological factors, etc.) and active defensive tactics (designing a “trap” to entice the opposite to make advanced attack), making the best play between the front and

the back strokes. It is not aimless or random strikes, but the former stroke should create a good opportunity for the latter stroke to help the own side or defeat the opponent. The latter stroke stays in the original position or moves to the best position in advance to hit the ball, so that the front and back strokes form a coherent connection, forming a tactics. In this sense, “connecting technique is also a tactics.” Therefore, there is an inseparable relationship between the connecting technique and the tactics<sup>[5]</sup>. Take the technique of picking up the backhand and twisting the short-spinning straight ball in the forehand as an example, further analysis is as follows.

Athlete A follows the pre-designed routine, makes a single step into the second stroke and receives a forehand short ball to straighten the path, because there is a very large gap in the backhand position, it is easy to lure the opposite athlete B back to the slash where the backhand position is, the fourth stroke of athlete A is based on this connection effect to quickly back to the backhand position with a backhand slash. With this “trap” temptation as a guarantee, athlete A can safely use the twisting technique in the short position of the forehand. This is an active defensive tactics: “The athletes design the routine in advance, intentionally give the opponent the opportunity to attack, predict the opponent’s return path, move to the best hitting spot in advance, seek victory in defense or create greater possibility for the transition attack”<sup>[6]</sup>. It can be seen that the second stroke of the athlete A is playing the active defensive tactics, and the fourth stroke is the connecting technique. In this way, athlete A’s two-stroke tactics and the connecting technique are integrated.

It can also be said that athlete A’s twist of straight path is predicted by the mindset of athlete B’s “slash at straight”, which is the “path change rules”<sup>[7]</sup>. It can be seen that the set-back after the second stroke’s twist of a straight path is preparing for the fourth stroke slash. The second stroke is the connecting technique, and the fourth stroke is the “unilateral slash” tactics. In this way, athlete A’s two-stroke tactics and the connecting technique are integrated.

As long as the athlete masters the “active defense” tactics or “path change” rules in the connecting technique, the technical and tactical connection effects of the two strokes can be generated. The connecting technique and tactics are also in one step and synchronized.

## **5. Discussion**

In a nutshell, the ITTF’s 40+ era reform program has touched the nerves of traditional Chinese training. Traditional table tennis training should enter the 40+ era as soon as possible, adapt to the trend, adjust the training program of techniques and tactics, and replace “rotation” with “falling spot” to meet new challenges.

The table tennis connection in the 38mm small ball and 40mm+ big ball eras is limited to the first four strokes, but after the 40+ era, the connecting technique is designed to have a sense of connection in the whole process of each ball except for the transition balls, technical and tactical connection should be formed before and after each stroke. We call the use of two or more identical or different tactics in a single ball as an overlay tactics. In the case that the “overlay tactics” cannot be used, the transition to one or two strokes to continue the tactics is allowed, and the author calls it “combo tactics.” The comprehensive and in-depth empirical research on the “overlay tactics” and “combo tactics” issues will be carried out in the follow-up study.

## **6. Conclusions and recommendations**

### **6.1 Conclusions**

The above idea of replacing “rotation” with “falling spot” compensates for the power of “technique elements” restricted in the 40+ era by “tactics elements”. Overlay tactics is the advanced tactics of the 40+ era, the general trend of tactical use, also the highest level of use, and its power is comparable to the power of “technique elements” before the 40+ era, and even more powerful. Thereby the overall level is improved, showing the advanced play with balanced techniques and tactics of the 40+ era. These tactical abilities of athletes entering the 40+ era can be improved through the training of “connecting technique”.

## **6.2 Recommendations**

### **6.2.1 40+ Tactical Training in the New Era Must be Enhanced to a Very Important Strategic Position**

Every coach in the 40+ era should fully realize that tactical training be upgraded to a crucial strategic position. The author here emphasizes that in the 40+ era, we can no longer conceal tactical laziness with technical diligence, and we should spend more time on tactical thinking. Coaches or athletes who do not think clearly or can not clarify the training direction will be eliminated by the 40+ new era.

### **6.2.2 40+ Convergence Technology in The New Era Must not be a Short Board**

The 40+ new era emphasizes the training of the “tactics element” of “falling spot”, that is, the connecting technique must not be a short slab. It can be expected in the future that a well-trained table tennis team will be reflected on the level of “connecting technique”, it is the touchstone for measuring the level of a table tennis player in the 40+ new era.

### **6.2.3 The Chinese Table Tennis Team Can Adapt to the New Reform of the International Table Tennis Federation**

The reforms of the ITTF will continue. This is an objective and irresistible law that is not based on people’s will, it is recommended for us to adapt to. Just like the past reforms of the Chinese table tennis team can turn calamities into blessings, the author believes and hopes that the Chinese table tennis team will overcome the difficulties in the 40+ new era and continue to lead the global table tennis game!

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