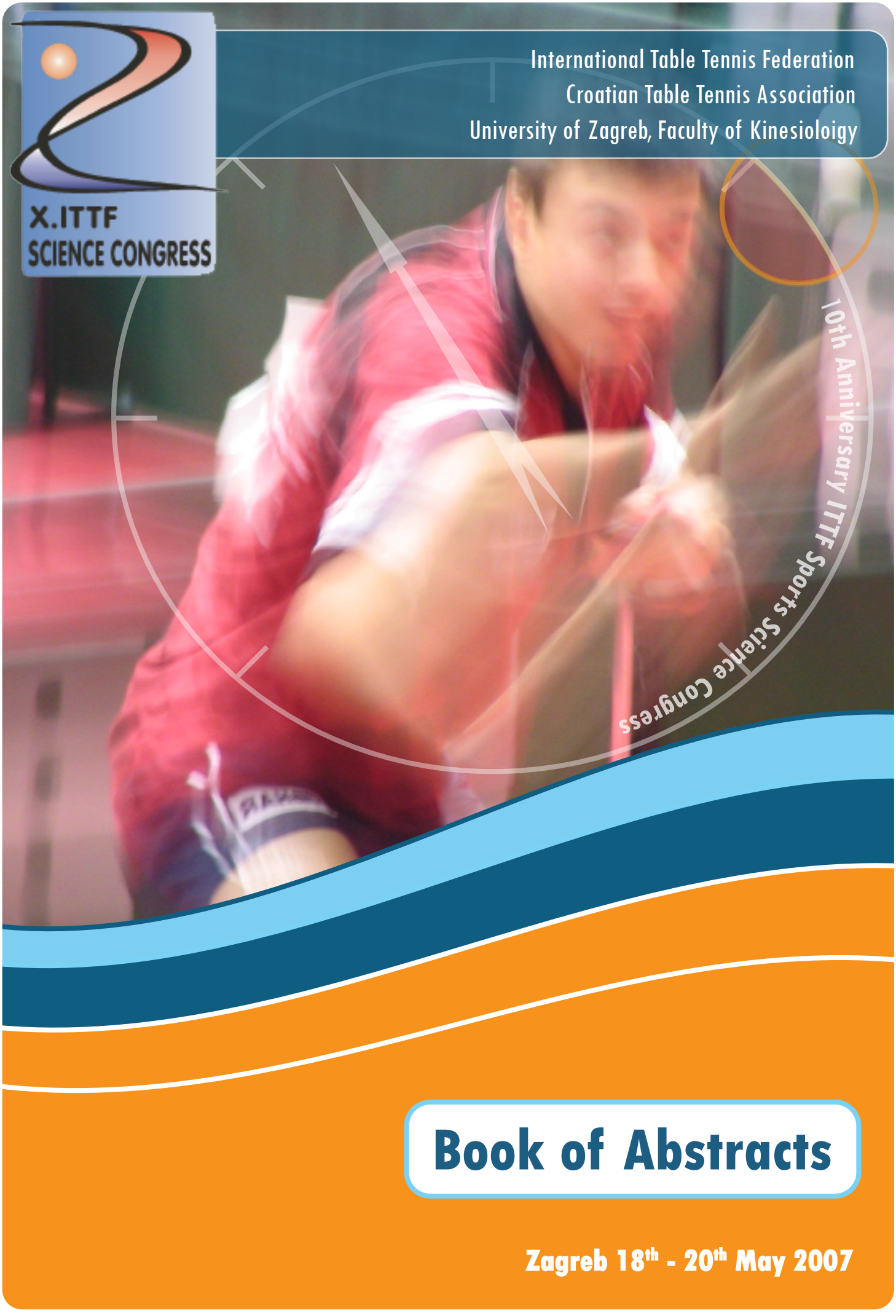


# Book of Abstracts

**Zagreb 18th - 20th May 2007**

# Book of abstracts of The 10th Anniversary ITTF Sports Science Congress

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# Message

It gives me great honour and pleasure to welcome participants from all over the world at the 10th Anniversary International Table Tennis Federation Sports Science Congress in Zagreb - participants who are making good effort to spread and to develop table tennis. The fact that the anniversary congress is held in conjunction with the 49th World Individual Table Tennis Championships, which follows, renders it as a significant event which will be indelibly stamped in ITTF history.

I would like to welcome you and express our appreciation for your unselfish contributions toward making this Congress a success. Your expertise from research and experiences in your own field will certainly benefit future development of table tennis all over the world.

The Organizing Committee of the 10th Anniversary ITTF Sports Science Congress would like to bid a very warm Mediterranean welcome to all the scientists and participants and wish you enjoyable and fruitful time participating in the Congress.

We are grateful for the trust and faith shown to us by ITTF and we hope to see a successful Congress. The success which involves all the scientists with their self-less work and sacrifice in putting the Anniversary Congress together, will help table tennis to its even greater development.

Thank you

Miran Kondric, PhD
*ITTF Sports Science Member*
*University of Ljubljana, Faculty of Sport*

## Contents

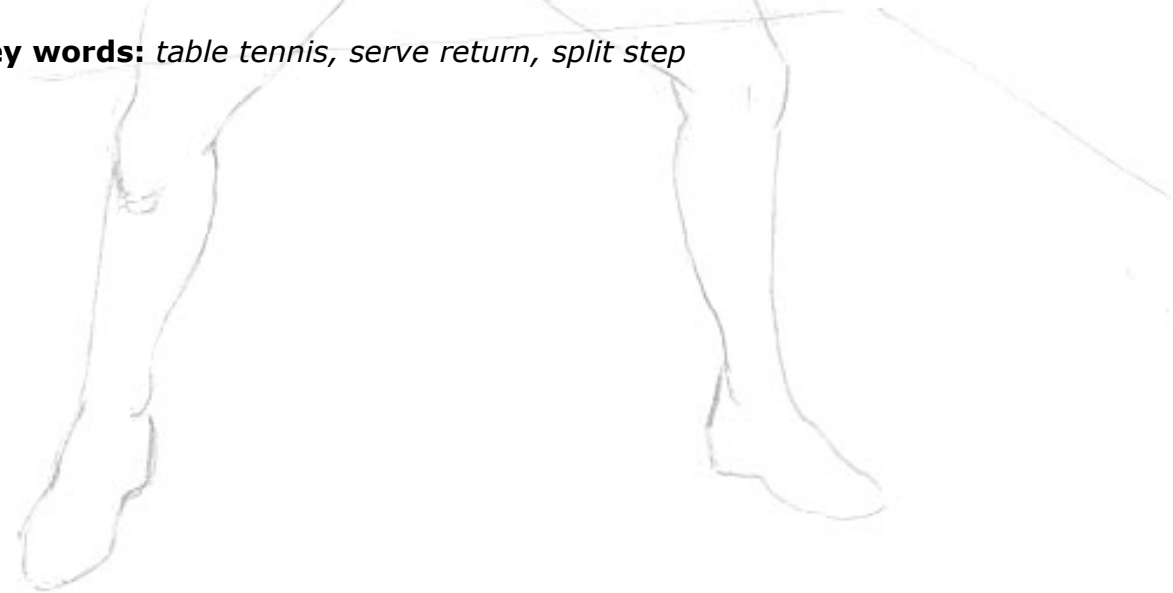
**Ak Emre**
*Middle East Technical University, Department of Physical Education and Sports, Turkey*

# DOES SPLIT-STEP AFFECT SERVE RETURN PERFORMANCE IN TABLE TENNIS?

## Abstract

An effective serve return, an important stroke in table tennis, may increase the chance of winning the point. Players have very limited time to anticipate and read the spin and the speed of the ball, since the game is being played in a narrow distance. Not only anticipating the ball flight path, but also the ability to react quickly and effectively to the ball are crucial elements in table tennis. In preparation of body, footwork is likely to play an important role in returning serve. Split step is suggested as the vital part of the player's pre-shot preparation in tennis. Although this consciously or unconsciously performed action is also observed in table tennis, it has not been documented in the literature. Therefore, the aim of this study was to investigate the effect of split step on serve return performance in table tennis. 20 elite table tennis players participated in this study. Players using split step were assigned in the first group whereas the second group consisted of players not using split step. Video recordings of the national level table tennis league in 2006-2007 season were used for the selection of the players depending on whether they perform split step or not. During the measurements players were asked to receive the serve coming from the ball machine with different spin and speed characteristics. Accelerometers and camcorders were used to determine overall reaction time as well as response and movement times. The results showed that split step does have an effect on reaction time during serve return in table tennis.

**Key words:** *table tennis, serve return, split step*



**Ak Emre**
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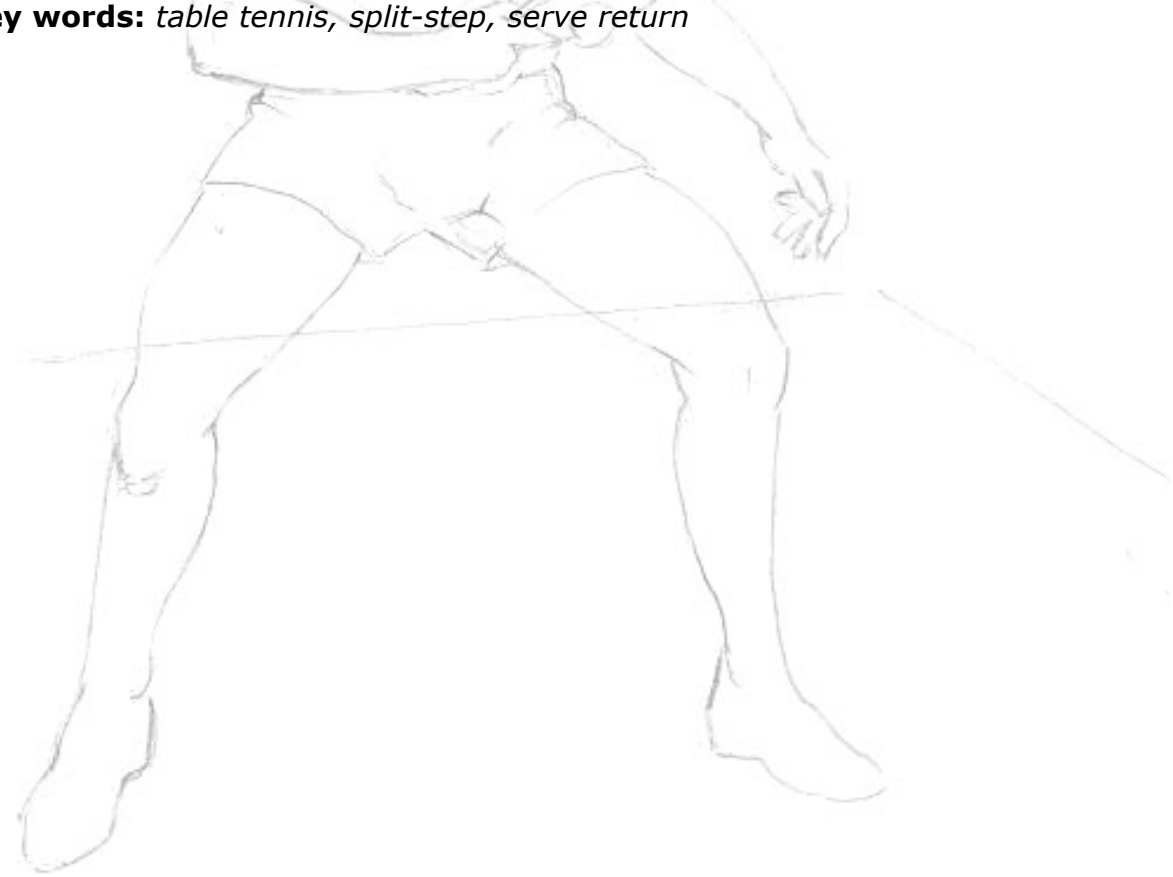
## THE USE OF SPLIT-STEP BY TABLE TENNIS PLAYERS IN TURKEY

**Abstract**

Footwork plays a very important role in table tennis. As the level of players increases it becomes more critical. Split step is an action that players' hops off the ground and land on the balls of the feet at the moment the opponent makes contact with the ball. Split step makes the player get ready to react and move quickly according to the direction, speed and spin of the ball in table tennis. It has always said to be an important action for tennis players. However it has not been investigated or taken into consideration in table tennis. Therefore the aim of this study was to investigate the use of split step by table tennis players from Turkish Super League. The sample of 40 male and 40 female players was video recorded and their use of split step while returning serve was investigated. Results demonstrated that there was no gender difference in the use of split step. It was also found that players generally do not use the split step.

**Key words:** *table tennis, split-step, serve return*



**Arndt Günter**
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# TRIPLES IN TABLE TENNIS: A PROMISING NEW TEAM COMPETITION SPORT

## Abstract

A new form of table tennis is described, with teams of three players playing each other. Apart from recreational applications it is seen as the ultimate test of combined team strength in 3-player team competitions, presently approximated by a series of singles and doubles matches, i.e. without teams facing each other *as a team.* With 3-player team competitions commencing in the 2008 Olympics, the new game presents a timely and relevant table tennis possibility.

The paper summarises some salient points of a comprehensive text on "Table Tennis Triples", due for publication in 2007 [1], which, based on extensive research and development, covers the rationale for the new game, the equipment needed and how to make it, the rules, how to play and umpire it, and its integration into existing and future table tennis events. After a general introduction to the new Triples game, this paper concentrates on its theoretical basis and its rules, and presents the results of first evaluation trials.

The basic change from conventional table tennis is that Triples is played preferably, but not exclusively, on a circular table [e.g. 2], and that the net height increases towards its periphery. Following the general acceptance of recent rule changes in table tennis, the Triples game with its novelty and benefits should fall in the same category. These benefits, compared to the conventional game, include: (a) the whole team plays at once, (b) an 85% larger table playing area, (c) increases in 'baseline length' and player movement area of 300%, and (c) a greater range of shot directions and lengths – 9cm to 900cm.

Apart from the basic ITTF rules, Triples play follows a very structured game plan. New aspects include 'Player Rotations', 2-shot 'Service Rallies', and games played to 31, except for 'Close Games', for which some concepts new to table tennis are introduced. These include 'Tie Break', 'Shoot-Out' and 'Draw' game outcomes, designed to progressively increase player, spectator and media excitement and appeal. Accompanying issues such as scoring and umpiring requirements are also described.

Three trials were performed on prototype equipment, with top pennant competition players. All aspects of the new game were tested repeatedly, and player reactions analysed. Players overwhelmingly accepted all rules, and felt comfortable in their new team roles. They agreed that Triples will be a welcome addition to the table tennis repertoire, suitable for play at the highest competitive level. – A promising start …

**Key words:** *team competition, table tennis innovation, new 'Triples' sport, new rules, equipment design, team psychology & tactics, event management, ITTF support, global acceptance testing*

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# COMPARATIVE STUDY OF MUSCLE FATIGUE IN TABLE TENNIS TRAINING - AN OUTLINE

## Abstract

Table tennis is characterized with intermittent intervals of explosive (anaerobic) muscle activity, being the cause for use of interval training as the most suitable training method. Performance in the game is a function of the state of neuromuscular system, i.e. its condition of (non)fatigue. The study is conceptualized where top young players are monitored through kinematic and surface EMG variables when performing a repetitive sub-maximal forehand top-spin movement, practicing with the table tennis robot, in such a dynamics and duration as to induce fatigue. Sequences of 10 shots are followed by 10 second rest periods, and this is to be repeated during overall time of 10 minutes. M. deltoideus anterior, m. deltoideus medialis, m. biceps brachii and m. pectoralis major are to be monitored, unilaterally. Kinematics of the upper body is to be measured using ELITE system (Zagreb) and VICON system (Vienna), respectively. Changes in time patterning of EMG signal waveforms are expected, while the decrease of median frequency of surface EMG power spectrum is to be used as a criterion of local muscle fatigue. Modifications of both neuro-muscular and kinematic patterns, together with decrease of performance are expected to appear with fatigue.

**Key words**: table tennis, muscle fatigue, EMG power spectrum, 3D kinematics

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# QUALITATIVE GAME ANALYSIS IN TABLE TENNIS

## Abstract

A workflow for assisting table tennis players during a tournament has been worked out. It is based on a qualitative approach, similar to that described by Lames and Hansen (2001). In cooperation with trainers and players of the Austrian national team a comprehensive model was developed for a process oriented description of the match (Baca et al., 2004). In order to fulfil practical needs, the game characterising parameters were reduced to the very essential ones for the coaching process. A hard- and software system was then developed for data collection and presentation. In addition to frame and initial data (grip, left/right-hander, first server etc.) values for the following attributes have to be registered only:

- type of stroke (forehand/backhand, topspin, block, defence, etc.)
- impact position of the ball on the table
- instant of service and moment when the point is finished
- type of error (out, net, etc.)

Additional variables are derived from the primary attributes and some initial information, automatically (e.g., by indicating the type of error on the respective side of the interactive table the system determines which player made the point). Matches are recorded on video and, if possible, observed on location. Video capturing and rough evaluation may be done during the game enabling to give immediate video-assisted feedback afterwards. Beginning and end of rallies are thereby recorded by registering the respective time code. Further analysis of individual strokes can only be performed offline.

The results of the analysis, together with the impressions of the match observer, constitute the basis for the qualitative analysis. Assisted by the interactive video component of the software tool used, all scenes of interest may be selectively accessed and presented. Coach and player(s) try to interpret the selected scenes and to find peculiarities or reasons for conspicuous quantitative results.

Baca, A., Baron, R., Leser, R. & Kain, H.. A process oriented approach for match analysis in table tennis. Science and Racket Sports III, eds. A. Lees, J.F. Kahn & I.W. Maynard, Routledge: London, pp. 214-219, 2004.

Lames, M. & Hansen, G.. Designing observational systems to support top-level teams in game sports. International Journal of Performance Analysis, 1 (1), pp. 85-91, 2001.

**Key words:** *table tennis, process oriented model, interactive video*

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# TWO SYSTEMS FOR PROVIDING KR FEEDBACK IN TABLE TENNIS TRAINING

## Abstract

In table tennis, performance parameters describing the outcome of one stroke are the spin, the position, where the ball hits the table, and the ball velocity. Systems that give immediate feedback on the quality of the ball just played are applicable in training. Besides of directing and conditioning the technique some motivational effects can be expected. The application of two types of KR (knowledge of results)-feedback systems shall illustrate the concept. The first type is based on detecting impact positions of the ball on the table in almost real time, the second on the acquisition of ball impact intervals.

The impact point detecting system is capable to give feedback on the accuracy of the placement when performing certain tasks and to give feedback on impact positions during service. In addition, it provides means to evaluate a series of trials and to give summary feedback. The system neither disturbs the players nor does environmental noise influence the system. Four accelerometers are fixed onto the underside of one half of the table. A triangulation method is applied to calculate the impact position from the vibration signal registered by the accelerometers. In a typical application of the system in training, a table tennis robot serves the ball in short intervals. The player has to return each ball into a marked area. After each series of trials, the player gets visual feedback on the ball impact positions.

