

# Differences caused with new 40mm ball in structure of competitors' activities of top table tennis players

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**Abstract** Subject of this research is the structure of activities of a sample of about 90 top table tennis players (mostly ranked in the first 100 of the ITTF Ranking, list such as Kong Linghui, Liu Guoliang, Samsonov V., Wang Liqin, Waldner J.O., Primorac Z., Ma Lin, Persson J., Gatién J.P.) during the competition season 2000/2001 (starting from October 2000), at the following competitions: French Open, Polish Open, Swedish Open, Finland Open, European Men Super League, European Men Champions League, Grand Final Pro Tour, JOOLA Europe TOP – 12, which will be compared with the results of the previously research (“Structure of competitors’ activities of top table tennis players” – Master work at Faculty of Physical Education – University in Novi Sad – YUGOSLAVIA – 1999.) in 1996/97, 1997/98, 1998/99 competing seasons (mostly in final matches at Pro Tour tournaments, European and World Championships, and European Champions League).

61 competitive activities were analyzed, in 3 groups:

1. *30 variables for evaluation of frequency, degree of realization and effectiveness of technical and tactical elements*

- Frequency of technical and tactical elements
- Effect of these elements
- Stroke placement zone
- Stroke realization zone

2. *23 variables for evaluation of accuracy and effectiveness of the service and return of service*

3. *8 variables for evaluation of movement activities*

- Side and deep movements
- Change between forehand and backhand
- Strokes in both positions

Research consists of the analysis of all competitors’ activities from the aspects of:

1. success in play (winners and losers),
2. quality of the players (position in ITTF Ranking list)

Basic statistics and frequency data were analyzed for each activity, and compared with the success of play and the quality of the opponent.

The statistically important differences between:

- winners and losers

- better and lower ranked are noted, and interpreted by expert analyses, showing how the training process produces champion players

The basic aim of this research was a higher effectiveness of the training process in table tennis. The results explain the modern concept of table tennis, and the factors that influence the success of play and the quality of play and players. Finally, this research gives an answer about the positive or negative changes caused by the new 40mm ball in top table tennis.

## 1 Problem, subject and aim of the research

Problems in this research are connected with the effort to discover and define lawfulness in the area of table tennis game, and mostly those which contribute to fortify exactly parameters which are, on the other way, important for the methodology of training process. The problems are very close connected with the problems and methodology of previously research: "*Structure of competitors activities of top table tennis players*" – Master work at Faculty for Physical Education and Sport – University Novi Sad – YUGOSLAVIA.

During the player's training process, from the beginning to the end of his sport career, at competition he is trying to dominate in game and naturally to win his opponent. In his play during the game he apply (more or less) those technical and tactical activities which he learned and improved in his training and during the competition. Whole technical and tactical potential, as the result of programs of his training as the results which he get at competition, make unique whole of creative process which must be in close correlations and condition. How that potential will be used rationally and in function of competitors activities, mostly depending from the program's of the training process, and his connection with the game claim (requires).

From the aspects of possibilities of the rationalization of training process, it will be very important to define those importance things in the structure of competitor's activities, from the less important segments.

On the other hand new 40mm ball in table tennis is a first step to improving and modernizing our sport, in way to be again attractive for spectators and TV media. From October 2000. until today (in short period of 7 month some changes are observed, but there is a necessarily for their co station and analyzing in which way competitors activities goes ?). The physical fact said that the new 40mm ball is slower about 4-8%, and with less rotation about 10-13%, but the basic question is : What the table tennis get by this ?

To get clue to get this problem in the area of technical and tactical activities, as for the whole competitors activities (which make the justifiableness of training programs), it is necessary, from the one hand studying practically effect of the training programs, and on the other hand structure of competitor's activities (during the competition).

For the fortifying of the structure of competitors activities, I applied those cybernetic process, in which outgoing information regulate incoming information

on the base, so called “*negative returning connection*”, in the purpose of the exactly fortifying and defining of the activities during the competition in case of the table tennis players.

Main subject of this research is the fortifying differences in competitors activities of top table tennis players with new 40mm ball. Considering previously research, and myself playing and coaching experience, I created the system for the valuation of competitors activities of table tennis players, with the personal opinion that the quantity of table tennis game, may be analyzed thru the 3 quality of game. Complete competitors activities was analyzed on the base of the 3 system of activities (considering complexivity of table tennis game) :

1. *System of activities for the appraisal of frequency, way of realization and effective of technical and tactical elements,*

2. *System of activities for appraisal of realization of service stroke (and returning of service) and effective after service stroke (and after the returning the service),*

3. *System for the appraisal of movement activities.*

Structure of competitors activities was study as a Complete activities of whole analyzed table tennis players, and from the aspects of success in play (winners/losers), and from the aspects of quality of analyzed player’s (position on the ITTF Rank List – better/lower ranked).