To give feedback on the quality of service techniques, a low cost device was developed. Ball impacts on the table cause typical acoustic signals. Two microphones are used for recording these signals. A microcontroller based system allows determining and displaying the time interval between first and second impact of the ball on the table immediately after service execution. In the case of short services, it also determines and displays the time interval between the second and the third impact. Typical exercises performed by the players include the task to minimize the impact intervals in order to decrease the reaction time of the opponent. Obviously, the time interval is strongly affected by the degree of spin of the serviced ball.

**Key words:** *table tennis, knowledge of results, impact position*

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# ACTUAL STATE OF TENNIS TABLE RESEARCH THROUGHOUT SPORT DISCUS DATABASE ANALYSIS

## Abstract

**Introduction.** Research activity of a group, institution or country can be defined by scientific production indicators. These indicators, a key piece in bibliometric studies are closely related to the most important scientific databases in the world. The aim of this study is to know the actual state of investigation on table tennis from specific database analysis. **Method.** We've quantified all of scientific publications on tennis table registered by Sport Discus database (last actualization: December 15th, 2006). From Sport Discus' Thesaurus we selected several key words related to table tennis for to combine them in different search fields and to determine: a) matters with the most scientific interest; b) countries with a greater level of scientific production; c) types of publication sources; d) level of understanding; e) publications' language, and f) evolution of number of publications throughout the last years. **Results.** Scientific publications on table tennis only show 0.4% from total of references that are registered in Sport Discus database. The matters most developed are those related with training while France is the country with the most important scientific activity on table tennis. Evidently, English is the predominant language in tennis table publications and is necessary to remark an important rise in publications during 1981 to 1990 period. **Conclusions**. It's possible to determine the scientific production on table tennis from a bibliometric study based on specific database analysis. There is a lack of investigation o table tennis compared with other sports, especially racket sports.

**Key words:** *table tennis, database, bibliometrics, research*

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# A COMPARISION ON HEALTH RELATED QUALITY OF LIFE BETWEEN TABLE TENNIS AND CLOSE-SKILL SPORT PARTICIPANTS

## Abstract

Health is a critical component for the quality of life in the late adulthood. Many health professionals suggest maintaining an active lifestyle, especially for the elderly, is key to health. However, what kind of activity provides the best result for the elderly is still a question that needs to be answered. As such, the study tried to compare the health related quality of life of the elderly participants who participate table tennis, a sport that is popular for all age range in Taiwan, to those that participate the commonly studied close-skill sports such as jogging, walking, and cycling. Fifty-four table tennis participants and one hundred thirty nine close-skill participants completed the MOS 36-item Short Form Health Survey (SF-36). The results of one way ANOVA indicated that a). The scores of physical functioning profile, role physical profile and role emotional profile of table tennis geriatric are higher than those of close-skill. b). The score of physical component summary for table tennis participants is higher than those of close-skill. Although this is a cross sectional study, the results suggest that table tennis participation provides more health benefits than close-skilled sports such as jogging, walking, and cycling.

**Key words:** *table tennis, close-skill, quality of life*

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# THE RELATIONSHIP AMONG SELF-ESTEEM, DEPRESSION, AND HEALTH ON ELDERLY TABLE TENNIS PARTICIPANTS

## Abstract

Many developed countries are rapidly moving into an aging society. This is also true for Taiwan. That means people are living longer and more people aged over 65 years old. Age affects not only the body of a person but also his mind. Among the mental problems that inflict elderly, depression is becoming more common. Self-esteem is another mental construct that is related to mental health. In addition, health-related quality of life is critical for the elderly. Physical activity has been shown promoting mental health and quality of life. Since table tennis is popular among the elderly in Taiwan. It is interesting to examine the relationship among self-esteem, depression, and health-related quality of life on the table tennis participants. Fifty-four elderly table tennis participants completed the Self-Esteem Scale (SES), Center for Epidemiologic Studies Depression Scale (CES-D), and The MOS 36-item Short Form Health Survey (SF-36). Correlation analysis indicated that a). Self-esteem was negatively related to the depression (r=-.339), positively related to the mental component of the health-related quality of life(r=.383). b). Depression was negatively related to the mental component of the health-related quality of life(r=-.613) but positively related to the physical component of the health-related quality of life(r=-.613). These results suggest enhance self-esteem to the elderly could be key to reduce depression and enhance health-related quality of life for the table tennis participants. Future study could explore how table tennis participation could affect self-esteem of the elderly.

**Key words:** *table tennis, self-esteem, depression, quality of life*

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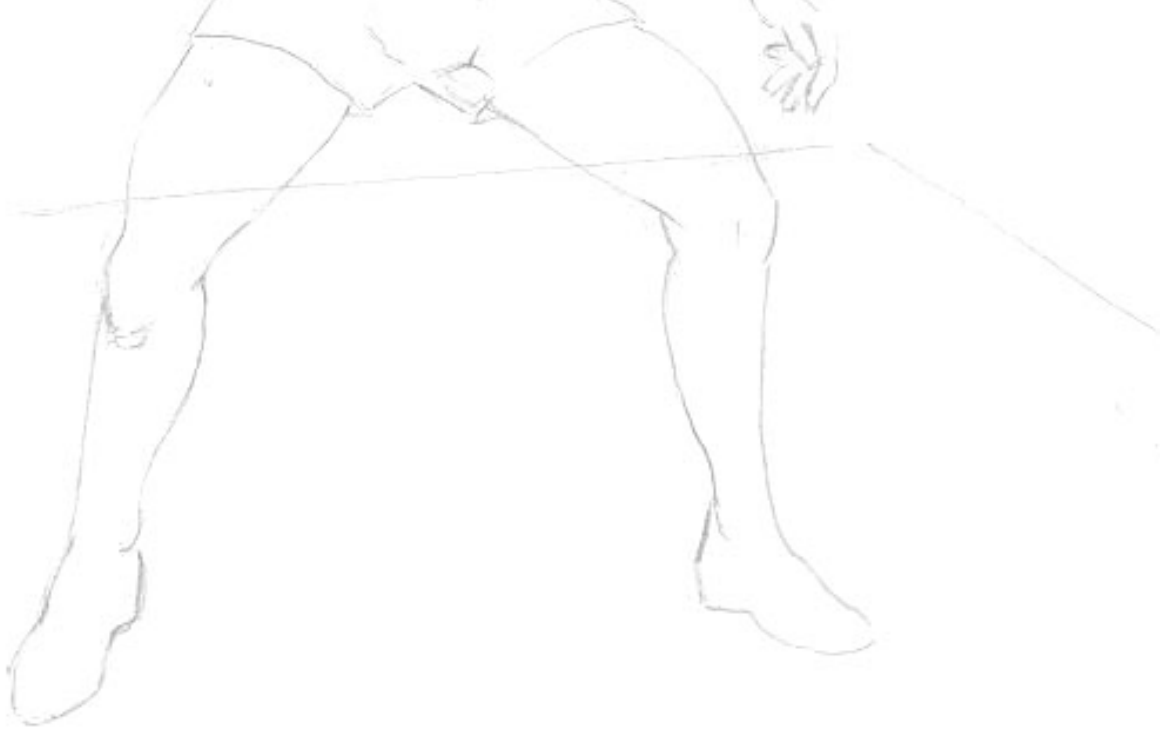
# THE USE OF WTCAIA IN THE JUNIOR TABLE TENNIS FEMALE NATIONAL TEAM

## Abstract

The personality usually to be considered as the basic of the athlete's psychology selection, practice and consultation. This paper testes the personality by the WTCAIA and analyzes their characteristics, in order to supply scientific foundation for the athlete's psychology direction and practice. Through the study, we found that to some extent, the personality of one athlete usually decide the style of her performance, that is her tactic and strategy, for example the athlete who is easy to excite is tending to be attractive style, and the one who is mild is tending to be defending style. So when their coach make training plan for the athlete, they must think over their character thoroughly and only in this way they will have the chance to get success. At the same time we think that though the study was just measure the female athlete, the conclusion will be appropriate for the male athlete too, that is different athlete need the different method to training, one plan will not suit for the all athlete even though it is be proved perfect.

**Key words:** *WTCAIA, female, personality, sport psychology*



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***Beijing Sport University, Beijing, China*

# GRF OF TABLE TENNIS PLAYERS WHEN USING LOOP DRIVE TECHNIQUE

## Abstract

***1 Purpose***
In order to discover the characteristics of the GRF (Ground Reaction Force) during the loop drive techniques of table tennis, and to find the difference between two types of force to drive (medium strength and the maximal strength). The GRF of table tennis player was tested. Furthermore, the authors hoped to give some suggestions for players and coaches on how to loop drive ping pong with the maximal strength.
***2 Method***
The subjects were 10 excellent ping-pong players in China (20±2 years old, the training years were 11±2). Two groups of loop drive techniques were tested, using the measurement methods of the KISTLER force-plate system (two force-plates were used). One group of loop drive technique used medium strength, and the other used the maximal strength. The two groups of GRF data (peak and valley value of the vertical direction, left-right direction and the front-back direction) were analyzed and compared. The data of GRF subtracted the body weight.
***3 Results***
(1) In the vertical direction of GRF, the peak value of right foot when player used medium strength to drive loop was 220.57±14.78N, and the peak of using the maximal strength was 226.67±19.55N, which showed that the difference was no evident.
When compared the peak of left foot between two types of forcing method, the difference was evident. The peak value of the maximal strength (207.97±27.20N) was higher than the medium strength (103.39±18.30 N). The point of peak value of left was appeared at the end of the player's driving when the gravity of player was moved from right foot to left foot fully. It can be explained that driving loop technique with maximal strength moved more.
(2) In the left-right direction of GRF, both the peak and valley values of right foot and left foot were compared, there was evident difference between two types of force, and the driving with maximal strength was higher. The peak values of right foot of two type of force were 63.78±7.56N and 42.77±6.11N. The peak values of left foot of two type of force were 41.54±5.70 N and 36.76±3.32N. The valley values of right foot of two type of force were -41.77±3.56N and -15.12±3.54N. The valley values of left foot of two type of force were -63.59±7.23 N and -38.35±4.19N.
(3)In front-back direction, the peak and valley values of right foot and left foot were compared, there was evident difference between two types of force, and the driving with maximal strength was higher.
***4 Conclusions***
The table tennis player's drive technique characteristic in three dimensions was described by the obtained dynamic data.
When the player drive loop with the maximal strength, it paid more attention to increase the GRF of left-right direction and front-back direction, which mean that the moving of gravity in left- right direction and front-back direction should be increased.

**Key words:** *GRF, loop drive, strength, difference*

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# INJURY INCIDENCE AMONG YOUNG TABLE TENNIS PLAYERS DURING 2005 SPANISH NATIONAL CHAMPIONSHIP

## Abstract

With the aim to obtain a registration of injuries in table tennis competition we have collected those that were occurred at 2005 Spanish National Championship. A total of 1300 matches were played in two days of competition. About one-hundred table tennis clubs took part, representing fifteen different regions of the country. This is translated to 355 young players (198 males and 157 females aged between 9 and 21 years) participating in this event. Ten injuries were attended. Three of the injured were males and the other seven were females. Injury incidence rate during the championships was 2,81%. Paying attention to gender distribution we can observe a injury incidence of 1,01% in males (30% of all sessions) and 4,45% in females (70% of all sessions). Reviewing these injuries we can verify that the most frequent are acute (88,8%) while chronic injuries only represent 11,2%. All of injuries attended were acute in female players. However, in males, the number of acute injuries represented 50% and the remaining 50% was for chronic injuries. The most serious injury reported (a traumatic meniscus injury) was suffered by a female player who had no alternative but to leave the competition. The remaining injured players completed their participation. These results can help us to confirm that table tennis is a low-risk sport.

**Key words**: *table tennis, competition, injury incidence, young players*

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# FUNCTIONAL DIAGNOSTICS OF TOP TABLE TENNIS PLAYERS

## Abstract

In order to achieve top sport result multidiscipline approach is needed as well as viewing the players' ability from different aspects. Modern table tennis demands high level of functional and motor abilities in player. With functional diagnostic of athlete will be able to provide tests and programs geared to meet specific goals and to improve performance. Our sport-specific tests use the latest in technology to identify individual strengths and weaknesses in aerobic capacity, anaerobic power, speed, strength, technique, and more. The term "functional diagnostics" implies determining of the basic anthropometrical characteristics (and their analysis), evaluation of functional abilities (the battery of tests) and evaluation of functional abilities of the athlete.

The functional diagnostic aims to: 1) Provide and monitor highly specialist training methodologies to high performance athletes, 2) Assess and devise fitness programs for sports people, 3) Promote the importance of sports medicine including diet, nutrition and exercise.

The importance of the functional diagnostics of the athletes is success of the training program is largely dependent upon satisfying the performance aims associated with it.

Testing and measurement are the means of collecting information upon which subsequent performance evaluations and decisions are made.

Functional diagnostics of the table tennis players includes the following analyses: 1) BOD POD Body Composition Analysis , 2) Anthropometrics data, 3) VO2 max (Maximal Oxygen Uptake), 4) Blood Lactate Analysis, 5) HR Training Zones & Training Intensities, 6) Dynamic Bike Fit & Treadmill Analysis, 7) Sub-maximal Testing, 8) Anaerobic Power and Capacity, 9) Nutritional Analysis, 10) Scientifically-Based Training Programs correction, 11) Training Log Reviews, 12) Speed of reaction and Explosive Power Analysis, 13) Bio Chemical substrate Analysis, 14) Pulmonary (Spirometry) Analysis, 15) Muscle Strength and endurance (upper & lower) Analysis.

Some analyses are interpreted on the basis of age-long work with the senior national team of Yugoslavia (Serbia and Montenegro). The results in certain periods of time and their consequential relation with the achieved results at big competitions (European and World championships) were analyzed.

Importance of recording the information: For the coach it is important to monitor the program of work, so as to maintain progression in terms of the volume of work and its intensity. Both coach and athlete must keep their own training records. A training diary can give an enormous amount of information about what has happened in the past and how training has gone in the past. When planning future training cycles, information of this kind is absolutely invaluable.

**Key words:** *table tennis, functional diagnostics, Anthropometrics, VO2max, Anaerobic Threshold, Lactate analyses*

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# TESTING, PERFECTION AND MONITORING OF MOTOR ABILITIES OF TABLE TENNIS PLAYERS

## Abstract

The study of table tennis structure represents the first step towards its scientific view working with top table tennis players.

Physiological aspects of modern table tennis are analyzed and defined.

The battery of tests is chosen on the bases of the analysis of structure and physiological requirements of modern table tennis.

Period of testing – during one competition season (July – May (June)) the following time points of motor abilities testing:

- Summer preparations (work on basic motor abilities) two testing (in the beginning and at the end of the preparations)
- Testing before the beginning of the competition season
- Winter preparations (two testing (in the beginning and at the end of the preparations)
- Testing before preparations for big competitions (World and European championship)
- Testing at the end of the competition season

The influence of motor abilities on the game results – the analysis of the test results of motor abilities during the longer period of time (national team of Serbia and Montenegro) and comparison with the results achieved at big competitions and rank of the players at the World Rang List:

- comparison and analysis of the results of Ilija Lupulesku, Slobodan Grujić, Aleksandar Karakašević and Rade Marković
- the analysis of the results of Erdelji Ana-Marija (European cadet champion in 2000 and in 2003 the final junior year)
- the analysis of the results of the male senior national team of India in the beginning of the competition season of 20001/2002 and before the performance at the Commonwealth Games 2002 (the bronze medals in team, pair and single competitions)
- the analysis of the results of Marko Jeftović and Pete Zolt (key players of the junior national team of Serbia and Montenegro before the European championship in Novi Sad 2003 (11th place as team) and the European championship in Budapest 2004 (second place (silver medal) as team)
- Comparison senior, cadet and junior players

**Key words:** *table tennis, motor abilities, tests, monitoring*

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*Table Tennis Association of Montenegro*

# ITTF SCORED A GOAL (changes of rules in table tennis during 2000-2003)

**Abstract**

In late nineties the ITTF estimated that table tennis has no bright future without changes of the rules. The need for changes was inevitable. Though the order of changes was adjusted nobody could predict how those changes would affect table tennis.

The system which would analyze the structure of the competitive activity of table tennis players was required in order to find out the consequences caused by the change of rules. Activities had to be representative and objective in order to perceive possible variations within them (related to the change of rules) and related to the logical group of the activities to which they belong. Competitors' activities were analyzed in 61 activities (variables), grouping in 3 systems of activities (variables):
1. System of variables for evaluation of frequency, way of realization and effective of technical and tactical elements (30 variables)
   - frequency of technical and tactical elements, effect of these elements, stroke placement zone, stroke realization zone.
2. System of variables for evaluation of realization service stroke (and returning of service) and effective after service stroke (and returning service) (23 variables)
   - realization of service stroke (type of service and service placement zone), effect of service stroke and activity after the service, realization (type) of returning service, effect of returning stroke
3. System of variables for evaluation of movement activities (8 variables)
   - side and deep movements, change of forehand and backhand position, stroke in forehand/backhand position and arm swinging for forehand/backhand strokes

The analyses were done in the following competitive periods:
- Competitive season 2000/2001 - 40mm ball play
- Competitive season 2001/2002 - 11-2 system of play
- Competitive season 2002/2003 - new service rule

For every analyzed period the most important changes were defined and described.

The comparative analysis of the final matches at the Olympic Games in Atlanta (1996), Sidney (2000) and Athens (2004) was made.

The influence on the ranking in European and World table tennis (trend) was observed – analysis of the first 50 players at the European and World rank lists, and the changes in rank regarding the changes of rules)

A special attention was given to comparison of the Asian and European players (both before changes and after).

**Key words:** *table tennis, game rules*

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# THE DETERMINATION OF ANTHROPOMETRIC CHARACTERISTICS OF TURKISH CHILDREN TENDS TO BE TABLE TENNIS PLAYERS

## Abstract

As a result of the age of starting to do sports decreases day by day, the issue of determining the appropriate person models at early ages has emerged recently. It results from that all of the scientific efforts to develop the performance of the ones who were encouraged to participate in inappropriate fields prove to be insufficient.

The purpose of the study was to examine the anthropometric features of Turkish athletes who are nominees to become table-tennis players. In order to examine the anthropometric features of the research groups who are 8±1 years and 205 people; age, height, weight, thickness of 5 skin curls, 2 width and 2 surroundings measurements were taken.

According to the consequence of the study, there emerges to be a significant discrepancy between the width of knees ($p<0.001$) and the width of ($p<0.05$) among genders.