Major aim is new attitude to the table tennis game from the aspect of serious science principle of research. In this attitude table tennis game was looked thru the science and practical way.

Aim of the science attitude is, on the results of the analyses of competitors activities, establish the possibility of the exact definition of table tennis game, and possibility of the defining lawfulness in table tennis game of top table tennis players in play with new 40mm ball.

Practical aim of this research is analyzing table tennis game from the aspects of success (final score) and from the aspects of quality of players (the best player’s in the World, and those who are not the best) and relation between those. In the way of knowing what is actually in modern table tennis and of course – what is the most effective way of playing and winning in table tennis game.

In one sentence, the Aim of this research is improving of table tennis training process in way of rationalization and higher effect of play at competition.

By the results of research I fortified following :

1. Differences in structure of competitors activities in play with new 40mm ball are fortified and defined.

## **2 Methodology of research**

### **2.1 Research methods**

As the major (dominate) research method the unexperimental systematic observation was used.

### **2.2 Sample of analyzed matches and player’s**

Analyzed matches and players :

There were analyzed 27 matches (54 top table tennis players in competing

season 2000/2001) in following competitions :

- TT Bundesliga (German Championship)
- TT Bundesliga Pokal (German Cup)
- ITTF Final Pro Tour Tournament
- European Champions League

### 2.3 Technique and instruments for the collecting data for research

In research following technique and instruments for the collecting data were used :

#### 1. OBSERVING

Was done with the technical equipment:

- video tape (which are make during the competition by the video cameras, and the other video material was taken thru the live broadcast o ffrom TV and SATELLITE program.)
- VCR (reproduction of video tapes was done by the VCR with the abilities for fine regulation of reproduction speed (slow motion effect,...))

As the instruments fro the collecting data, 3 lists were formed:

LIST 1 – *For appraisal of frequency, way of realization and effective of technical and tactical elements*

LIST 2 – *For appraisal of realization of service stroke (and returning of service) and effective after service stroke (and after the returning the service)*

LIST 3 – *For appraisal of movement activities.*

### 2.4 Analyzed activities

Considering table tennis specific characteristic, as also and subject and the aim of the research, competitors activities of top table tennis players was evaluate on the base of 3 systems of activities.

#### *1. SYSTEM OF ACTIVITIES FOR APPRAISAL OF FREQUENCY, WAY OF REALIZATION AND EFFECTIVE OF TECHNICAL AND TACTICAL ELEMENTS (30)*

##### Frequency of technical and tactical elements

- |            |   |  |
|------------|---|--|
| 1. SERVIC  | - | Service stroke   |
| 2. FHCONT  | - | Forehand counter stroke (with small rotation, smash,...)   |
| 3. FHBLOC  | - | Forehand block stroke  |
| 4. FHFLIC  | - | Forehand flic stroke   |
| 5. FHSPIN  | - | Forehand top spin  |
| 6. FHSPBS  | - | Forehand top spin on backspin  |
| 7. FHBCSP  | - | Forehand backspin stroke   |
| 8. FHOTHE  | - | Forehand others stroke (defense stroke far away from table, backspin defense from the table,...) |
| 9. BHCONT  | - | Backhand counter stroke (with small rotation, smash,...)   |
| 10. BHBLOC | - | Backhand block   |
| 11. BHFLIC | - | Backhand flic stroke   |
| 12. BHSPIN | - | Backhand top spin  |

13. BHSPBS - Backhand top spin on backspin  
 14. BHBCSP - Backhand backspin stroke  
 15. BHOTHE - Backhand others stroke (defense strokes far away from table, backspin defense from table,...)

Effect of technical and tactical elements

16. ACESTR - Ace stroke (opponent had been in play out situation)  
 17. WINSTR - Winning stroke (opponent had contact with ball)  
 18. NORSTR - Normal stroke (opponent return stroke in game)  
 19. ERRORS - Error stroke  
 20. PLYOUT - Play out (players didn't make contact with his racket)

Stroke placement zone

21. OUTBPS - Outside backhand zone placement stroke  
 22. MIDBPS - Middle backhand zone placement stroke  
 23. MIDFPS - Middle forehand zone placement stroke  
 24. OUTFPS - Outside forehand zone placement stroke

Stroke realization zone

25. OUTBHS - Outside backhand zone stroke  
 26. MIDBHS - Middle backhand zone stroke  
 27. MIDFHS - Middle forehand zone stroke  
 28. OUTFHS - Outside forehand zone stroke  
 29. NEARTS - Stroke made in zone near the table (until 1.5 meter zone)  
 30. FARFTS - Stroke made in zone far from table (from 1.5-4 meter zone)

*2. SYSTEM OF ACTIVITIES FOR APPRAISAL OF REALIZATION SERVICE STROKE (AND RETURNING OF SERVICE) AND EFFECTIVE AFTER SERVICE STROKE (AND RETURNING SERVICE) (23)*

Realization of service stroke (type of service and service placement zone)

31. FLONSE - Forehand long service  
 32. FSHOSE - Forehand short service  
 33. BLONSE - Backhand long service  
 34. BSHOSE - Backhand short service  
 35. SEROBZ - Service placed in outside backhand zone  
 36. SERMBZ - Service placed in middle backhand zone  
 37. SERMFZ - Service placed in middle forehand zone  
 38. SEROFZ - Service placed in outside forehand zone

Effect of service stroke and activity after the service

39. SERACE - Ace service  
 40. SERWFS - Point won with first stroke after service  
 41. SERACT - Point won with action after service (more than one stroke)  
 42. SERLOS - Point lost after service  
 43. SERERR - Service error

Realization (type) of returning service

- 44. FFLICR - Forehand flic return service
- 45. FSPINR - Forehand topspin return service
- 46. FBCSPR - Forehand backspin stroke return service
- 47. BFLICR - Backhand flic return service
- 48. BSPINR - Backhand topspin return service
- 49. BBCSRE - Backhand backspin stroke return service

Effect of returning stroke

- 50. RSEACE - Returning service ace stroke (as a ace and winning stroke)
- 51. RSEWPO - Point won by the returning service (in action after returning)
- 52. RSLSPO - Point lost after returning service
- 53. RSERRO - Returning service error

*3. SYSTEM FOR APPRAISAL OF MOVEMENT ACTIVITIES*

- 54. DEPMOV - Deep movements
- 55. SIDMOV - Side movements
- 56. CHSBTP - Change from service to basic table tennis position
- 57. CHFBBP - Change of forehand/backhand position during point
- 58. STFHBP - Stroke made in basic forehand position
- 59. STBHBP - Stroke made in basic backhand position
- 60. ASFHST - Arm swinging for forehand stroke
- 61. ASBHST - Arm swinging for backhand stroke

**3 Statistical analyses**

For all analyzed activities (variables) following statistical parameters are done :

Descriptive statistics :

- Arithmetic Middle
- Standard Deviation
- Variation (Maximum and Minimum results)
- simple and relative Frequency

Percentage in complete activity and group of activity are done.

Analysis of Variance (ANOVA) (model One-way Between Groups) was used for the defining of existing differences between analyzed groups of players (group of players with new 40mm ball - 54 players and group of players with 38mm ball – 70 players) and other groups (winner/loser – with 40mm and 38mm ball).

All the results of research are presented with appropriate text, graphs and tabs.

NOTE :

Multivariate Analysis of Variance (MANOVA) was used, but it doesn't shown anything because the matrices was very near the singular matrices (there is

a high level of correlation between 2 analyzed group (38mm – 40mm). But the FOLLOW UP - ANOVA test was done and shown results.

## 4 Results

### 4.1 Results of descriptive statistic analyses

Mostly the results in descriptive statistic data are the similar as the results of the previously research. But, of course there is some interesting observation in some activities.

Recently I publish one article in Italian Table tennis magazine (La Ravista del Tennistavolo), with comparative analyses of some index value from seasons 82/83, 96-99, and for this research I put and the same index from the season 2000/2001. Results can be seen at the table number 1.

**Table 1.**

	ANALYSES	SEASON 1982/83		SEASON 1996-99		SEASON 2000/01	
		F	B	F	B	F	B
1.	Number of stroke in point	3.56		1.73		1.83	
2.	Relation between Forehand and Backhand spin strokes	87.3%	12.7%	77.0%	23.0%	63.8%	36.2%
3.	Relation between Forehand and Backhand flip strokes	86.7%	13.3%	61.8%	38.2%	53.7%	46.3%

From first look, it is obviously that the number of stroke per point increase from 1.73 to 1.83 per point, it is approximately about 5.3%.