***Key Words*:** *Somatotype, Anthropometry, Children*

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# THE EFFECT OF A RECOMMENDED TRAINING PROGRAM FOR DEVELOPING THE MOTOR ANTICIPATION SPEED ON PERFORMING SOME ANTICIPATORY SITUATIONS AND OFFENSIVE SKILLS FOR TABLE TENNIS JUNIOR PLAYERS

## Abstract

Table tennis balls are different in directions, places and speeds. He linked the ball speed with its direction and type of spine. There are spine-free balls that represent a problem for the junior player in anticipating the ball speed, place and trajectory. The current research is an attempt to increase the experiences of junior table tennis players under 15 years as long as the junior player at this stage lakes the necessary experience, When using a device for measuring the motor anticipation speed in the training hall, this will be considered as a valuable additive in the field of anticipation speed for table tennis juniors using the real playing tools that are the ball, the racquet and the table. Designing a training program for enhancing motor anticipation speed skills using different ball directions, places and speeds for junior table tennis players under 15 years ,Recognizing the effect of using the recommended training program on enhancing and developing motor anticipation speed for junior table tennis players under 15 years. The researcher used the experimental approach using one group with pre- and post- measurements, (15) Junior table tennis players under 15 years from Tanta Sports Club , The motor anticipation speed measuring tool (designed by the researcher), Anticipatory situations tests (designed by the researcher). Findings: The anticipatory situations tests (simple or complex) indicated a positive direction in increasing the improvement percentage after applying the recommended training program

**Key words:** *table tennis, training program, anticipation, speed*

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# EXPERTS VERSUS NOVICES EFFICIENCY DURING A HITTING TASK IN TABLE TENNIS

## Abstract

*Introduction*
Normally, any trainer expects that their actions allow the improvement of the technique of movement and the reduction in the energy needs for the player (Sparrow & Newell, 1994). We assume that, in striking tasks of increasing difficulty, experts in table tennis would have a higher performance and a lower energetical implication than novices. Moreover, we expect that task difficulty would affect motor skill efficiency whatever the practice level.

*Method*
Two groups of table tennis players -novices (n=11) and French national level (n=6)- were asked to perform a forehand drive with precision to hit a target (a circle of 21 cm of diameter) and fast enough to pass over a 75 cm high barrier placed at 2.50 m from the table. Balls were thrown at the players by a trainer following 9 different experimental conditions: 3 place conditions (one place, two places or random), each performed at 3 different ball ejection rates (60, 72 or 80 balls.min$^{-1}$). Before testing, novices followed a specific training program (10 sessions of 1.15h; Jospin & al, 2006).
Heart rate (HR) and performance (numbers of balls hitting the target and passing the barrier) were recorded during exercises.

*Results - discussion*
Statistical analyses revealed that (i) experts have a higher performance than novices ($P$ <.001), and, surprisingly, a higher HR ($P$<.05) and, (ii) experimental conditions influence the performance level ($P$ <.05) and HR for both groups of players ($P$ <.05).
These results showed that table tennis required an energetical implication to maintain a high level of performance. A possible application for the trainer, working with high levels, is to be aware of both demands of the activity: motor skill organisation depends on the physical preparation, and physical preparation sustain motor skill efficacy (Jospin et al., 2006).

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**Key words:** *table tennis, practice level, efficiency*

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# THE EFFECTIVENESS OF SHADOW PRACTICE IN LEARNING THE STANDARD FOREHAND DRIVE

## Abstract

The study was conducted in response on how to develop a practice structure that will promote learning in Table Tennis P.E. classes even with limited time and inadequate facilities which is a common fixture in Philippine setting. In the present study, the participants (N=32) were randomly assigned to either one of two subject groups. The experimental group (N=16) performed the shadow practice while waiting for their turn to practice with multi-balls. The control group (N=16) practiced with a single ball for each pair of students while waiting for their turn to practice with multi-balls. The commonly used consistency and accuracy skills test was used to determine their pre-test, post-test and retention test scores. The level of significance was at P = .05%. Using descriptive measures, the data revealed that both groups showed a significant change in scores in the post-test phase of testing. The experimental group's mean = 83.5 while this groups pre and post test t = -14.3226. The control groups mean = 81.7 while this groups pre and post test t = -16.02311. However, only the experimental group was able to retain their scores in the retention test phase of testing. The experimental groups mean = 83.4 while this groups post and retention test t = 0.04897. The control groups mean = 78.3 while this groups post and retention test t = 4.625929.

**Key words:** *table tennis, shadow practice, multi-ball practice, physical education, feedback.*

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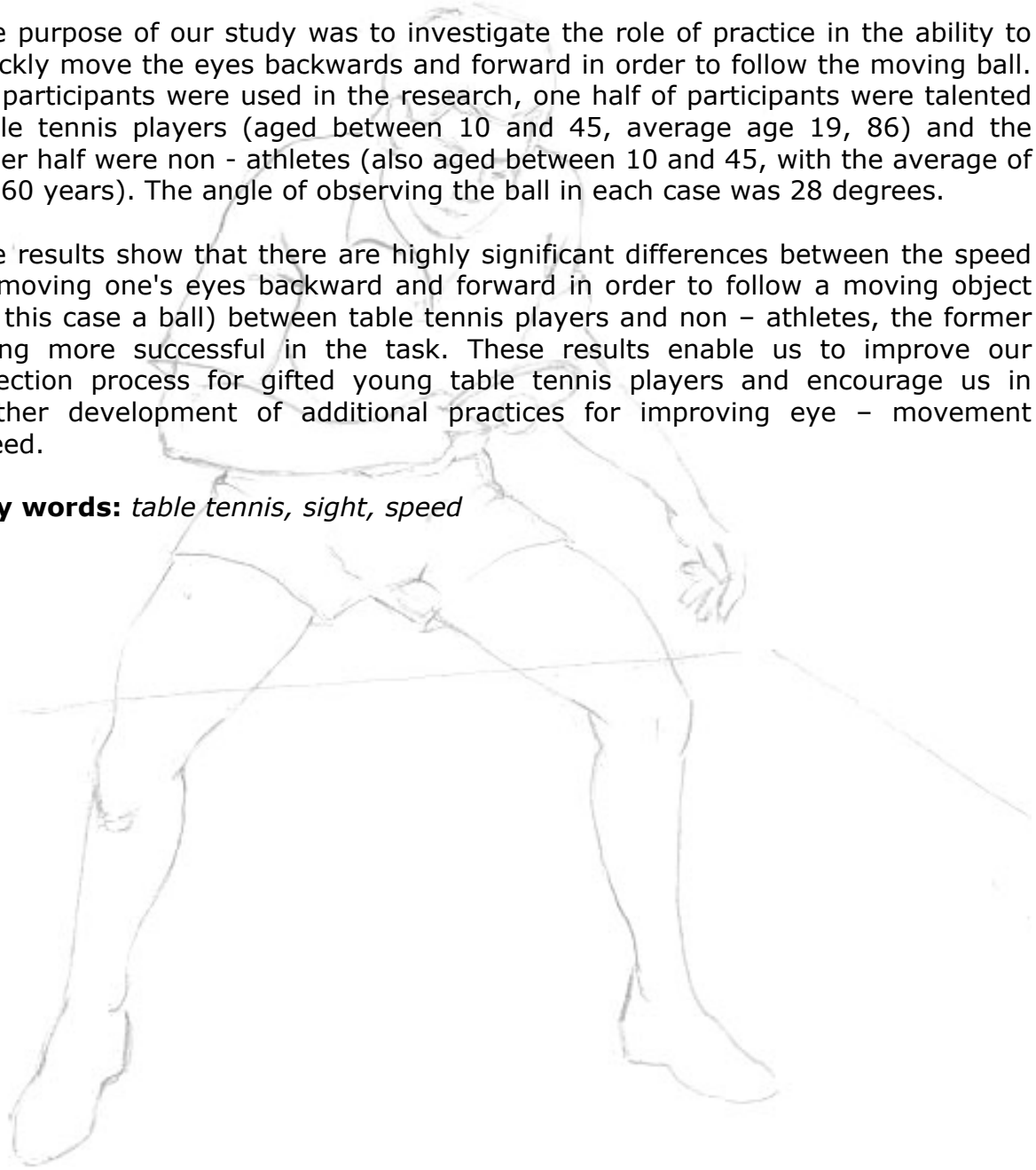
# THE ROLE OF SIGHT IN TABLE TENNIS (REMOTE MOVEMENT AND RETURN OF THE EYE)

## Abstract

The purpose of our study was to investigate the role of practice in the ability to quickly move the eyes backwards and forward in order to follow the moving ball. 30 participants were used in the research, one half of participants were talented table tennis players (aged between 10 and 45, average age 19, 86) and the other half were non - athletes (also aged between 10 and 45, with the average of 33,60 years). The angle of observing the ball in each case was 28 degrees.

The results show that there are highly significant differences between the speed of moving one's eyes backward and forward in order to follow a moving object (in this case a ball) between table tennis players and non – athletes, the former being more successful in the task. These results enable us to improve our selection process for gifted young table tennis players and encourage us in further development of additional practices for improving eye – movement speed.

**Key words:** *table tennis, sight, speed*



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# PSYCHOLOGICAL INTERVENTION IN TABLE TENNIS: SKILLS ASSESSMENT AND ENHANCEMENT IN TALENTED-YOUNG PLAYERS

## Abstract

Sport performance is the result of the control and integration of the athlete's physical, technical, tactical and psychological skills and capabilities. In order to obtain a great level of control and domain of these competences, a large amount of time and effort is destined in the athlete's formation process. The individualized identification of the players' specific needs, deficits and resources and of their level of control in the use of these later will help in the formulation of the intervention objectives and in the design of the psychological training to develop the mental competences which are considered as relevant for each athlete considering his/her needs, the sport modality, his/her level of knowledge, experiences and self-domain and the level of competition. Nonetheless, to approach this goal, it is necessary to previously perform an exhaustive assessment of their competences, capabilities and skills with the main aim of offering them a psychological training which results appropriate to their resources and needs to enhance the athletes' sport preparation and to optimize performance in training and competition.
Inserted in the National Sport Technification Program developed by the Spanish Table Tennis Federation, it has been included a psychological intervention aimed to the detection of the psychological skills of tennis table young players and to the enhancement of the personal control on these by the athletes who are participating in the above-mentioned program. This is inserted in the program's general objective of the identification, selection and formation of talented young players. This work is integrated along with the work developed in the remaining program's areas, and it is adapted to the characteristics, resources and needs of the participants.

The specific goals, characteristics, structure, components, and main results of the psychological intervention developed are presented in this paper. As main skills, the following ones are approached: activation and anxiety control, use of self-talk, attributional style, success and failure coping skills, attention/concentration self-management, self-confidence, sport, basic and competitive motivations, collective skills, relationships skills and fairplay.

Results have indicated the suitability of considering psychological assessment and training for the complete preparation of players in order to improve psychological skills which allow them to confront adequately the increasing demands from sport participation in accordance with the advancement of their implication. This is highly relevant in the case of individual and collective sports modalities, as well as in the identification and formation of talents, specifically in racket sports, as will be discussed.

**Key words:** *Sport Psychology, children-young athletes, psychological assessment, psychological training, sport talents.*

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# ANALYSIS ON TECHNIC AND TACTICS OF RYU SEUNG-MIN IN MAN'S SINGLES TABLE TENNIS FINAL AND SEMIFINAL OF THE 28TH OLYMPIC GAMES IN ATHENS

## Abstract

To prove up characteristics of technique and tactics of Ryu Seung-Min in Man's singles table tennis final and semi-final of the 28th Olympic Games in Athens, in order to supply reference for there under in following training and matches. The paper have analyzed and researched on 11 games of Man's singles table tennis final and semi-final of the 28th Olympic Games in Athens, by means of literatures, observe videos, three-phase method, mathematical statistics, single technique analysis. The results indicates that the score rate 68.4%, the applied rate 32.2% in stage of attack after service; the score rate 59.5%, the applied rate 35.6% in stage of attack after receiving; the score rate 34.2%, the applied rate 32.2% in stage of be locked in a stalemate in the final games. The score rate 81.5%, the applied rate 29.3% in stage of attack after service; the score rate 51.4%, the applied rate 38% in stage of attack after receiving; the score rate 43.3%, the applied rate 32.6% in stage of be locked in a stalemate in the semi-final games. The net score rate 7.6% of service, the net score rate 0.85% on location of forehand , the net score rate -2.5% on location of backhand, the net score rate 2.5% on middle location in final game. The net score rate 16.3% of service, the net score rate -3.3% on location of forehand, the net score rate 9.8% on location of backhand, the net score rate 1.1% on middle location in semi-final. The net score rate 11.4% of service, the net score rate -1% on location of forehand, the net score rate 2.9 % on location of backhand, the net score rate 1.9% on middle location in two games of final and semi-final. The data analysis indicates that service is the best technique of Ryu Seung-Min, the second is angled loop drive on location of backhand and forehand. In stage of be locked in a stalemate, defending on location of forehand and backhand is his weakness.

**Key words:** *the 28th Olympic Games, table tennis, Ryu Seung Min, characteristic of technique and tactics*

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## A STUDY OF THE UNIVERSITY STUDENTS' MOTIVATION IN TAKING THE COURSE OF TABLE TENNIS

**Abstract**

The research aims to understand the factors that affect the university students' motivation in taking the course of table tennis, and to provide findings for better physical education. The subjects of this research are 208 students (119 males & 89 females), who took the course of table tennis at National Chung Hsing University (NCHU). The "University Student Motivation Factor Scale" was adopted in the research to measure the students' motivation. It was divided into seven dimensions: social demand, health and fitness, release of tension, teacher's way of teaching**,** nature of the sport, achievement and honour, and grade consideration. The data were analyzed by descriptive statistics and t-test. The conclusions were:

1. The top three motives in order for taking table tennis were: teacher's way of teaching, nature of the sport, and health and fitness.
2. Those students had higher motivation who would play table tennis at their free time than those who would not.
3. Students of the advanced level in table tennis skill had higher motivation than students of the basic level.

**Key words:** *university students, table tennis, motivation*

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# DETERMINATION FACTORS OF SPECTATOR ATTENDANCE AT TABLE TENNIS CONTEST IN TAIWAN

## Abstract

In today's society, sport spectating represents a predominant form of leisure behaviour. Spectator attendance was related with on-field success of players. Chinese Taipei National table tennis team's performance is very well in international competition recently. It should attract spectators to participate the game but it was only a few audience attending table tennis tournaments in stadium. Therefore, the table tennis association has been faced with the challenge of attraction of spectator attendance. The purpose of this study was to investigate determinant factors of spectator attendance.

Participants were 120 spectators who were attending national table tennis tournament. Table Tennis Spectator Attendance Scale (TTSAS) was used in this study. Descriptive statistic and one-way analysis of variance were chosen in the data analysis. There were 30 questions in the questionnaire which was divided into 6 factors: Performance (5 items), Facilities and environment (3 items), Finance (2 items), Promotion (6 items), and Personal factors (14 items).

The results indicated that players' performance was the top rated factor followed by personal factors, facilities and environment, and promotion. Finance was the lowest rated factor. Suggestions of this study were as follow: (1) player's performance, personal factors, facility and environment, promotion were important determinant factors of spectator attendance; (2) determinant factors were significant related with demographic factors, such as gender, age, occupation, educational levels, and salary; (3) the findings of this study should be taken into consideration in developing strategies for National Table Tennis Association in Taiwan; and (4) there is a need for further study on table tennis spectators.

**Key words:** *determinant factors, spectator, attendance*

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# KNEE JOINT INJURIES IN TABLE TENNIS PLAYERS

## Abstract

Table tennis is assumed to be a sport with practically no injuries. This is a very common prejudice within general sports medicine community. In contrast, table tennis is accompanied with different types of injuries. There are two patterns of injuries in active table tennis players, first caused by single impact trauma, and second related to repetitve microtrauma. The latter has much higher incidence.

The purpose of this paper is to analyze available literature with respect to injuries involving knee joint.

Percentage of knee injuries in overall number of injuries in table tennis are reported to be within the range of 10 to 15 %. Most common injuries to the knee joint caused by single impact trauma are meniscal tears followed by much lower incidence of ligamentous injuries and osteochondral lesions. Rotating movements on pivoting knee causes meniscal tear. Overuse injuries around knee involve patellar tendinitis (jumper's knee), quadriceps tendinitis, semimembranosus tendinitis and rarely iliotibial band friction syndrome.

There are not many available data in the literature concerning specific knee injuries in table tennis players, in spite of the fact that overuse injuries are very often assessed in clinical practice.

**Key words:** *table tennis, injuries, knee joint*

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# AN INTRODUCTION TO SHAKING-WRIST SERVICE FOR SHAKEHAND STYLE HOLDING RACKET PLAYERS

## Abstract

This shaking-wrist service (SWS) was firstly invented by Chinese player with penhand style holding racket in 1970's and it has been frequently used by the penhand style holding racket player in their matches. In this paper, author would like to introduce the principles and application of SWS, based on his more 30 year experiences as a coach for a table tennis school, to the player with shakehand style holding racket, especially for no Asian player. It is characterized by shaking wrist from right to left and then left to right rapidly with the help of low arm swinging. The force for SWS come from three part of the body, i.e. low arm, wrist and two figurers thumb and index fingers in the case with shakehand style holding racket. The wrist plays a most important role to create SWS in high quality. With the force mainly made by wrist, the racket swinging inside(right to left if one uses his right hand holding racket) and followed by outside in opposite direction, and maybe also inside again, possessing three movements. The inside movement makes ball spinning inside if the ball is hit at the moment while the second movement makes ball spinning outside. It is possible to make composite spinning for the ball, i.e. the ball may have a pure side spinning or side spinning plus low or top spinning (composite spinning) in both inside and outside directions. The third movement is used to confuse the opponent. The spinning direction, spinning rate and the point served in the opponent table of the ball can all be controlled by shaking wrist. The spinning rate of the ball is also related to how high the player tosses the ball. Swinging racket with wrist makes it easy to confuse the opponent in spinning direction so that it can create good chance for serving player to attack the opponent, followed by serving. The author of this paper just finished to introduce SWS to Belarusian players at the invitation of Belarusian table tennis federation in 2006. SWS is also suitable for the shakehand style holding racket players.

**Key words**: *shaking, swinging, wrist, service, spinning, shakehand style*

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# THE INSTITUTION OF THE PROFESSIONAL TRAINING ON TABLE TENNIS COACH IN CHINA

## Abstract

### 1 Purpose
The table tennis coach plays an important role in keeping Chinese Table Tennis at an advanced level long-term in world. The professional training is a kind of institutional arrangement which guarantees the table tennis coach to renew knowledge and grasp the newly development of the table tennis technique in world. The purposes of this study are as followings. (1) Discussing the basic function of the institution of professional training in China. (2) Analyzing the application status of the institution of professional training on the table tennis coach in China systematically. (3)Summing up the successful experience and giving some suggestions to develop the profession training on table tennis coach for the future.

### 2 Methods
#### *2.1 The method of collecting the relevant literature*
The relevant literature about the professional training on table tennis coach was collected and read.
#### *2.2 The method of having an interview with the expert*
Several experts who are in charge of the professional training in Chinese Table Tennis (CTTA) were interviewed.

### 3 Conclusions
(1) The working system of professional training on table tennis coach in China was basically established. Moreover, it made a further progress in the process of professional training in the past 10 years.

(2) According to the teaching arrangement, the combination of the theories and practice was emphasized, and the study content of practice was stood out. According to the distribution of courses time, the time of profession theories lesson accounted for 65%~70%, and the time of the basic theories lesson accounted for 30%~35%.

(3) It paid more attention to discuss the theories and the practice development trend of the table tennis techniques, which played the leading role for table tennis coach in the future coaching work.

(4) In training courses, it proved effective to appoint the on-the-job coaches of the Chinese national table tennis team as experts to teach lessons. They made a series of keynote lectures on table tennis coaching. Combining their coaching experience, they explained the problems which coaches met with in practice.

**Key words:** *table tennis, coach, professional training*

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# RISK FACTORS IN VETERAN TABLE TENNIS PLAYERS

## Abstract

Like other physical activities such as walking, running, swimming or cycling, table tennis can be practiced from childhood to old age. In general, being physically active when getting older brings different positive effects. For example and by comparison with sedentary people of the same age, the regular practice of table tennis slows down the unavoidable decrease in muscle mass, especially in legs, and maintains the aerobic capacity at higher values than in sedentary people. It is well known that playing table tennis after 50 years can help to keep balance, skill and reflexes at a good level, and it has also a positive influence on some brain functions and mood.

However it must also be kept in mind that the ageing process is characterised by a more or less pronounced reduction in physical and mental abilities, even in the most physically active people. Therefore the risk of illness or injury increases as the body resistance declines, and some accidents can have a tragic outcome as far as the cardiovascular system is concerned.

In order to help older players and their physicians to better treat the specific injuries associated to table tennis and also to prevent them, I started to study the insurance claim reports collected during a 40 months period in France and concerning 142 officially registered table tennis players whose age was equal to or above 40 years. Among the 142 injuries, 125 were traumatic injuries, and 17 were cardiovascular events of which 15 lead to the death of the player in a few minutes. All the fatal cardiovascular events have occurred in competition except one during a training session.

The joint injuries (32) were mainly represented by ankle and knee sprains. There were also patella and glenohumeral dislocations, and low back injuries. Concerning muscle injuries (25), there were 21 partial ruptures of the gastrocnemius muscle ("tennis leg"), 3 partial ruptures of the tight posterior muscles, and 1 partial rupture of the biceps brachii muscle. The largest number of cases has been obtained with the rupture of Achilles tendon (29). Fractures (20) have concerned elbows, wrists, ankles, feet and teeth. There were also 3 falls on the floor without serious outcome, 1 rupture of the patellar tendon, 2 short losses of consciousness, 1 cranial traumatism, and a dozen of minor injuries (bumps against the table or with a racket, etc.)

In conclusion, an adapted practice of table tennis by veteran players may contribute to delay and to momentarily soften the negative effects of the ageing process. However since there is no possibility to totally avoid some of these negative effects, veteran players are strongly encouraged to have a regular activity of moderate level without fighting spirit, and to periodically undergo a medical examination preferably made by a physician who is aware of the loads and constraints linked to table tennis, and particularly with regard to the cardiovascular aspects.

**Key words:** *table tennis, veterans, risk factors*

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# COMPARISON OF TABLE TENNIS COACHES AND COACHES IN INDIVIDUAL SPORTS IN SLOVENIA

## Abstract

We conducted a study of characteristics of Slovene coaches and within the scope of that investigation compared characteristics of table tennis coaches and other coaches from individual sports. 69 coaches participated in the study, 9 of them were table tennis coaches and 60 coaches worked in other individual sports (swimming, athletics, tennis, biathlon…). We measured their personality (BFQ), motivational characteristics (SMI and Costello's inventory), social skills (SSI), emotional intelligence (VEK), attitudes and leadership styles (LSS and LEAD). Table tennis coaches turned out to have different leadership styles (they use more delegating and give less feedback to their athletes), they manipulate with their athletes less and are less open to new experiences and cultures in means of personality traits. In comparison to other individual sports coaches they also seem to report somewhat more problems, related to their work. Some of the results could be contributed to sample characteristics – table tennis coaches were significantly older than other coaches.

**Key words:** *coach, personality traits, motivation, social skills, leadership styles, emotional intelligence*

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# APPROPRIATENESS OF SPECIAL TRAINING OF TABLE TENNIS

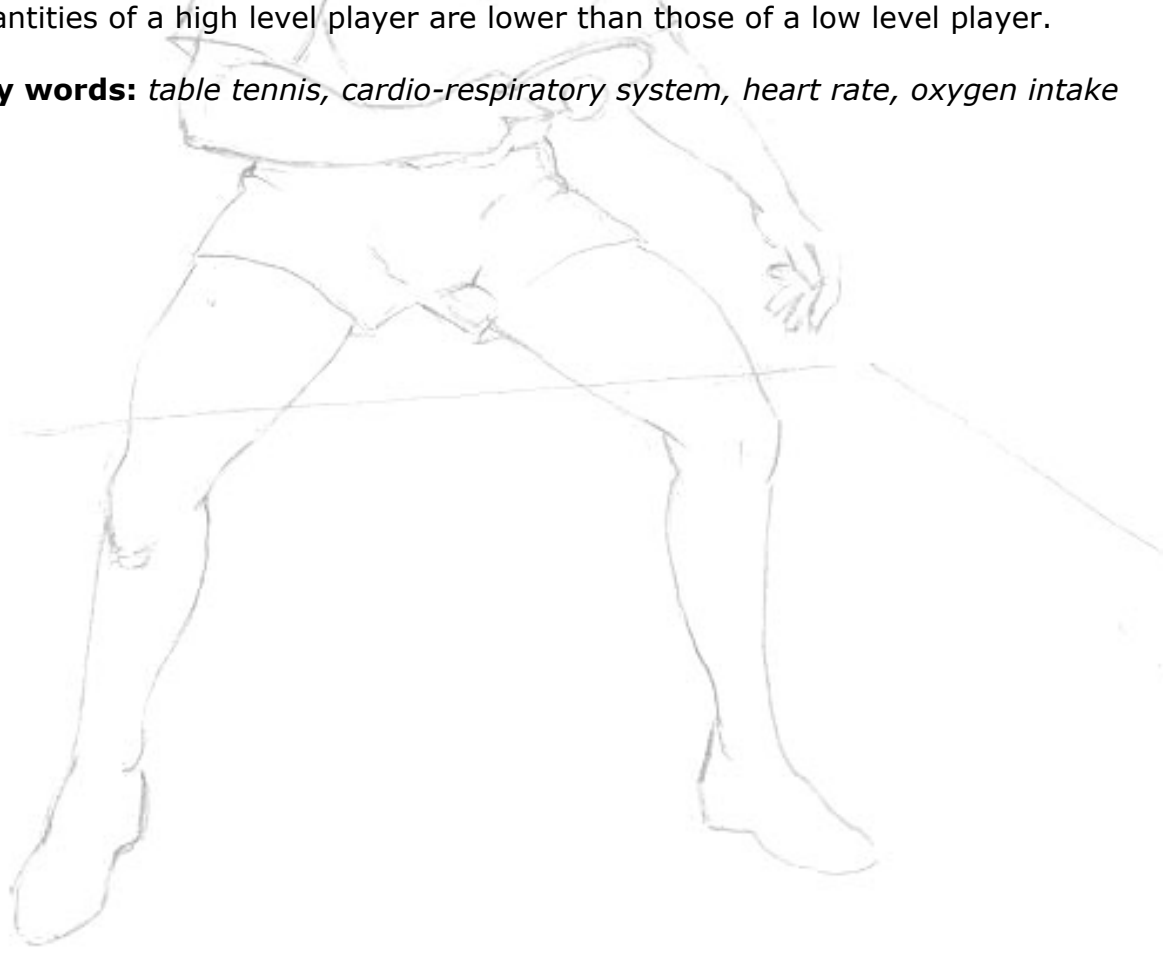
**Abstract**

To evaluate cardio-respiratory function of table tennis players, heart rates and oxygen intake quantities during training were measured by a telemetric method. The subjects of the test were top level student players. The measurements were made for the following 5 different stroke conditions.

Condition 1. long stroke at a fixed point,
Condition 2. drive stoke at a fixed point,
Condition 3. smash stroke at a fixed point,
Condition 4. drive stroke with right and left motion,
Condition 5. smash stroke with right and left motion

The measured data indicate that the oxygen intake quantity and heart rate increase in the order from Condition 1 to 5. It was also found that these quantities of a high level player are lower than those of a low level player.

**Key words:** *table tennis, cardio-respiratory system, heart rate, oxygen intake*



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# REAL PLAY TIME IN TABLE TENNIS MATCHES IN THE XXVIII OLYMPIC GAMES «ATHENS 2004»

## Abstract

The modifications of Table Tennis regulations, with more important the end of games to 11 than to 21 points change appears to have changed the duration of match, with regard to both the total and also real play time. The purpose of this study was to record the real play time that is required in order to come to an end a Table Tennis match as well as it realises, the existed changes in the real play time between the Men and the Women that took part in XXVII Olympic Games of Athens (2004). The play time differences at the development of organisation by the phase of first round up to the Quarterfinals were also studied. As sample was used the total of games that was carried out at the duration of Olympic Games in Athens (n=120), in Men (n=60) and Women (n=60) singles. The results showed, that the real play time of sets oscillated from 3:7'' until 6:6'' in total. The mean of duration of set was increased at the development of organisation up to the Quarterfinals. Men's pure play time was from 3:8'' to 4:4'' and Women's from 3:7'' to 6:6''. A difference in pure play time was noticed in Women and this might be a result of style of play. The real play time that was presented can be used as tool to training process.

**Key words:** *table tennis, real play time, Olympic Games*.

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# DIFFERENCES IN GRIF EXECUTING FOREHAND TOPSPIN WITH DIFFERENT BALLS

## Abstract

In modern table tennis most international competitors favour the forehand top spin as most favourable attacking stroke. Technically correct performance of top spin strike and his power is, of course dependable on the player's knowledge, his motor abilities, his morphological characteristics and especially of his physical preparation. Perfect performed top spin has to be executed from the legs and a proper kinetic chain is therefore most important part of this stroke.

The aim of this study was to find out if during the forehand top spin strokes with balls of different sizes there are differences in the ground reaction impact forces (GRIF). Lack of strength in player's legs can namely produce over time a wide range of injuries.

The comparison of selected parameters proved that differences increase due to increased ball size. If the player will hit the ball with more spin, then he must use wider path to have a ball on his racket. As bigger ball have by the same speed less spin, player need to execute top spin with more power.

The gathered data should facilitate planning of the physical preparation training process of table tennis players.

**Key words:** *table tennis, GRIF, forehand top spin*

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# KINEMATIC ANALYSIS OF TOP SPIN STROKE WITH BALLS OF TWO DIFFERENT SIZES

## Abstract

In modern table tennis most international competitors favour the forehand top spin stroke as the most favourable attacking stroke, especially on cut balls. Technically correct performance of top spin stroke is, of course dependable on the player's knowledge, his motor abilities, and his morphological characteristics.

The purpose of our research was to find out if there are differences between top spin strokes with 38- and 40-mm ball, respectively. The comparison of selected kinematic parameters proved that differences in the amplitude of forehand stroke of the tested player increase due to increased ball size. The possible reason for the observed difference in technique is that the player uses more power in upper limb segments to produce the same velocity and rotation of the ball. High upward velocity would give the ball increased topspin to ensure that it would hit the opponent's side of the table. A possible means to achieve this goal is to improve his preparation for the stroke.

The gathered data should facilitate planning of the training process of TT players and especially for promising young players.

**Key words:** *table tennis, kinematic analysis, forehand top spin*

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# POSSIBILITIES TO REDUCE SPEED AND SPIN BY CHANGING THE THICKNESS OF SPONGE, UPPER LAYER OR TOTAL THICKNESS OF SANDWICH RUBBER

## Abstract

Table tennis is without no doubt the fastest game in the world. As table tennis has developed during last decade and player's techniques have improved, the ball's speed and spin have become too fast and that's why rallies are shorter. The aim of our research was to find out what are the differences in results when strokes are performed with rubbers of different thicknesses.

For this purpose the impact has been investigated, and a simple impact model has been proposed on the basis of the idea that the contact duration is determined by the natural period of a whole system composing the mass of ball, the nonlinear stiffness of ball and rubber.

Different rebound angles from the racket on the robot arm determine different trajectories of parabolic shape. Therefore, at another angle where the parabolas are higher and the ball flight paths longer, the quartiles are wider since even a slight change in the rebound angle affects the duration of the ball flight more than when parabolas are lower, that is the flights of the ball are more direct.

These measurements and results of measurements show us that there is a big potential to regulate table tennis rules regarding to slow down a game and take into consideration health of table tennis players. We can do this with limitation of rubbers or with prohibition of speed gluing. Even though results show us differences in different kind of rubbers there is still a lot of work to be done.

**Key words:** *table tennis, rubber, speed, spin*

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# RESEARCH REGARDING POSSIBILITIES OF MARKING THE BALL IN ORDER TO MAKE SPIN VISIBLE

## Abstract

Marked balls should enable the players to see more clearly the rotation of the ball, particularly when receiving the service. Marked balls should be helpful as well in coaching, to teach young players to watch the ball all the time.

To find out whether a ball marked with lines or otherwise could help the players to see more clearly whether the ball had or had no rotation and even determine which rotation the ball had. This could be a help to players specially when returning the service and so reduce mistakes in returns, but be helpful in rallies as well.

After test with different markings it seems that the best visible marking on white and orange balls are black lines (2 mm width) – three black lines on the equator of the ball placed so that each line is on the right angle to each other line. Another good possibility seems to be marking similar to that of basket balls.

After short practice players were able to see clearly whether the ball in play has rotation or has no rotation. Due to it «floating» services, services without rotation caused almost no returns mistakes.

**Key words:** *table tennis, marked balls, visible spin*

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# THE EFFECTS OF SOME ANTHROPOMETRICS ELEMENTS ON THE WORLD RANKING OF 32 TOP WOMEN TABLE TENNIS PLAYERS IN ATHENS' 2004 OLYMPIC GAMES

## Abstract

This study aims to examine the impact of some anthropometrics elements of 32 top Women Table Tennis Players in Athens' 2004 Olympic Games.

Anthropometrics has been considered as the most influential factors of Talent Identification in different sports. Thus, the researcher is attempting to find out whether anthropometrics could be applied as the basis for recognizing talented table tennis players as well.

In this correlational research, the anthropometric characteristics of 32 top women table tennis players who participated in Athens' 2004 Olympic Games, were analyzed to indicate any significant correlation with their world ranking.

The data including the measurement of some anthropometric features such as weight, height, body mass, etc. of the above mentioned qualified players were collected from ITTF website. These data were analyzed through correlational statistics, and in order to examine the correlation of the variables, Spearman's Rank Order Correlation Coefficient was applied.

Results:
Statistical analysis indicated the mean values of *height*, *weight*, and *body mass* as 165.45cm, 57.64kg, and 21 respectively.

The correlation coefficient between *height* and *world ranking* of the subjects was calculated as $r=0.217$ ($p=0.332 > \alpha=0.05$), which demonstrates no significant relation between the mentioned variables.

Furthermore, the correlation coefficient of *weight* and the *world ranking* of the players was $r=0.180$ ($p=0.422 > \alpha=0.05$), which does not suggest a meaningful value, either.

Finally, the correlation coefficient between *body mass* and *world ranking* came to as $r=0.189$ ($p=0.412 > \alpha=0.05$), which is not significant as well.

**Key words:** *talent identification, antropometric elements, body mass, women table tennis players*

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# MANIFESTATION OF "SPIRIT IN MOTION" BY PARALYMPIC TABLE TENIS PLAYERS

*A Study of Paralympic Table Tennis Players in 2006 World Table Tennis Championships in Montreux, Switzerland*

## Abstract

Table Tennis is considered as a suitable sport for people of different ages and physical conditions. It has proved to be the pioneer sport in attracting people with physical and intellectual impairments as well as the hearing and vision impaired.

Table Tennis was probably played with improvised equipment in England during the last quarter of the 19th century. Since then, it has been developing and spreading all over the world, winning favour as a popular sport in over 195 countries currently as ITTF members. Table Tennis has been part of the Paralympic Program since the first Games in 1960.

The purpose of this study is to have a look at Paralympic Table Tennis from a new angle, and to try to draw the attention of ITTF towards the unique nature, conditions, and needs of Paralympic Table Tennis as an important part of World Table Tennis Family.

The researcher studied the 348 players with disabilities who participated in 2006 World Table Tennis Championships in Montreux, Switzerland.

The data was gathered from IPTTC Medical and Classification Committee about the number of players in each category and the reasons for their disabilities.
The gathered data was analyzed through descriptive statistics; the results suggested that there were 13 major categories of disabilities of which 5 were the most prominent due to the number of the players in them. These 5 categories are Spinal Cord Injuries (SCI) with 44.54%, Les Autress (LA) with 23.85%, Polio with 11.49%, Cerebral Palsy (CP) with9.48% and Amputee with 8.04% of the whole population of 348 players.

With an eye to the enthusiasm, motivation, efforts, and suffering that are displayed by Paralympic table Tennis Players who play, holding the racket with a stump of the arm, with the leg, and even with the mouth, we realize that they play Table Tennis with their hearts, indeed.
This is the manifestation of "SPIRIT IN MOTION" that is definitely of significant importance to ITTF for considerations in their future planning.