Relation between forehand and backhand strokes (generally) in last research was :

#### SEASON 1996.-99.

FOREHAND 57.85%  
BACKHAND 42.15%

#### SEASON 2000/01.

FOREHAND 52.48%  
BACKHAND 47.52%

The game became a little bit more unique – from the aspect of the use of forehand and backhand stroke.

## **4.2 Descriptive statistic analysis for players with new 40mm ball (model of play)**

Players members of the Winners group have in their competitors activities following characteristics (some of these characteristics are compare with model of play of the Loser group) :

### **1. CHARACTERISTICS OF FOREHAND STROKES**

Mostly used forehand stroke is forehand topspin (FHSPIN), than forehand backspin stroke (FHBCSP), and forehand topspin on backspin (first attack stroke) (FHSPBS). Differences are observed in use of more of forehand flip stroke (FHFLIP) in play with 40mm ball, which can be explained with the much aggressive play at opponents service and at short placed ball. There is less forehand counter strokes - smash and stroke with small rotation (FHCONT), possible because the play is a little bit slower and point must be systematically worked out.

### **2. CHARACTERISTICS OF BACKHAND STROKES**

Mostly used backhand stroke is backhand block (BHBLOC), than backhand topspin (BHSPIN), after these they are backhand counter stroke (BHCONT) and backhand topspin on backspin (BHSPBS). The different is in much more use of backhand topspin play in game, and less counter stroke – possible caused by the more time to play spin. There is and much more use of backhand flip stroke (BHFLIP) as the result of aggressive play in returning of service.

### **3. QUALITATIVE ANALYSIS OF REALIZED STROKES**

Relation between realized strokes (effective of strokes) is the same as in play with 38mm ball – in the mean of percentage relation. But there is obviously difference in error stroke (ERRORS) and play out situation (PLYOUT), in really less number than before. This is one of the important difference which are caused with slower ball and with less rotation in play.

### **4. STROKE PLACEMENT ZONE**

There is no changes in relation in stroke placement zone in play with new 40mm ball. Only, there is a data which show that the play is a little bit based on the forcing of opponents backhand zone – (MIDBHZ and OUTBHZ).

### **5. STROKE REALIZED ZONE**

Relation in this characteristic of ply stay the same as at last, but there is a co station that there is less stroke played from outside forehand zone, as a product of tactics in forcing the backhand opponent play.

### **6. CHARACTERISTICS OF REALIZED SERVICES AND SERVICE PLACEMENT ZONES**

The co station is that the relation of the service realization stay at the same, but there is increase of the forehand short service (FSHOSE) and backhand short service (BSHOSE), and decrease of forehand long service (FLONSE). Because the way of returning of service become more aggressive, and with the fact that service is less harmful – because of less rotation possibilities, mostly players use short service. The data shown also and the effect of forehand long service as a stroke of surprise didn't have positive realization in all analyzed sample of 54 players. Service are mostly placed in middle backhand (SERMBZ) and middle forehand zone (SERMFZ), and because less of long service of surprise – radically less in outside forehand zone (SEROFZ).



### 7. EFFECT IN REALIZATION OF SERVICE STROKE

The relation between effect in realization of service stay at same, but there is difference in decreasing number of ace service (SERACE), and the number of service error (SERERR). Analyses shown and increasing the number of lost point after the service. All these data input to a fact that the effect of service is rapidly down and that play became equal in all segments of play – without play based on good service.

### 8. CHARACTERISTICS AND EFFECT OF RETURN STROKES

Mostly, the relation between the strokes of returning services stayed same. Also, in play with new 40mm ball is observed, that after the returning with backspin stroke – forehand and backhand (FBCSPR – BBCSPR), expansion of flip stroke return (FFLIPR – BFLIPR), and less number of topspin strokes – as a product of tendencies of short service. This make conclusion that service lost his primary function, and at return opponent have opportunity to play aggressive to get initiative in play.

The number of points won directly by returning ace strokes (RSEACE) decrease, as also the number of error at service return (RSEERR), while the number of points lost after the returning of service (RSLSPO).

### 9. CHARACTERISTICS OF ANALYZED MOVEMENTS ACTIVITIES

In comp ration with players in game with 38mm ball, players with new 40mm ball, have about the 7-10% more of all movements activities. This is a product of increasing the number of strokes in point, and longer time of point. The quality relation of side movements (SIDMOV) and deep movements (DEEPMOV) is not interrupted.