**Key words:** *paralympic players, classification, spinal cord injuries, les autress, polio, cerebral palsy, amputee*

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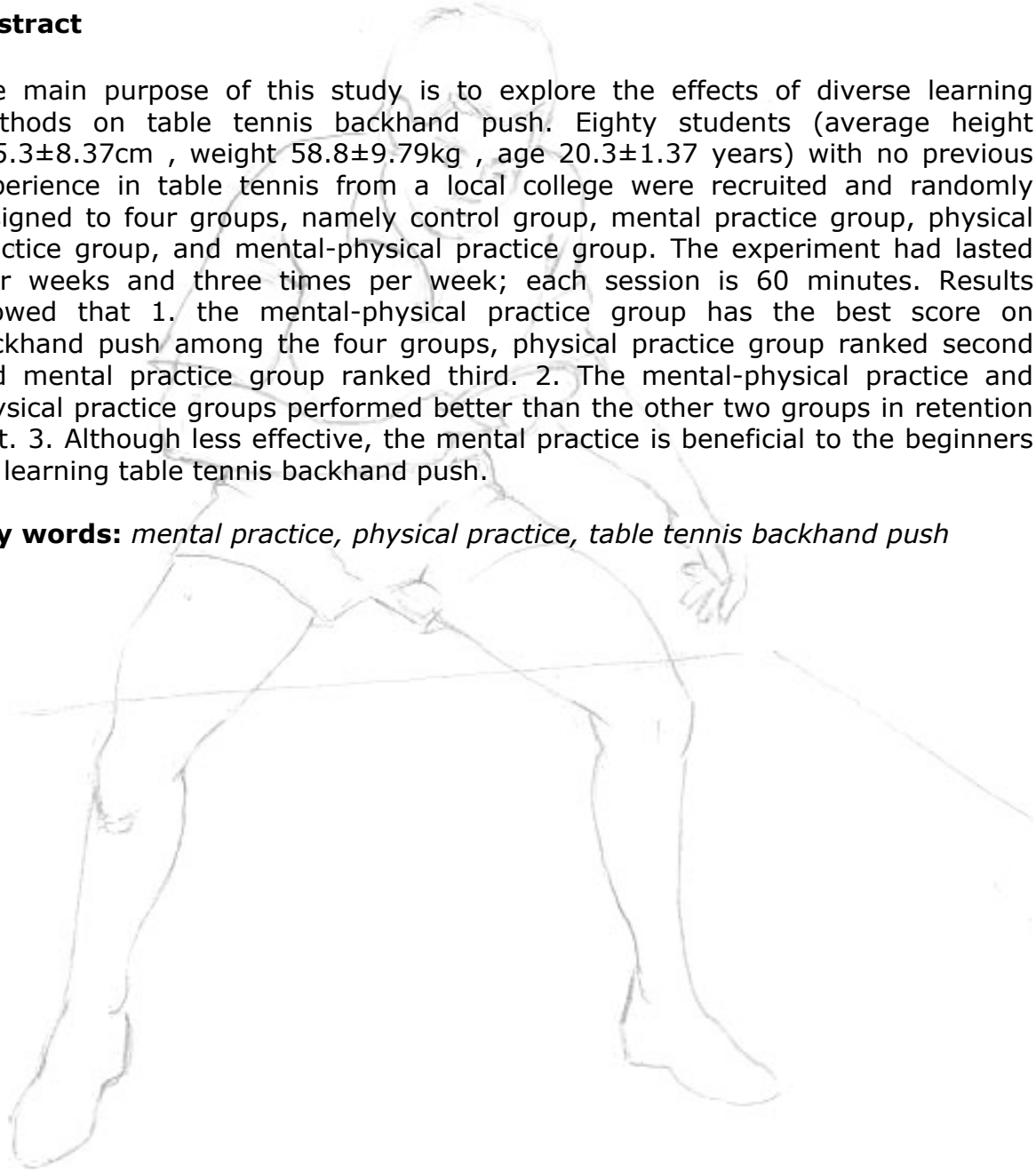
# THE EFFECTS OF DIVERSE LEARNING METHODS ON TABLE TENNIS BACKHAND PUSH

## Abstract

The main purpose of this study is to explore the effects of diverse learning methods on table tennis backhand push. Eighty students (average height 165.3±8.37cm , weight 58.8±9.79kg , age 20.3±1.37 years) with no previous experience in table tennis from a local college were recruited and randomly assigned to four groups, namely control group, mental practice group, physical practice group, and mental-physical practice group. The experiment had lasted four weeks and three times per week; each session is 60 minutes. Results showed that 1. the mental-physical practice group has the best score on backhand push among the four groups, physical practice group ranked second and mental practice group ranked third. 2. The mental-physical practice and physical practice groups performed better than the other two groups in retention test. 3. Although less effective, the mental practice is beneficial to the beginners for learning table tennis backhand push.

**Key words:** *mental practice, physical practice, table tennis backhand push*



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# THE EFFECTS OF MULTIMEDIA ASSISTED INSTRUCTION AND TRADITIONAL INSTRUCTION ON STUDENTS' LEARNING MOTIVATION AND TABLE TENNIS LEARNING ACHIEVEMENT

## Abstract

More recent motivational research focuses on the identification of effective techniques for enhancing instructional design and improving student learning. A general model for motivational design of instruction is described and reviewed in terms of its application to college physical education contexts. Learning-motivation researchers are applying some of the same theories and concepts found to be effective in industry to the development of motivational models that enhance the teaching-learning environment. One such model is the ARCS Model of Motivational Design developed by John M. Keller (Keller, 1983, 1987). ARCS is a systematic model for designing motivating instruction. This digest will describe the ARCS Model, and will outline some of the ways in which Attention, Relevance, Confidence, Satisfaction components may be applied to instructional design. Therefore, the purpose of this research was to investigate the effects of multimedia assisted instruction (MAI) and traditional instruction (TI) on students' learning motivation and table tennis learning achievement.

Two undergraduate table tennis sessions were selected as the research samples. One session was randomly assigned to be taught by using MAI and the other session was by TI. Based on the result of ARCS Survey for learning motivation, the data was examined the difference on several factors before and after the teaching and across different methods. Basically, four findings were observed. First, for each group, the learning achievement, motivation, attention, confidence, and satisfaction of students are better or higher than untrained. However, the relevance perception about motivation was not significant before or after the teaching. Second, across two control groups, students in the MAI group perform significantly better in forth mentioned factors. Nevertheless, the relevance perception about motivation was not significant between groups. Third, for the MAI group, forth mentioned factors are significantly positively related after the teaching, except the relevance perception about motivation. Lastly, the results pointed out that the satisfaction factor from the ARCS Survey could be used to predict the table tennis learning achievement. In conclusion, the results suggested the ARCS Model of Motivational Design which is an easy-to-apply, heuristic approach to increasing the motivational appeal of instruction in college physical education. An ARCS Model provides a useful framework for both the design and improvement of the motivational quality of table tennis activity increases the likelihood that these entities will be used and enjoyed in college physical education.

**Key words:** *multimedia assisted instruction, traditional instruction, learning motivation, table tennis*

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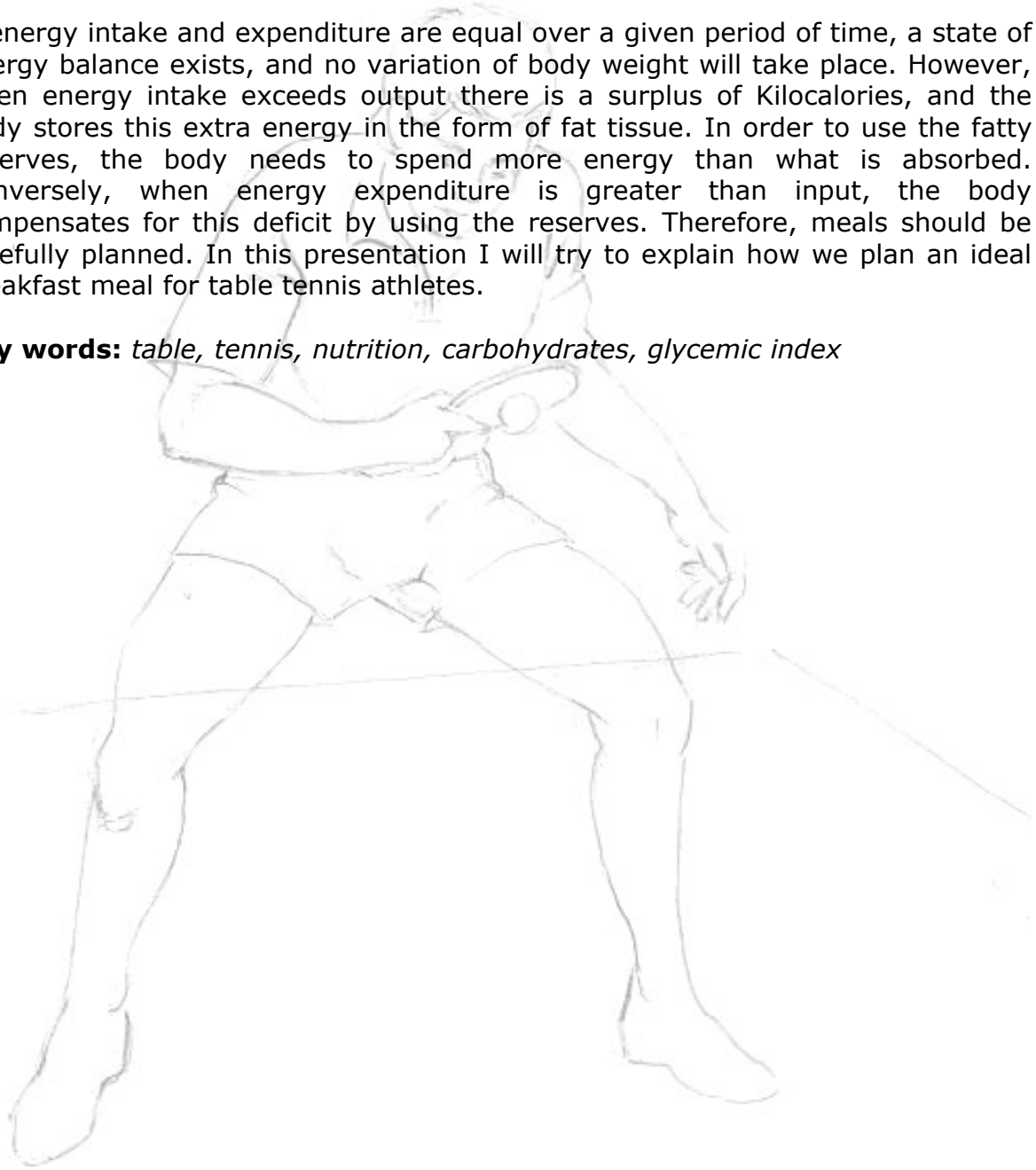
# THE PRE-COMPETITION MEAL BREAKFAST FOR TABLE TENNIS CHAMPIONS

## Abstract

If energy intake and expenditure are equal over a given period of time, a state of energy balance exists, and no variation of body weight will take place. However, when energy intake exceeds output there is a surplus of Kilocalories, and the body stores this extra energy in the form of fat tissue. In order to use the fatty reserves, the body needs to spend more energy than what is absorbed. Conversely, when energy expenditure is greater than input, the body compensates for this deficit by using the reserves. Therefore, meals should be carefully planned. In this presentation I will try to explain how we plan an ideal breakfast meal for table tennis athletes.

**Key words:** *table, tennis, nutrition, carbohydrates, glycemic index*



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# CHARACTERIZATION OF THE FRICTION BEHAVIOR OF TABLE TENNIS RUBBERS

**Abstract**

Recently, novel polymeric materials (bulk elastomers, elastomer foams, fibers and fiber reinforced composites) were developed and are frequently used for racket sport equipments. These materials reveal highly non-linear, time and temperature dependent mechanical behaviour and the material performance is highly influenced by the environmental conditions (temperature, humidity, pollution). Hence, to support both material development efforts and novel design procedures for high performance racket sport equipments, novel tests methods and procedures to characterize the bulk and surface mechanical behaviour were developed, implemented and applied.
The main objective of this paper is the characterization of the surface behaviour of both pimple in and pimple-out table tennis rubbers. Hence, the friction between table tennis ball and rubber surfaces was measured under various sliding motion conditions and the results are described and discussed in the paper. Special emphasis was devoted to the proper definition of the friction and the determination of the main influence parameters on the friction.
The rubber friction is widely investigated over a wide range of test conditions and is described and the results discussed in many scientific papers. The main driving force of these investigations was the characterization of tire rubber friction/traction under dry and especially wet conditions. The friction force for rubber is a sum of the contribution of two essentially different physical processes; the adhesion between rubber and solid counterpart and the deformation of the elastomers which is described as the hysteretic deformation of the rubber

$$F_r = F_{adh} + F_{hyst} \qquad (1)$$

Where $F_r$ is the friction force, $F_{adh}$ the adhesion force component and $F_{hyst}$ is the hysteretic deformation force component. While the hysteretic component can be derived from the dynamic mechanical test performed and described in the previous paper, the determination of the adhesion component remains a challenging task.
To gain more insight into the complex surface behaviour of rubbers friction tests were performed using a universal microtribometer (UMT, CETR, Campbell, CA, USA). The table tennis ball was glued into a fixture and this was positioned in the upper moving part of the UMT. The test specimen was the rest of the cut table tennis rubber sponge and was glued to a steel plate fixed in the lower stationary drive of the UMT. The table tennis ball was first pressed with a controlled normal force ($F_z$) into the rubber surface and subsequently a linear sliding motion with controlled rate was applied. The normal force was varied as 1, 2, 5 and 10 N and the sliding rate was 0.1 and 1 mm/s in the experiments.
Both the normal ($F_z$) and the friction force ($F_x$) was continuously measured and recorded during the test. The coefficient of friction (COF) was than calculated in the test software.
The results of these investigations are described and discussed as:

- Influence of the normal load and sliding rate on the friction behaviour of table tennis rubbers,
- Effect of the surface cleanness on the friction behaviour,
- Recognition of the modification of the surface by additional treatment and
- Comparison of the friction characteristic of various commercial table tennis rubber sponges.

**Key words:** *table tennis, pimple-in and pimple out table tennis rubbers, friction behaviour, sliding rate and load dependence, cleanness, material comparison*

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# FOOTWORK TECHNIQUES USED IN TABLE TENNIS: A QUALITATIVE ANALYSIS

## Abstract

*INTRODUCTION*
Footwork and steps (one step, side to side, slide step, "turn" step, cross step, and combinations of these steps) are fundamental in table tennis. Players should use the best technique for guarantying the shortest time to arrive in the right position, that gives the possibility to play the best shot.
*AIM OF THE STUDY*
This study aims to define the different footwork techniques used by table tennis players. To compare different footwork techniques for giving useful suggestions to coaches and implementing better training for players, from a technical and physical point of view.
*METHODS*

1. Analysis of 2 matches of 4 male players from 2006 World Team Table Tennis Championships (videos recorded from television). During that competition the players were the n° 1 (Wang Liqin), 2 (Timo Boll), 4 (Ma Lin) and 56 (Christian Suss) in the world ranking. Analysis of the matches: L. Ma vs T. Boll, and L.Q. Wang vs C. Suss.
2. To record the 5 different types of steps defined and the 16 types of shots (drive and back) was used a 16 x 5 table. To carry out this analysis it has always been taken into account the last step before the shot or before the attempt to hit the ball.
3. The analysis of the frequencies of the different types of steps were performed and percentages calculated.
4. The non-parametric Chi Square test were performed to identify significant differences ($\alpha=0.01$) in the use of footwork techniques by the 4 players considered.

*RESULTS*
The results allow a qualitative description of the various step movements.
The most frequent step is the "one step" with a frequency of 43%; the second one is the "turn step" with a frequency of 24%; they are followed by the "chassè" 17%; the "slide step" 9% and the "cross step" 7%.
Chi Square analysis, by comparing the use of different types of steps by the players, shows significant differences between them ($\chi^2$ (15) = 35.35, $p<0.01$). A single match analysis shows that between Boll and Lin there are not significant differences in the steps used ($\chi^2$ (5) = 11.27, $p<0.01$); while between Wang and Suss the differences in steps movements are significant ($\chi^2$ (5) = 24.08, $p<0.01$).
*DISCUSSION*
Analysis of the matches suggests inter individual differences in the characteristics of the steps movements. The "one step" is especially used to hit the ball in the forehand and backhand push to return the service. The "turn step" is used to prepare the forehand top spin. The Timo Boll vs Ma Lin match shows a similar use of steps by players whereas in the Wang Liqin vs Christian Suss match, the first player (the winner of the match) uses the "turn step" more frequently than the other player. Further studies on a larger number of matches, using the same methods, will permit a better understanding in the use of footwork techniques.

**Key words:** *table tennis, footwork technique.*

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# HEALTH RELATED HABITS OF TABLE TENNIS COACHES

## Abstract

World health organisation has already established the main factors influencing health those being socio-economic factors, way of life and physical environment (WHO, 2003). The risk factors in relation with the way of life are nutrition, physical inactivity, smoking, alcohol consumption and use of drugs.

Sports in general, as well as other professions that are in close relation with sport are usually presumed to be in connection with life quality especially regarding health. Most of the laics would conclude that people involved professionally in sport lead a healthy way of life, take care about their dietary habits and avoid most of the habits that would endanger the health. Sports coaches would be a typical example of a professional who should be well aware of the basis of healthy living. Though, this has never been scientifically proved and there is a great lack of published papers dealing with this issue.

The aim of this research is to determine the health related habits of table tennis coaches regarding nutrition, alcohol consumption and physical activity.

The sample comprises 46 male table tennis coaches from different clubs in Croatia. For dietary habits, alcohol consumption and smoking habits determination, the new questionnaire was constructed based on previous national and international studies. To determine physical activity levels the Baecke questionnaire of habitual physical activity was used. The questionnaire was completed anonymously. The obtained data were analyzed by standard statistical procedures, with statistical software package SPSS 13.0.

According to the results it is obvious that dietary habits of the coaches are not on adequate level. Especially there is a problem in skipping the meals and eating fast food. Smoking is unfortunately widely accepted and though the campaign against smoking is going on in many countries the real results are still not apparent, and the number of deaths caused by cancer that could be connected with smoking is still very high. Concerning the smoking habits it was found that 34.6% of the table tennis coaches are smokers, although the majority of them stated that that they are smoking between 5 and 10 cigarettes per day. 66% of coaches are consuming alcohol, mostly beer and wine. The levels of all examined dimensions of habitual physical activity were greater than in average Croatia male population.

Sport coaches are part of the population that has its own specificities and because of their connection to athletes, especially young ones, they way of life deserves to be researched. As sports have a very important role in many nations worldwide, and even though for that the athletes take most of the credits the coaches are of great importance also, so their education in all fields would surely contribute to improvement of an athlete´s performance.

**Key words:** *health habits, table tennis, coaches, nutrition, smoking, alcohol*

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# DESIGN OF AN ELECTRONIC SCOREBOARD FOR TABLE TENNIS

## Abstract

This paper talks about a design of Table tennis electronic scoreboard, with multiples functions and benefits, like: automatic server indication; automatic change of side indication for the last set and change of score side; Time-out indication; time for rest between sets; at the end of match, it shows scores and times for each set. The table tennis rules are embedded in the scoreboard.

This design has non-volatile memory in case of lost of energy, it keeping the current score in memory. A battery can be used for continuous use even if the main energy source is lost.

Many electronics scoreboards can be network connected, in order to shows in several places the same score ("mirror" scoreboard). Also many electronic scoreboards (to 255 scoreboards) can be network connected for several match scores and they can be monitored from a main computer (PC) for scores concentration. All the scores sequences for each match with the time (hour: minutes: seconds) for each point can be filed and used for statistical. Internet displaying of the scores can be done by the PC used for monitoring.

This scoreboard can be used in table tennis instruction for easy learning of scoring. It has the option of to place pads in the table for training and counting the balls hitting over the pads.

The scoreboard can be used in tournaments, clubs and home; for professional use and for entertainment (funny) use.

It is based in a microcontroller using CAN bus for network communication, it use LEDs for display the score (Points, Sets, Server and End of match). It uses a serial EEPROM to save the scores, configuration and other important information. The keyboard uses only 4 keys for an easy management.

**Key words:** *electronic scoreboard, microcontroller, network, CAN, learning, training, embedded rules.*

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# THE INFLUENCE OF LONG-TERM TABLE TENNIS TRAINING ON THE INCIDENCE OF THE IMPROPER POSTURAL ALIGNMENTS (PARAMORPHISMS)

## Abstract

The main objectives of this investigation were to (a) classify the subjects (table tennis players - TTP, and age-related controls - C) according to their postural alignment status, as well as to (b) determine is there any relation between long-term active table tennis training and emergence of improper postural alignments (paramorphisms) in children and youth. The sample of subjects comprised 67 TTP, younger cadets and cadets; and 80 C (all 10-14 years of age). Measurement of the postural status indicators was performed using the photo-equipment of the high-resolution. Digitalized photo shots were taken in the frontal and sagital plane, and additionally processed using the "Posture Screening" software program in beta version.

According to data calculated by means of the taxonomic and discriminant analysis it can be concluded that there is (a) no significant difference between TTP and C regarding their clustering into groups of the different-postural-alignments, while (b) significant differences were found in several indicators of the postural status. Although considerable incidence of the improper postural alignments is found, it has to be stressed as the general problem in youth and not to be directly related to regular table tennis training. Table tennis training brings forward some specific circumstances in a problem of the improper postural alignment, e.g. lowered shoulder of the dominant hand and somewhat hunchbacked basic position in a sagital plane, all mainly linked to biomechanical and structural characteristics of the sport.

Results obtained herein, as well as the high incidence of the improper postural alignments, directly point at importance of the general preparation of a locomotor system in athletes; mainly because that there is no doubt that multi-approachable conditioning training, adjusted to the athletes age; can positively influence the proper and symmetrical development in young TTP. In such manner, it is possible to diminish some negative consequences that a frequent and intensive table tennis trainings could have on the postural status.

**Key words:** postural alignments, paramorphisms, table tennis, software program (computer program)

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# FACTS ABOUT SPEED GLUE

## Abstract

In its environmental charter, "Agenda 21 of the Olympic Movement", the IOC defines its stance on hazardous substances in sports products as follows: "…the members of the Olympic Movement undertake… to avoid using products recognized as being hazardous or toxic to humans or environmentally polluting."

As a member of the Olympic Movement, the ITTF has decided to introduce a ban on the organic solvents used in speed gluing with effect from September 2007. The authors of this report have set themselves the task of presenting facts associated with the following aspects of speed gluing and the use of organic solvents: current actual speed gluing practice and the quantities of solvents used and released into the air, the statutory provisions regarding organic solvents in Europe, the actual risk potential and the hazardousness of organic solvents.

Speed gluing is currently characterised by the desire of players to "tune" their rubbers to the point of maximum performance using speed glue. To do this, more than 20g organic solvents are needed for one rubber. 85% of these escapes into the air. Having looked at all the relevant safety datasheets, it has been established that all organic solvents are dangerous to health. They are toxicologically effective and many of them also damage the environment. In Europe, speed glues have to carry a warning notice on the packaging stating that they "must be kept out of reach of children". Under the term Germany's Youth Employment Protection Act, young people under the age of 18 and children may not be exposed to organic solvents at all unless it is necessary and even then only if supervised. A factor that has so far gone largely unheeded is the tendency of organic solvents to form explosive mixtures when combined with air. Using a simple model calculation it was possible to show that, in unfavourable circumstances, it is entirely possible for explosive mixtures to form during speed gluing. Finally, data was gathered showing the extent of "gluing sniffing" in Europe and the third world. The findings of one international study show that in many European countries 10-20% of schoolchildren have "sniffed" at least once. In the third world, a large proportion of homeless children are dependent on glue sniffing.

The authors consider it their task to assemble these facts. The evaluation of the facts and the requisite decisions are in the hands of the IITF and the national associations.

**Key words:** *table tennis, speed gluing, IOC*

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# A COMPARISON OF SPORT ATTITUDE BETWEEN FEMALE TABLE TENNIS STUDENT ATHLETES TOWARD COMPETITIVE MOTIVE IN INDIVIDUAL AND TEAM SPORTS

## Abstract

*Introduction.* The findings of several studies that compare the attitudes of female athletes toward competitive motive in individual and team sports indicated that their competitive motives are quite different. Bowman et al (2001); McDonough and Crocker ( 2005) ; Sit and Linder ( 2006) found that female student athletes in team sports were more motivated in competition than those in individual sports. *Objective*. The purpose of this study was to compare the attitude of female university table tennis student athletes toward their competitive motives in individual and team sports. These athletes participated in the Seventh University Olympiad Games which was held in summer 2005.
*Method.* A total of 360 female students both from individual and team sports served as two samples in this study. Each sample consisted of 180 players. The Sport Attitude Inventory Questionnaire's (SAI) constructed by Willis (1986) was used as an instrument for this study. This instrument consisted of 3 dimensions: power motive (PM), motive to achieve success (MAS), motive to avoid failure (MAF), all of which together measure the student athletes' motives toward individual and team sports. The validity and reliability of this instrument were reported to be satisfactory.
*Results.* The results of MANOVA showed that there were significant differences between student athletes' attitudes toward individual( Table Tennis, Badminton , Track and Field) and team sports( volleyball, Basketball, football/futsal) in all three dimensions of competitive motive (PM, MAS, MAF). Then, in order to find out which group is different in dependent variables, one- way analysis variance was conducted. The results of the calculated F for all dependent variables were significant. When the mean scores difference of the sport attitude in individual and team sport athletes were compared, the post hoc test(LSD) showed that: 1) the mean scores differences of the attitude toward power motive between badminton athletes and futsal athletes was significant., 2) A same comparison between the attitudes of badminton ,track and field and futsal athletes in motive to achieve success showed no significant differences., 3) the mean difference between track and field with basketball athletes in motive to achieve success were reported significant., 4) the mean differences between basketball and futsal athletes in motive to achieve success were also significant., 5) the mean difference between table tennis and track and field athletes In motive to avoid failure was significant.,6) the mean difference between the attitude of track and field , volleyball and basketball athletes in motive to avoid failure were significant. However, when the mean scores of table tennis athletes were compared with athletes in other sports, no differences were reported to be significant.
*Conclusion.* Since all student athletes in individual and team sports need to improve their competitive motives to advance their performances, it is, therefore, recommended that the coaches and team psychologists provide rich environment for athletes in different sports to help them identify and improve these competitive motives. This probably may help the athletes to maximize their potential and transcend the negative effects while maximizing the positive benefits of the intended traits such as power motive, motive to achieve success, and motive to avoid failure. Considering these traits may help them to improve their high anxiety, low stimulation and high competitive drive.

**Key words:** *sport attitude, individual games, team games, Olympiad, table tennis.*

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# METHOD AND SYSTEM FOR CORRECTING AND PERFECTING THE PERFORMANCE TECHNIQUE IN TABLE TENNIS

## Abstract

The concrete scientific goal of this study was to realize an electronic system meant to correct and improve the performance technique of the main technical elements in table tennis for beginner players.

1. The electronic device for correcting and perfecting the performance of the technique (DECT) has been born out of the necessity of making the coach's work easier, as well as for decreasing the period of time necessary for learning the basic technique in table tennis. An essential problem that comes up when the subject has the necessary skills for practicing the sport is learning the correct technique. The technical device has been made so as to be compact, to have a reduced size, to be easy to transport, efficient and to solve the matters he was designed for.
2. By linking together a notebook and a digital video camera, we managed to store a large amount of information which was later used for the analysis.

This method can be successfully used for learning, as well as for the correction and self-correction of the technique. Moreover, the self-control system, combined with the reduced weight and the large data storage capacity, offers the researchers, the teachers or the coaches in this field a high degree of mobility.

**Key words:** *electronic device, technique, table tennis*

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# ADJUSTING OF THE "BIOPAC" INVESTIGATION MINILAB FOR MEASURE THE REACTION SPEED TO THE VISUAL STIMULUS

**Abstract**

The appearance of Personal Computers and the computerized mini-labs marked a quality improvement in the technological development. By means of the new technology, a larger amount of information is being processed, information which is then stored for later use.

The concrete purpose of the scientific investigation was to determine how the BIOPAC investigation mini-lab can be used to measure the reaction speed to a visual stimulus, in order to use it for further as a tool for researchers, teachers of coaches who are in charge of identifying and measuring the ability.

As a conclusion to the study we can state that: The complex made up of the BIOPAC student investigation mini-lab and the notebook can be successfully used to measure the reaction speed to the visual stimulus. Moreover, the system offers mobility and multiple possibilities of analyzing the data, since it has a reduced weight, it is compact and easy to move and it has a large data storing capability

**Key words:** *test, reaction speed, visual stimulus, BIOPAC*

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# A COMPARISON OF THE INJURIES AND REASONS FOR OCCURRENCE IN TABLE TENNIS BETWEEN EGYPTIAN PLAYERS AND OTHER PARTICIPATING COUNTRIES' PLAYERS IN THE TT WORLD CUP FOR JUNIORS 2006 IN EGYPT

## Abstract

This study aims for the determination of the types of injuries in table tennis and the organs that are mostly affected as well as the reasons of occurrence for Egyptian players, and comparing them to players of other national teams participating in the TT world cup for juniors 2006 in Egypt.

The sample of the study included (128) players divided into (54) Egyptians and (74) representing other national teams, both males and females representing (16) countries in this first class event. The frequency of injury, reasons of occurrence & affected organs were reported through a questionnaire to define the reasons for injury through personal interviewing.

The most important results of this study can be briefed as follows:
The most frequent injury for the Egyptian players occurred in the spine with a percentage of (28.3%) for males and (15.3%) for females followed by shoulder injuries with a percentage of (17.5%) for males and (14%) for females.
And for the other participating teams the most frequent injury occurred in the spine also with a percentage of (25%) for males and (23.7%) for females followed by shoulder injuries with a percentage of (23.7%) for males and (22.9%).

Conclusions: We can conclude form these results that the most affecting reasons for injury occurrence for the Egyptian players was due to the unorganized planning for training loads which causes the players to burn out or feel fatigue. Comes next the weakness of physical preparation programs. Also, the non-presence of a physiotherapist with the participating teams even during first class world events. Besides the lack of information about first aid.

For other players representing other countries, they suffered from the high intensity of training and unorganized sessions in addition to not applying the first aid quickly that causes some injuries to turn
into chronic ones.

**Key words:** *table tennis, injuries*

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# THE FORECASTING ANALYSES OF OPPORTUNITIES OF LONG TERM PREPARATION IN TABLE TENNIS

## Abstract

The analyses of existing Russian and foreign systems of long term preparation, published in special literature, has shown, that in the theory and methods of table tennis it is going the permanent process of search and replacement of different points of view, hypothesis, theories at the system of long term preparation of sportsmen. We can judge about it by lack of decision of the serious problem questions:

- Theoretical well-grounded concept of long term preparation, which meets the requirements of the modern Olympic and professional sport;
- Model of the phased preparation with the optimal temporal limits of the beginning, completion of the speeches, optimal structural formation of preparation and its duration;
- Common understanding of the purposeful function of the lasting sport's preparation;
- Necessary methods while research and planning of the structure of the long term preparation;
- Investigations in the theory of the scientific foresight of the sporting future;
- Methods of education with the foresight of results of assimilation of the moving skills;
- Forecast model of management of the long term sport preparation and foresight of the results.

These problem questions must be solved on the basis of creation of didactic concept of the system of the lasting preparation in sporting games, which ensure biologically optimal period of preparation and usage of purposeful function as the means of pedagogical management of general preparedness by way of creation of didactic pedagogical impacts with the output known in advance. The purposeful function of preparation must ensure the participation in three Olympic Games with the first place in the temporal interval from 22 to 23 years. The correlation of time of preliminary preparation and participation in the competitions of the highest level is 1:3.

The concept must include the methods, purposeful function, model of preparation of individual tendency and monitoring of the model, ensuring its scientific escort (accompaniment).

**Key words:** *table tennis, long term preparation*

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# A SELECTION AND FORMATION MODEL FOR SPANISH YOUNG TABLE TENNIS TALENTS

## Abstract

Detection, selection and technification process for sport talents represent one of the most important research area in Sport Sciences. Actually, Spanish Table Tennis Federation, throughout Sport Technification National Program (PNTD), are developing a detection, selection and technification process for young players with the aim to develop a sport specialization in a correct form.

Different players are selected after the application of valid criteria in sport talent identification. In this sense, table tennis players selected must to present a specific profile, take into account physical, technical, tactical, psychological, anthropological and social characteristics, although adaptation capacity to table tennis training of these players is the main factor to take into account.

Table tennis training concentrations in high performance centres have a duration between four and ten days in which it follows a structured program. Also, multidisciplinary team composed by coaches, sport psychologists, ophthalmologists, sparrings (top-level table tennis players out of competition), and sport physicians evaluates to the players applying systematic and active methods.

With this work we want to give to know the features of a pioneer experience for young table tennis players in Spain, describing general and specific aims of the program and the main guidelines that are followed by the national coaches that are responsible of the PNTD.

**Key words**: *table tennis, talents, training, young players*

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# REACTION CAPACITY, ACCELERATION AND VELOCITY IN A SPECIFIC DISPLACEMENT AFTER VISUAL STIMULUS IN YOUNG TABLE TENNIS PLAYERS

## Abstract

**Introduction.** Table tennis is a sport in which the players must to react quickly to a great number of visual stimulus in each rally of the match. Also, displacements and specific skills must be repetitively performed in tenths of seconds. For this reason it is important to develop the reaction capacity and the velocity since the initial stages in table tennis training. Thus, the aims of this study were: a) to quantify the in young table tennis players; b) to determine acceleration and velocity developed in a specific displacement, and c) to compare this values with those from age-matched sedentary group. **Method.** Twenty-five young table tennis players (14 boys and 11 girls; age between 9 and 11 years) and twenty-five age-matched sedentary children (15 boys and 10 girls) took part in this study. Subjects from the two groups carried out the Take-Off Reaction Test (Newtest) and were tested in random order. From table tennis base position (on contact mat) subjects reacted to the red light (left or right) that electronic device emitted in random order. Next, subjects leaved the contact mat and performed a lateral run until left or right photocells (placed 5 m from the mat). Subjects completed 12 attempts (6 to the left and 6 to the right) and the best result was registered. **Results.** Table tennis players showed a better reaction capacity than the sedentary children. Also, acceleration and velocity developed in 5 m in table tennis players were significantly higher than the values found in sedentary group. No significant differences were found in reaction capacity, acceleration and velocity taken into account the left or the right side of displacements. **Conclusions**. The Take-Off Reaction Test is a simple but valid tool to test reaction capacity to visual stimulus in table tennis players. However, the test needs of certain adaptation (to reduce the lateral run distance) for to obtain higher levels of specifity. Table tennis practice generates perceptual and neuromuscular adaptations of which effects have been demonstrated in this study.

**Key words**: *table tennis, reaction capacity, velocity, acceleration*

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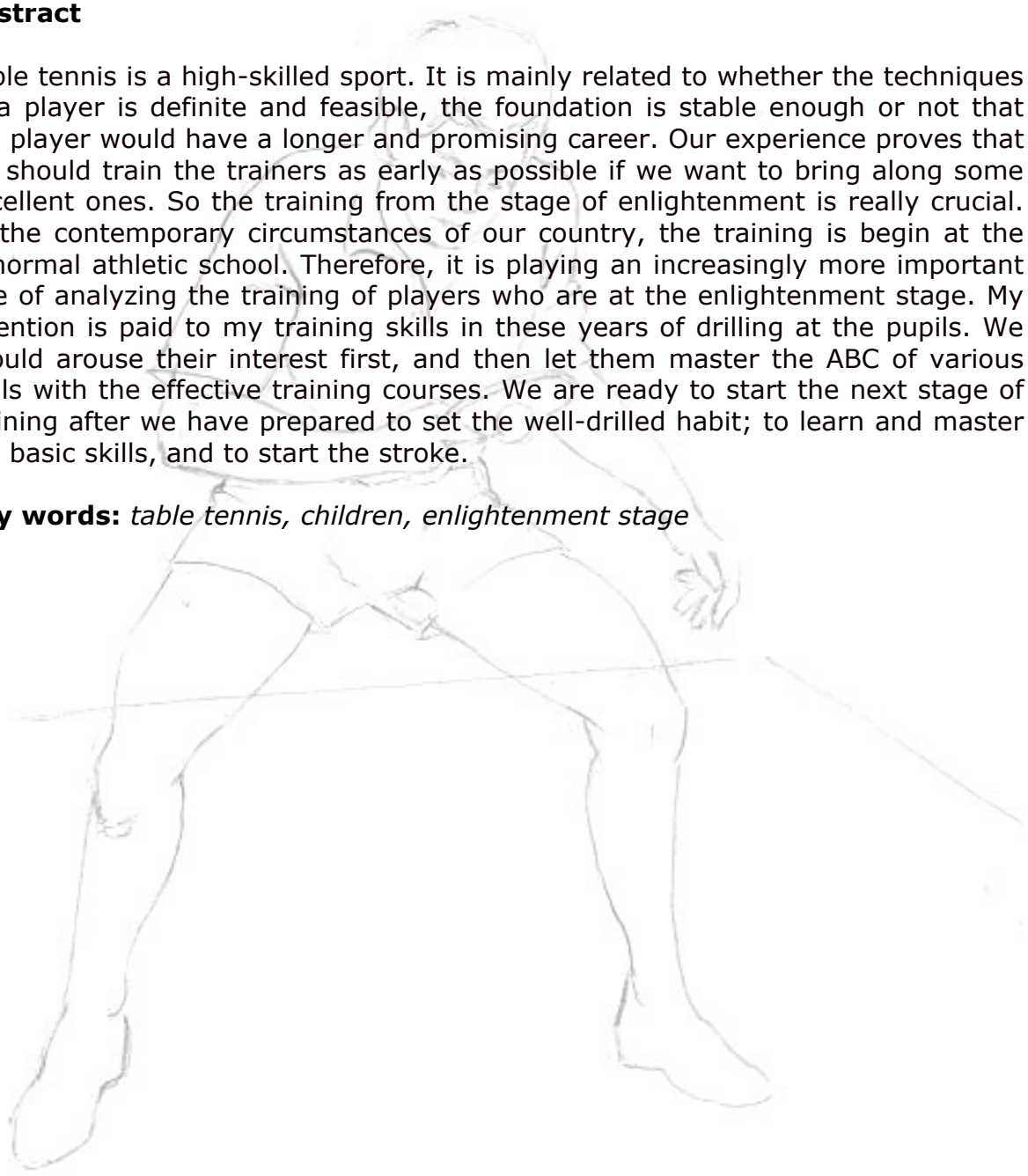
# ABOUT THE METHOD OF TABLE-TENNIS ENLIGHTENMENT TRAINING OF CHILDREN BRIEFLY

## Abstract

Table tennis is a high-skilled sport. It is mainly related to whether the techniques of a player is definite and feasible, the foundation is stable enough or not that the player would have a longer and promising career. Our experience proves that we should train the trainers as early as possible if we want to bring along some excellent ones. So the training from the stage of enlightenment is really crucial. At the contemporary circumstances of our country, the training is begin at the denormal athletic school. Therefore, it is playing an increasingly more important role of analyzing the training of players who are at the enlightenment stage. My attention is paid to my training skills in these years of drilling at the pupils. We should arouse their interest first, and then let them master the ABC of various skills with the effective training courses. We are ready to start the next stage of training after we have prepared to set the well-drilled habit; to learn and master the basic skills, and to start the stroke.

**Key words:** *table tennis, children, enlightenment stage*



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# THEORETICAL MODEL FOR OPTIMIZE THE MANAGEMENT OF THE TABLE-TENNIS AS A SYSTEM IN ISTANBUL

## Abstract

In the last 8-10 years the interest in practice Table-Tennis is progressively growing up in Istanbul.

There are possibilities of good realization of the social process, relevant to the stable increase of the social functions of the game (socials, educative, health, rehabilitation, culture).