## **5 Results of ANOVA test**

There were 2 group of analyzed players :

GROUP 1 (40mm) – Players which played match with new 40mm ball (54 players).

GROUP 2 (38mm) – Players which played match with 38mm ball (70 players).

Also, there were 2 under group (from the aspect of success in play) :

WINNERS – group 1 - 40mm and 38mm players

LOSERS – group 2 - 40mm and 38mm players

### **5.1 ANOVA test – technical and tactical activities – (40mm – 38mm)**

From the results of *Analysis of Variance*, we can get conclusion that there is a statistical significant deference between the analyzed groups (on p level  $p = .05$ ). Statistically significant differences between analyzed groups in area of system of technical and tactical activities are isolated in 3 analyzed activities (variables).

#### 1. FHCONT (Forehand counter stroke)

In forehand counter stroke (mostly near the table, stroke with small rotation of ball) there is a difference in larger number in play with 38mm than 40mm ball. The reason is mostly that there is no so many smash stroke in play (as the Ace stroke) because the points are mostly won in systematic action play, and mostly

are won with topspin strokes.

### 2. ERRORS (Error stroke)

In error stroke there is a significant difference in larger number in play with 38mm than 40mm. The fact that new 40mm ball is slower and that in play are not dominate some stroke of surprise, make the game interesting and let the players possibility of "playing" in point, and possibility to won the point (and of course to defend) more systematically now, than before.

### 3. PLYOUT (Play out)

In play out situation the larger number is on 38mm play, side. The slower ball make the possibility of increasing number of ace stroke, and there is less possibilities to be play out situated in point.

## **5.2 ANOVA test – service and return of service activities – (40mm – 38mm)**

From the results of *Analysis of Variance*, we can get conclusion that there is a statistical significant deference between the analyzed groups (on p level  $p = .05$ ). Statistically significant differences between analyzed groups in area of system of service and return of service activities are isolated in 5 analyzed activities (variables).

### 1. FLONSE (Forehand long service)

There is a larger number of forehand long service in 38mm play. This number is radically decreased in 40mm ball play. Possible that this is caused with the fact that ball in service stroke is with lower rotation and less speed, so the effect of surprise is not like as it was before with 38mm ball. So, this service is used, in play, but with lower use in play (and with less effect than in 38mm play, from the aspect of efficiency).

### 2. SERACE (Ace service)

There is lower number of service ace stroke in 40mm ball play. The co station is very obviously, the effect of less possibilities of rotation of ball in service, make service not so harmful and easier for returning. There is a less number of error stroke in return of service, and fact that there is a increasing number of offensive way of returning service, mean that the service lost the primary place in table tennis game of top table tennis players.

### 3. FSPINR (Forehand top spin return of service)

The forehand top spin return of service is caused with the fact that there is a lower number of long services in 40mm ball play.

### 4. RSEACE (Returning service ace stroke)

The lower number of direct points won in returning service in 40mm play, shown that new 40mm ball bring good signal in way of taking the primary place of service, but also, get chance and to the other side in way that player have bad service stroke. He get a chance, after the bad service, again to play. and in good rally and action it win a point. The ball is slower, and also is with less "back rotation" from server, which is used mostly, in top table tennis.

### 5. RSERRO (Returning service error stroke)

Considering the previously fact (with effect of service and returning of service), the number of error stroke returning the service is much lower in 40mm ball play.

Also I tried to make analyses of differences between under groups (winners and looser group).

### 1. ANOVA TEST WINNER 40mm – LOOSER 40mm

Those differences are similar as the difference fortified in last research (the results are in continuing text – “Structure of competitors activities of top table tennis players”).

### 2. ANOVA TEST WINNER 40mm – WINNER 38mm

Generally the results of ANOVA test shown the tendencies of game, a less number of forehand counter stroke, less number of ace service, and less number of forehand topspin return stroke (as a product of increasing of short placed services). Increasing number of backhand flip stroke in return service, show the increasing of aggressively in play.

FHCONT	40mm	< 38mm	FFLIPR	40mm	< 38mm
SERDIR	40mm	< 38mm	BFLIPR	40mm	> 38mm
FSPINR	40mm	< 38mm			

### 3. ANOVA TEST LOOSER 40mm – LOOSER 38mm

In generally, in play of analyzed group of looser, shown tendencies is that there is less play out situation in game, also there is some tendencies of tactical activities connected mostly with play mostly in backhand zone placed strokes, the return activities have less positive directly winning activities, and less number of errors stroke returning the opponents service.