Objective is the need of the application of a method of approach and a methods for planning and the implementation of a complex of theoretical and research of scientific application in the area of the management of the Table-tennis.

Through the projected theoretical model with application of the system method of approach are differentiated in mutual relation basic elements of construction, function and development of the Table-Tennis in Istanbul, as a social system under the conditions of their surroundings. Concerning that relation as a basic elements we can mark: politics, strategy, aims of development of Table-Tennis; subject of managing /states, municipals and private institutions and organizations/; object of management: personality and social-demographic groups of the population; Table-tennis as a part of the educational system, in the free time, the sport of children, teenagers and elite sportsmen, structure and means of teaching, practice /training/ and the competitive activities; resources insurance: financial, material-technical, personnel, legally-normative, scientific, informative, etc.

The aim of the planning complex of management, pedagogical and economical study is to optimize the influence of the particular elements over the planning system for management of the Table-Tennis in Istanbul.

**Key words:** *The management of the table tennis, social functions of the game, basic elements: politics, strategy, subject and object of managing, training and the competitive activities*

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# HOW TO PREVENT THE MOST FREQUENT INJURIES OF THE FOOT IN TABLE TENNIS

**Abstract**

Three decade in table tennis is quite enough period to notice the most often problem related to overuse injuries in the foot region. This paper is attend to open the problem and at the same time to close up with possible prevention measures.
The normal foot must conform to the following criteria:

- it must be pain free
- it must have normal muscle balance
- it must have no contracture
- the heel must be central
- the toes must be straight and mobile
- during gait and stance must have three sites of weight bearing.

Foot pain, when noted during standing, can be considered *static* and when noted during walking, can be considered *kinetic*.
The majority of painful conditions of the foot originate in the soft tissue; muscles, ligaments, tendons, nerves, blood vessels and tissues of the joint spaces.
In most cases of the foot and ankle pain local lesion can be implicated, and it can be result of trauma or stress.
In table tennis the main problem is *chronic stress*. Repeated trauma leads to mechanical effect on all structures which begins with strain and ends with deformation.
The first symptom of overuse injury is related to ligamentous inflammation with resultant pain.
Persistent stress can cause ligamentous elongation and even some degeneration.
Support of the joint is lost and the joint undergoes excessive motion or malalignment. The stress inflames the joint capsule, a condition that also causes pain. Persistence of joint irritation causes structural damage to the articular surfaces, and degenerative arthritis results. This sequence interrupted early may be reversed but if allowed to proceed may lead to irreversible demage.
March fracture is stress injury of a metatarsal shaft caused by overused conditions.
The pain in the region of the heel may arise from the tissue behind and under the calcaneus, arise within the bones and joints of the heel, or be referred to the heel region from a distant site.
Plantar fascitis is most often seen in players who train in the soft shoes on hard surfaces. The examination reveals deep tenderness of the anteromedial aspect of the calcaneus which is the site of the plantar fascia.
Rupture of the Achilles tendon may occur from stress or injury. Tearing occurs usually in narrowest portion of the tendon approximately 2 inches above the point of attachment.
The purpose of this paper is to point out the fact that we have adequate standard for the table tennis shoes. Our mutual task should be multidisciplinary approach to this issue to try to solve this problem.

**Key words:** *table tennis, foot injuries, foot pain, table tennis shoes*

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# ANTHROPOMETRICS, AUXOLOGY, AND TABLE TENNIS

## Abstract

Anthropometrics is the study of patterns in human body size and their correlates over a period of time. Auxology is the study of human growth. Both studies confirm that the world population (approximately 6 billion people) is getting taller.

Height is determined by the complex interaction of genes and environment. With the advance of modern medicine and plentiful nutrient-rich food in the developed world, average height has increased dramatically. Nutrition is now believed to be the most important factor in determining height. Previously it was thought to be genetics.

Over the past 100 years people have increased significantly in height. Americans were the tallest in the 19th Century at 1.71 m (5'7.3"). Today they average 1.77 m (5'10. 8"). Several nations in Europe have now surpassed the United States, particularly the Netherlands and Scandinavian countries. In a century's time the Dutch have gone from being the smallest people in Europe to the tallest in the world. Their men average 6'1" (185.42 cm) and the women 5'8" (172.72 cm). This increase has been so dramatic that many physical structures had to be redesigned and altered to accommodate their much taller frames. Ceilings had to be lifted, furniture redesigned, lintels raised to keep foreheads from hitting them etc…

Table tennis had its origin around 1900. It was initially played on dinning room tables, which were customarily 2'6" or approximately 76 cm in height, which is the standard height of table tennis tables today. Therefore, for over 100 years the height of the table tennis table has been the same.

Cabinet manufacturers in the United States have always had a standard height for their fixtures such as bath vanities, sinks, kitchen countertops, dining room tables, etc… Until recently this height was as 30" (76 cm) high. Note this 30" (76 cm) was the identical height of most dining room tables when table tennis originated and was no doubt why the table tennis tables have always been the same height of 2'6" (or 76 cm). Until the year 2000, there was not much variation among off-the-rack manufactured bath and kitchen vanities. In the year 2000, manufacturers decided that the furniture height averages based on their prior specifications were now obsolete. They stated that present day Americans were beginning to resent having to stoop, bend, and squat just to brush their teeth or wash their hands in a sink. They are now producing vanities that are 34.5" (87.63 cm) to 36' (91.44 cm) tall. Shouldn't table tennis table's height be adjusted accordingly?

Other sports have adjusted their playing dimensions, rules, and equipment to adjust for the increase in the size of their present day athlete's (e.g. basketball).

If the sport is to continue proportionately to the increase in the height of players perhaps in the distant future even the length and width of the table may have to be adjusted. Standardization of equipment may help to keep down the price of equipment and promote tradition but in the immediate future, if not now, some consideration should be given to adjusting the table height for the personal comfort and health of our athletes from an orthopedic standpoint.

**Key words:** a*nthropometrics, auxology, table tennis*

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# ITTF EXPERIMENT – THE NEW LONGER-REACH TABLE TENNIS TEAM FORMAT

## Abstract

In 2003 an International Table Tennis Federation (ITTF) experiment on the new longer-reach team format that was carried out in Nigeria. A series of tests were conducted to evaluate the effects of the longer-reach table on Nigerian players' skill performances, fitness, technical and tactical abilities as well as the visibility of rallies in the new team play format as compared to conventional team play. Eight three-hour physical conditioning and skill training sessions involving 11 senior, six junior players and four cadets were held in Lagos, Nigeria. The players' fitness levels were also assessed using standardised test battery, including upper body strength, leg power, muscular endurance and aerobic capacity. The skill training programme included service and returns, push play/chop, counter hit drive, loop/top-spin drive, smash, counter loop drive and block shot. A new size of table (Width: 2.74m; length: 5.05m and height: 76cm) was used for the experiment. This was achieved by placing two conventional tables sideways, each table now forming one half of the new size. The former length of the conventional table now becomes the width of this new table. This means that what the new team format requires is an adaptation of two conventional tables. The still waters area gap is fixed at 1.0m on either side of the net whose length is now 2.74m, plus 0.32m for net extension. For cadet and junior players, optimum gaps of 0.70m and 1m, respectively, i.e. 0.35m and 0.5m on either sides of the net, were adopted after a series of tests. A synthetic mesh was designed to collect out-of-play balls, i.e. the balls which land in the still waters area. New competition rules including the order of service were designed for the team play format in which a game is played out of 18 points. Service is delivered diagonally from the left half of the table. Each player serves thrice in succession to all three members of the opposing team before the right to serve is transferred to the team which last received service. A 40mm ball which weighed 2.7g was used for the experiment. The players played three sets of trial matches on round-robin basis. Based on the findings it was concluded that:

1. The longer reach team play format promoted more participation because a total of six players competed in a match at once. It was easier for spectators to understand the new playing format as a team event because all members of a team could compete together in a match. The new rules and scoring procedure are also easy to follow.
2. The wider playing surface promoted more visible rallies.
3. Players' athletic ability was also enhanced because of the preponderance of footwork skills and increased power of stroke execution.
4. Trickery in service delivery was minimised because of the longer distance the ball travelled from one half of the table to the other. This increased reliance on skill and stroke techniques thereby minimising over-dependence on advancement in rubber technology, which enhances the technical characteristics of service delivery.

**Key words:** *Longer-reach team play format, athletic ability, rules, rallies*

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# DEPENDENCE OF RESULTS IN TABLE TENNIS ON CERTAIN GAME EFFICIENCY INDEXES

## Abstract

From sports aspect, the basic and most utilitarian indicator of game quality is exactly the achieved result on a particular sports competition. Amongst different manners of quality analysis of table tennis players' game, the basic idea of research was to seek to detect those indicators (data) for collection of which only the final result in particular competitions in larger number of events, in one table tennis match, certain sets in one table tennis match could be sufficient. Sindik (in year 1999) performed that by implementation of variables which could directly be derived from the results of competitions, however, those variables one could reduce to a smaller number of indexes. The basic aim of the research is to question to which extent the indexes directly derived from the results of individual table tennis matches could foresee indexes which are described by the final result of an individual in a larger number of individual table tennis matches. Research is comprised of analysis of appropriate sample of 39 entities – *total individual competition effect of sportsmen in 9 team championships,* for all the players of one table tennis team, in the period from 1990 till 1996, in the organization of TTOCAZ, in different competition ranks in which the named team has competed. 16 indexes – indicators of efficiency of an individual in table tennis competition have been defined, which can be derived directly from the competition results. The predictive value of used indicators has been determined, significant in statistical manner, for the prognosis of direct indicators of success on basis of other indexes. However, due to characteristics of the sample, the generalization of results is not possible.

**Key words:** *table tennis, game efficiency, correlation, basic hypotheses, data collection, entities, dependent variables, independent variables, collective indexes, multiple regression analysis*

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# TABLE TENNIS AS SELECTED SPORT IN SLOVENIAN PRIMARY SCHOOLS

## Abstract

The electives represent an interesting variegation of the physical education process in Slovene schools. Children massively select elective subjects of sport activities which help to increase the variety of variegated and interesting sport activities in schools. Sports teachers thus have the possibility to offer extra activities in addition to the compulsory program.

The aim of this research was to acquire opinion of pupils from selected primary schools on the elective school subjects (electives) and position of table tennis in pupil's selection. The sample includes 245 male and female pupils form 11 Slovenian primary schools. Pupils have been given a questionnaire of 22 questions, targeted to establish the opinion of pupils on the subjects from various perspectives.

Based on the analysis of the questionnaire answers, the following conclusions can be drawn:

- Pupils like to attend Sports as elective subject, while there is slightly lower interest in Dance.
- Within Sports as elective subject, pupils would most want to attend the following sports: swimming, handball, football, roller skating, volleyball, badminton, skiing. Table tennis is in the middle of pupils choices.

The results indicate that teachers make good use of this fact for the benefit of children's harmonious physical and motor development.

**Key words:** *elective subjects (electives), table tennis, nine-year primary school, analysis, pupils*

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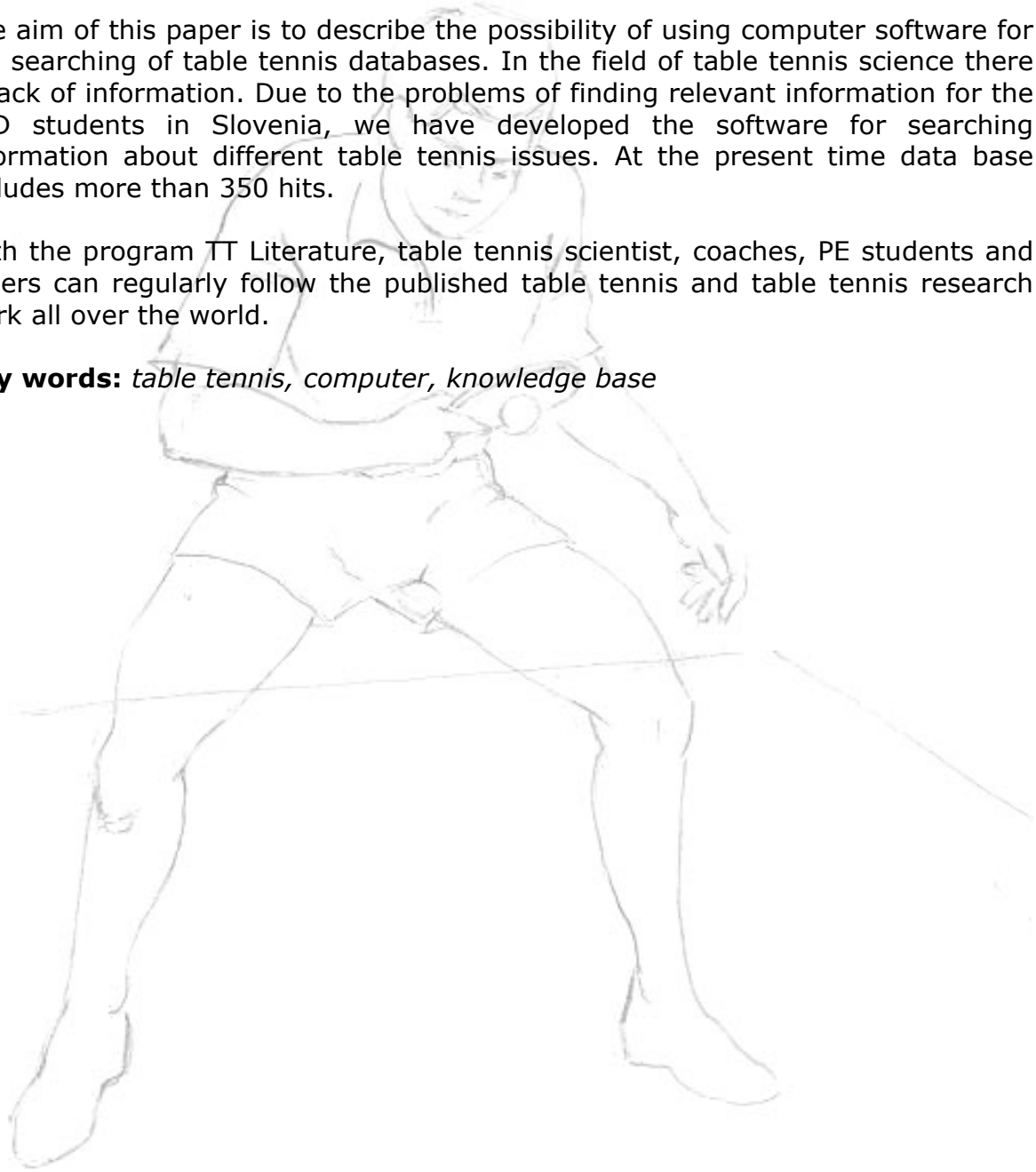
# DEVELOPMENT OF DATA BASE SYSTEM "TABLE TENNIS KNOWLEDGE BASE"

**Abstract**

The aim of this paper is to describe the possibility of using computer software for the searching of table tennis databases. In the field of table tennis science there is lack of information. Due to the problems of finding relevant information for the PhD students in Slovenia, we have developed the software for searching information about different table tennis issues. At the present time data base includes more than 350 hits.

With the program TT Literature, table tennis scientist, coaches, PE students and others can regularly follow the published table tennis and table tennis research work all over the world.

**Key words:** *table tennis, computer, knowledge base*



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# INFLUENCE OF GLUE ON BALL SPEED

## Abstract

Increasing ball speed is a great concern for table tennis players. For increasing the ball speed, manufacturers have been making various efforts to make sponge rubber more elastic. The elasticity of rubber depends not only on the materials of rubber itself, but also on how to bond the rubber with the blade which is usually made of wood or plywood.

It is well known that organic solvent contained in some glue makes sponge rubber swell because solvent volatilizes in the sponge for a few hours after bonding. As a result, sponge rubber becomes more elastic.

This kind of glue is called "speed glue". Unfortunately, such organic solvent is toxic more or less in general. Therefore, the influence of organic solvent on players' health has been a big issue in the table tennis world. At last ITTF BOD decided in 2004 that the speed glue with organic solvent should be prohibited from September 1, 2007. As a preliminary step, even a bonding action in the stadium or in a place adjacent to the stadium will be prohibited from September 1, 2006.

Responding to these decisions, some Japanese manufacturers have developed aqueous glue without using organic solvent. Some of the aqueous glue are already sold in shops. The aqueous glue developed so far does not have any swelling effect on sponge rubber.

Under the circumstances mentioned above, player and coaches are anxious about the influence of glue regulation on play. JTTA SMSC (JTTA Sports and Medical Science Committee) has organized a project team in June, 2005. The aim of the project is to clarify the influence of glue on ball speed. Particular interest is comparison between speed glue and aqueous glue. The present report describes what the project teams of JTTA SMSC have conducted in the past year.

***Key words:*** *table tennis, glue, organic solvent, aqueous glue, ball speed*

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# MODEL OF SPORT MOTIVATION

## Abstract

Motivation for sport activities has become very popular area in the field of sport psychology. Researchers are trying to find the basic determinants of motivation for physical activities. Some very interesting problems have occurred since they did not separate the phenomena of level of involvement in sport quite exactly. Some of the researchers have researched top sports, others college sports or other forms of fitness and recreation activities. Their approaches are mostly also very partial and just directed in investigating localised problems. But the motivation is very wide. We are trying to see motivation as very complex phenomena, which must be researched freely with all its correlating variables.

Motivation variables of elite Slovenian athletes and young Slovenian athletes (age 12-14) in 9 different sport disciplines have been obtained, among them also table tennis. Motivation included achievement motivation, incentive motivation, participation motivation, goal orientations, satisfaction and enjoyment in sport, self-efficacy, effort and ability attributions etc. The most popular framework for motivation in sport at the moment is social cognitive perspective. The aim of this study was to form a dynamic interactive model of sport motivation. We tried to upgrade different models of motivation to one unique model, which would explain all possible behaviours and motivation in sport situation.

Success in competitive sports depends mostly on athlete's skills, personality and motivation. Motivation became very popular lately in the last two decades and many of researches were conducted to investigate determinants of motivation. The presence of "zeitgeist" social cognitive perspective in psychology has changed the view on motivation for sport. On the base of these results we established the model of motivation, which helped us to improve motivation.

**Key words**: *table tennis, motivation*

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# EATING HABITS OF 14 YEAR-OLD MALE AND FEMALE FREE TIME TABLE TENNIS PLAYERS

## Abstract

The aim of this study is to analyse eating habits of 14 year-old male and female free time table tennis players. A questionnaire including 22 variables has been used to question 80 9th grade boys and girls from a primary school in Slovenia.

We have established that on average boys and girls alike have a normal body weight and that they are in most cases (68%) happy with their bodies. 14 year-old pupils practice a healthy way of eating – the majority (92%) has three to five meals a day and they mostly eat at home. They go to McDonald's rarely – more than half of the pupils visit McDonald's less than once a month. 3% of 14 year-old pupil's smoke and 64% of them don't drink alcohol.

We are of the opinion that sport is a tool for developing motor abilities in young people and maintaining one's health. In addition, sport helps young people to be protected from various addictions, indifference, and bad influences of the street life, modern trends and to develop a positive self.