PLYOUT	40mm	< 38mm	RSEACE	40mm	< 38mm
OUTFHS	40mm	< 38mm	RSERRO	40mm	< 38mm

## 6 Resume

Sample of 54 top table tennis players in 27 matches at leading World, European and German National League competitions was analyzed with aim of fortifying of differences in structure of competitors activities of top table tennis players caused with new 40mm ball play, and also, existing of factors which influence at success in modern top table tennis.

In previously stage all analyzed players were grouped in 2 group (WINNER / LOSER) including the success of players in final score.

This way of grouping implicate parallels analyses of technical and tactical activities, activities connected with serving and return of service and movements activities, in area of applied activities (variables).

After the analysis of results, we can get following resume:

1. Results of analyses of descriptive statistics show that the game is slower about 5% in point (as a result of increasing the number of stroke in point), and that the game (from the aspect of tactical activities) is more based on the forcing of backhand zone placing strokes.

The relation between the strokes, generally stayed at same, but there is increasing the number of offensive play to short placed stroke – as a forehand and backhand flip stroke – as a result of short placed services.

In game is also shown that more time for stroke (slower ball) increased the number of topspin stroke, primary in relation of the backhand counter and

backhand topspin strokes. The game become slower and one result is of course and less number of play out situation, and there is much less number of error stroke (caused not only with slower ball and also, with lower rotation of ball).

From the aspect of service stroke, slower ball and less rotation make the service easier for opponent for return, and there is a much decreasing number of ace service. In play dominate place is reserved for short services, and long service (mostly try deep forehand zone had been shown as a not so effective factor of surprise).

In return of service dominate safe way of return with backspin strokes, and there is a increasing number of flip strokes (from backhand and forehand) which make return strokes more aggressive, with the tendencies of decreasing of the service effective. This data is support and with a fact that the number of error in return of service is decreased.

2. Resuming the results of Analysis of Variance (ANOVA) we can conclude that the differences between analyzed groups in area of applied activities (variables) exists and they are statistically significant.

Results of Analysis of Variance between group 40mm/38mm based at success in play (considering the 3 systems of activities) show statistical significant difference in 8 activities (variables) :

In system of tactical and technical activities differences in 3 activities (variables) were shown:

1. FHCONT - Forehand counter stroke
2. ERRORS - Error stroke
3. PLYOUT - Play out

In system of service and return service activities differences in 5 activities (variables) were shown:

1. FLONSE - Forehand long service
2. SERACE - Ace service
3. FSPINR - Forehand top spin return of service
4. RSEACE - Returning service ace stroke
5. RSERRO - Returning service error stroke

These isolated activities make the representative activities which are caused the differences in competitors activities of top table tennis players caused with new 40mm ball.

3. Considering results of the previously research; "Structure of competitors activities of top table tennis players", this results fortified fact that table tennis game have tendencies of continuing development and changing. This results are important not only for the table tennis trainers (which ca easily create the training process), players, but also, and to table tennis equipment manufactures and International table tennis Institutions (ITTF and ETTU), for the future development of table tennis game, possible with another changing of some rules of the game – in aim of creating table tennis more attractive for the spectators.

In front of previously resumes, we can take the final, general conclusion:

1. *The game become slower with the increasing number of strokes in point approximately about 5%, and with strokes not so effective as before and with lower number of errors, which make play more interesting for the players and spectators.*

*2. The most significant changes are in area of service and return of service activities. The effect of service decreased, and there is a opportunity for all players to "play" and to have nearly equally chances in their game.*

Generally this research give us opportunity for see or better "to peep" difference caused with new 40mm ball, and the some better results will give research with more adequate sample of players (optimal number is about 180 players), to make shore that this conclusion are a scientific facts.

This research is one in the role of research but only with one aim, that training process must be rational sated and much effective in process of creating quality and successful players in top table tennis.

Following tasks from this research :

1) Realization of the experimental program (based on results of this research).

2) This research give a lot of next research theme as:

- Fortifying structure of competitors activities at optimum sample of matches (about 180 players must be analyzed – and the leading statistical method's will be Factor Analysis and Discriminative Analysis)
- Fortifying the difference in competitors activities of European and Chinese players,
- Fortifying a tactic solution in play against lefthander, or penholder style players,....,
- Fortifying differences in competitors activities in top junior and senior category (problem of change of age category),...