**Key words**: *youth, sport, free time table tennis players, eating habits*

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# AN EMPIRICAL STUDY FOR ATHLETIC PSYCHOLOGICAL SKILLS OF HANDICAPPED TABLE TENNIS PLAYERS IN TAIWAN

**Abstract**

The study was purported to examine the "athletic psychological skills" of handicapped table tennis players in Taiwan. The results might offer useful information for coaches, table tennis players, and promoting agents in terms of preparing training programs, consolidating players' confidence, promoting mental ability, improving performance and providing suggestions for competition strategies. A "Mental Skill Scale for Handicapped Table Tennis Players" was used in the research. Those subjects were handicapped table tennis players who randomly selected from various universities in Taiwan. The major findings from analyzing the answered questionnaire can be summarized as the followings:

1. The dimensions of athletic psychological skills under the investigation were "Confidence", "Teachability", "Motivation", "Peak under pressure", and "Concentration". The results showed "Confidence" owned the highest scores, meanwhile, "Teachability", "Motivation" and "Peak under pressure" followed by order and "Concentration "got the lowest scores.
2. There were significant differences in "Peak under pressure" and "Teachability" between the subjects who have diverse accomplishment. Those non-national level players performed better in "Peak under pressure" than national level players, however, the performance on "Teachability" yielded the opposite results.

**Key words:** *athletic psychological skills, table tennis, collegiate table tennis players*

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# ON THE ANALYSIS OF BACKHAND ATTACKING TACTICS OF WORLD FAMOUS MALE SHAKEHANDS GRIP PLAYERS

**Abstract**

In recent years, the ITTF has refined the table tennis game regulations three times in succession, including that the ball should be 40 millimetre in diameter, a game shall be won by the player or pair first scoring 11 points and the ball shall not be hidden from the receiver by the server or his doubles partner or by anything they wear or carry. These new regulations not only helps to speed up the tempo and add intensity to confrontations, but also brings new reformation trends, which still favour the trends of being active, having outstanding speciality, all-round skills, and no obvious leak. Shakehands grip attacking play is maturing and governing today, and the backhand attacking tactics is crucial to the combat of the first three bats, to the switches of attack and defence and to the final victory. So shakehands grip attacking play must be kept up with the new developments in tactics and skills.

Through the analysis and statistics of the backhand attacking play of world famous male shakehands grip players, this paper aims to summarize some of the common and disciplinary issues and investigate the ongoing trends of shakehands grip backhand attacking tactics, and supply reference for the further developments in China. Methods applied are the methods of literature review, video, statistics, segmental index evaluation, percentage analysis, single attack analysis and logic analysis.

Conclusions are listed as the follows.

1. Shakehands grip attacking play, represented by players like Wang Liqin, Timo Boll, Vladimir Samsonov, Chen Qi and Kalinikos Kreanga, has a variety of performances and features and problems as well. The common problems are that in the first 4 backhand bats, they are very fierce, but the number of direct scores is not satisfactory, leading the strikes into the deadlock combat state; the tactics combination most commonly applied is that firstly change the track of the ball with backhand and then follow successive forehand attacks.
2. Wang Liqin's switch of forehand and backhand play, Boll's backhand tearing and backhand topspin and Kreanga's backhand bursting forth at middle and back court and backhand pulling have added vigour to the development of backhand shakehands grip attacking play, with the innovations and skills referred making the tactics more successful.
3. Today's table tennis game has become an all-sided confrontation; with attacks can be forehand and backhand, from back court, middle court and short court. Backhand attacking play helps a full court attack and an all-sided tactics.
4. Under the new regulations and new game system, Chinese shakehands grip players should strengthen the trainings on backhand attacking play abilities. Only on the basis of keep the advantage of forehand attacking play abilities, can these trainings help us to get ahead of our competitors.

**Key words:** *shakehands grip; backhand attacking play; service combat state; receiving combat state; deadlock combat state.*

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# A STUDY INTO THE EFFECT OF TABLE TENNIS EXERCISE ON FITNESS OF THE ELDER MAN

## Abstract

**Purpose:** There are more and more elder people in Shanghai China nowadays. So it is very important for us to improve their healthiness and life quality. we measured the physical fitness of the elder man who has taken long-time regularly table tennis exercises and the others who have not taken any physical exercise, in order to discover whether the characteristic of physical fitness has been changed among them.
**Subject:** In this cross-section study, 61 elder men were collected for testing. Their age was between 60 and 69 years old. As the experiment group, 30 of them had taken regular Table tennis exercise at least 2 times each week and at least 1 hour per time for more than 3 years, and they have not other P.E hobbies. The other 31 who had not taken any regular physical activity formed the control group. People in these two groups had no statistical differences in height and weight.
**Methods:** The applied parameters include: height, weight, waistline, hipline and some other corresponding derivative parameters, such as BMI, WHR and %BF, for a comparatively all-round describing of the elder men's physical formation and the state of their of their physical compositions. Furthermore, blood pressure in quiet state, heart rate in quite state for testing cardiovascular functions and state of their development and change. The power of gripping for measuring strength competence; response time, bending forward while sitting, standing on one foot with one's eyes shut, for appraising their competence in speed, flexility and equilibrium.
**Result and suggestion:**
1. BMI, WHR and waistline of experiment group are significantly less than that of the comparison group ($p<0.05$).But there were no significant differences in %BF and hipline ($p>0.05$). So we suppose regular Table tennis exercise contributes to the reduction of the elder men's fat, the improvement of the proportion of their composition.
2. SBP of experiment group are significantly less than that of the comparison group ($p<0.05$), while no significant difference ($p>0.05$) in DBP and heart rate. We consider maybe ligament can strengthen the elder men's cardiovascular function.
3.Power of gripping of experiment group are significantly better than that of the comparison group ($p<0.01$), as well as response time and one foot standing along with closing eyes. We consider maybe regular table tennis exercise is helpful to improve the elder men's competences in strength, balance and response.
4. Bending forward while sitting was no change by comparing with each other ($p>0.05$). Maybe regular table tennis exercise does not effect the elder men's flexility. So we suggest elder men should do extra extending exercises to soften the muscle, joints and ligaments on their body trunk
5. Table tennis is a Safe and middle-intensity sport. In order to postpone the function declining with age, it is suggested that the elder man should take regular Table tennis exercise.

**Key words:** *table tennis, the effect of exercise, fitness, elder man, Shanghai China*

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# EFFECTS OF TABLE TENNIS EXERCISE ON PARTIAL PHYSICAL FITNESS RATIOS OF MIDDLE-AGED MALE IN SHANGHAI

**Abstract**

There are many relevant statements as to middle-aged people keeping health by the way of playing table tennis, however, few relevant research has ever been conducted from the angle of statistic by now.

The thesis used the investigation, conducting a test of partial physical fitness ratios on 29 males aged between 40 and 59 from shanghai who has played table tennis over a long period.

Meanwhile, as a comparison group, some same-aged males (N=38) who seldom do exercises or do exercises for a short period also took the physical fitness tests. Furthermore, analysis and researches have been done with the method of comparison. The main conclusions are as follows:

(1) Long term table tennis exercises can help to build good shape, lower numerical values of cardiovascular system disease causing factors such as BMI, BF ration and so on.

(2) Long term table tennis exercises can obviously shorten response time, enhance the strength of ventral muscles and explosive force of legs, and have certain function on the improvement of equilibrium and pliable and tough quality of their bodies.

(3) Long term table tennis exercises can obviously enhance the strength of the muscles of the arms which hold the bat, but the strength of the arms which don't hold the bat is not be improved obviously.

(4) Table tennis exercise is an effective and safe method to keep health for middle-aged males.

**Key Words:** *table tennis, effects of exercise, physical fitness, middle-aged male, Shanghai China*

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# THE RESEARCH FOR THE LEISURE FUNCTION OF TABLE TENNIS EXERCISE

## Abstract

The degree in use of free-time and the fashion in use of free-time are the new measures to scale the people's quality of life. How to use the free-time is a question which needs to be solved at once so as to accelerate the development of humans and speed of building a harmonious society.

Most researches about the table tennis exercise focus on the aspects of the technique, the function of the healthy. However, the researches on mood and socialization about the table tennis exercise are neglected.

We use "The Profile of Mood States (POMS)", designed by McNair from USA, and make a survey among 525 Shanghailander which are divided into two groups, table tennis fans and normal citizens occasionally join sport exercises. The data of the survey were processed by the software of SPSS11.0.

The leisure function of table tennis from our research is embodied in the aspects as below:

1) Table tennis is an activity which has a lot of joys can effectively improve the rest and recovery of the body and mood.

2) Participants can overcome their negative emotion; obtain favourable impression in playing table tennis, which can improve people's mood of self-esteem and promote mental health.

3) Table tennis exercises can help to improve and form some characteristics which are essential to healthy and comprehensive development of individuals. Table tennis exercises can help to develop self-realization, to form good self-image and enhance creativity.

4) Table tennis can improve human relationship and help people to be adaptable, confident and positive.

**Key words:** *table tennis, exercise, leisure function*

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# EFFECTS OF THE TRAINING LOAD ON THE EFFICIENCY OF TABLE TENNIS PLAYERS DURING A HITTING TASK IN TABLE TENNIS

**Abstract**

*Introduction*
When we look at the very top level of tennis table players, it appears that a high level of training –in quantity and in quality- is a necessary condition. The training load seems to be one of the factors conditioning the gain in players' performance.
The objective of this study is to show that the increase in players' efficiency depend on the quantity of specific training. Efficiency is defined as the relation between the performance level and the movement economy (indirectly indicated by the heart rate frequency and the perception of the effort, Borg et al., 1985).

*Method*
14 young table tennis players (± 13 years) were volunteered to participate to the study. They were divided in two groups according with the training load: group 1 which followed 5 sessions of 2 hours during the working week and group 2 which have 2 sessions of 1.30h during the working week.
The task consisted in a series of continuous forehand drives as precise to attain a target (a circle of 21 cm of diameter) placed in the opponent half-table and as fast to pass a barrier placed at 2.50 m from the table. Balls were sent by a trainer at a frequency of 72 balls.mn$^{-1}$ during 3 min. Participants had to execute the task in 2 experimental conditions: (i) without displacements (T1), or (ii) with a predictable displacement (T2). These 2 conditions have been tested before (pre-test) and after (post-test) a training period of 3 months.
Performance, heart rate, and effort perception (Borg, 1985) were recorded during exercises execution.

*Results – Discussion*
We observed a more important increase in the performance for the higher training load ($P > 0.01$). However, and surprisingly, we did not observe such a marked effect for the HR and the perception of the effort ($p<0.05$). We can interpret these results in the two following ways: (1) the specific training has only allowed an increase in the performance, considered as movement organisation, without any physiological repercussion, or (2) the methodology used in this study does not allow to really analyzing the energetical implication.
The second interpretation seems more interesting. Multiplication of the articles, seminars, conferences, or other works testified the essential need for trainers to deal with the physical preparation factor. However, we need to enlarge our knowledge on the relation between energy expenditure and motor organisation in table tennis.

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**Key words:** *table tennis, practice level, efficiency*

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# THE TABLE TENNIS CURRICULUM SELECTS ELECTIVE COURSES - THE RESEARCH OF CONSIDERATION

## Abstract

The main objective of this research is to investigate the consideration factors that affect undergraduates to take the table tennis courses. The research objects are 299 students taking the table tennis courses in National Chiao-Tung University (NCTU) and Ta Hwa Institute of Technology (THIT). We used statistic analysis, item analysis, factor analysis, t test, and ANOVA to analyze the acquired data. According to the analysis result, we found that there are three consideration factors, which affect students to take the table tennis courses, including personal feeling, environmental equipments and fashion, and experience and convenience. The consideration factors, which affect students to decide what courses to take, rank as personal feeing, environmental equipment and fashion, and experience and convenience. Those three factors show more obviousness in students in THIT than students in NCTU. The factors, Environmental equipment and fashion, shows more obviousness in male students than in female students. The factor, Personal Feeling, shows more obviousness in students who have families who are table tennis enthusiast than in students who don't have. The two factors, Environmental equipment and fashion and Personal feeling, shows more obviousness in students who have friends who are table tennis enthusiast than in students who don't have. The factor, Environmental equipment and fashion, shows more obviousness in students who live in the rented house outside school than in students who live in school dormitory. To combine all above, we can know that Personal feeling and environmental equipment and fashion are main factors which affect parts of students to select courses. Consideration factors which affect students to choose courses are also affected by intimate related people, friends, and personal background. Hope that this analysis result can provide other teachers in school as a reference to proceed with their research.

**Key words:** *table-tennis courses, Confirmatory factor analysis*

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# THE TABLE TENNIS CURRICULUM GETS INVOLVED THE RESEARCH OF DEGREE

## Abstract

A research on the degree of involvement (DI) in table-tennis courses among college students is investigated in this work. Total 299 students in Ta Hwa Institute of Technology (THIT) and National Chiao-Tung University (NCTU) are explored as the sample population. The confidence and efficiency of collected data are confirmed first according to the item analysis and confirmatory factor analysis. Afterward, the description-statistics, t-testing, and one-way analysis of variance (ANOVA) are further applied for data analysis. By the statistics, it is found that the students in THIT have much higher DI than those in NCTU. Moreover, male students, people with table-tennis lovers in family or in their friends, and those living at home or renting houses have obviously higher DI than the female ones, those without table-tennis lovers, and those living in the campus, respectively. As a result, it is concluded that the students, belonging to the classification of THIT, male, people with table-tennis lovers in family / in their friends or living at home / renting houses outside campuses, possess higher DI. This statistics result is expected to be the reference for school instructors or any further researches.

**Key words:** *table-tennis courses, Confirmatory factor analysis*

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# INQUIRY INTO THE COLLEGE TABLE TENNIS ATHLETES' COMPETITIVE BURNOUT AND CONFIDENCE

## Abstract

What I wish to show in this paper were: 1. to compare the differences of competitive burnout and confidence of college table tennis athletes with different demographic variables, and 2. to explore the relationship of college table tennis athletes' competitive burnout and confidence. One hundred and fourteen college table tennis athletes (male 63, female 51) were recruited and administered the Competitive Burnout Inventory and the Inventory of Confidence. The material in this paper was analyzed by independent t-test, independent one-way ANOVA, and Pearson product-moment correlation. The following results were obtained: 1. Male athletes had higher scores of "devaluation by coach and teammates", and "confidence" than those of female athletes. 2. National level athletes had higher scores of "psychological withdrawal" than those of national-game level athletes. 3. The athletes who practiced 6-7 days a week had higher scores of "devaluation by coach and teammates" than those of the athletes who practiced 4-5 days a week. 4. There were positive correlations between "confidence" and "the perception of personal sport performance" of competitive burnout, while there were negative correlations between "self-confidence" with "emotional and physical exhaustion" and "negative self concept of sport ability".

**Key words:** *college table tennis athletes, competitive burnout, confidence*

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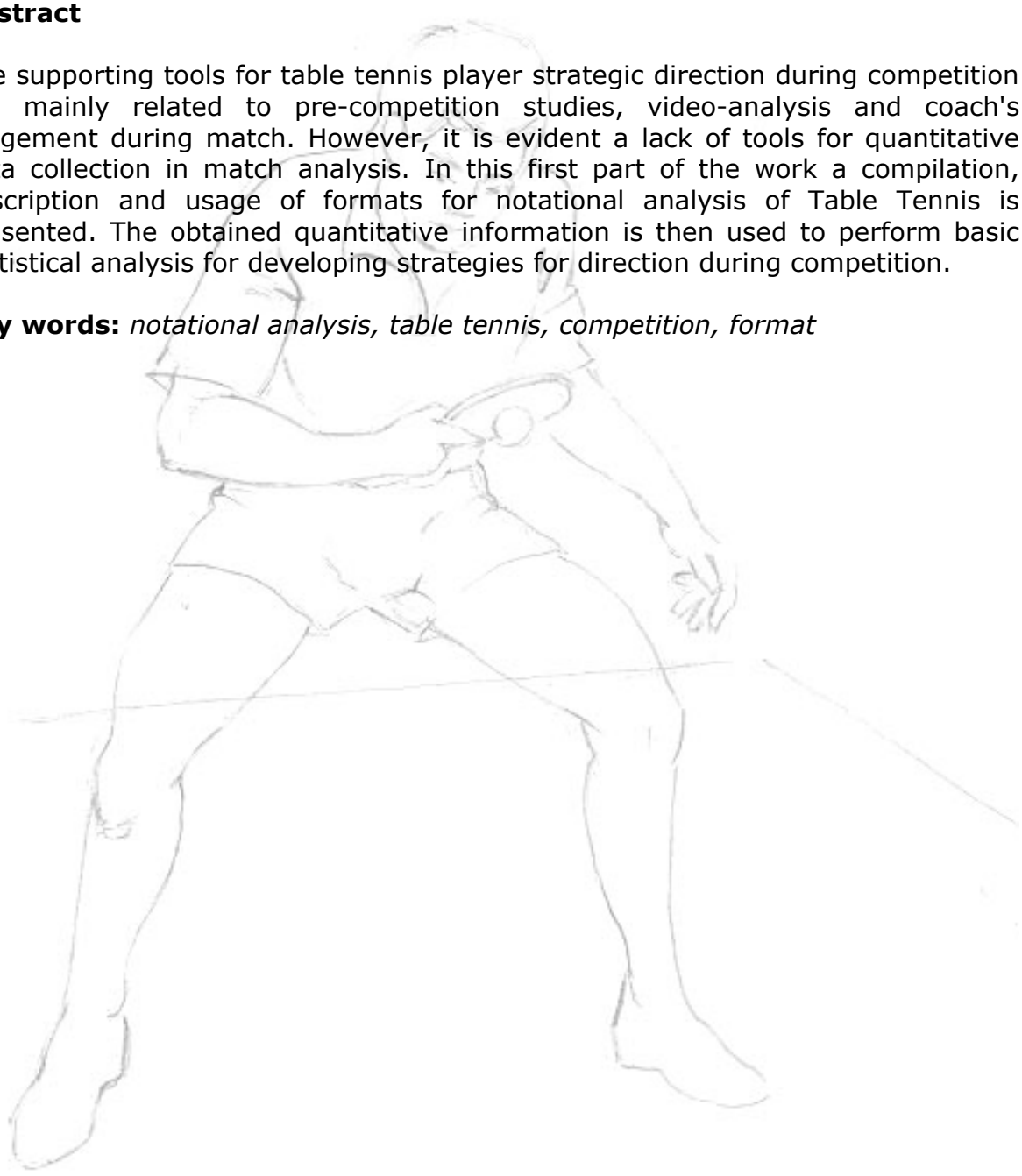
# NOTATIONAL ANALYSIS FOR COMPETITION IN TABLE TENNIS (PART I): BASED FORMAT ANALYSIS

**Abstract**

The supporting tools for table tennis player strategic direction during competition are mainly related to pre-competition studies, video-analysis and coach's judgement during match. However, it is evident a lack of tools for quantitative data collection in match analysis. In this first part of the work a compilation, description and usage of formats for notational analysis of Table Tennis is presented. The obtained quantitative information is then used to perform basic statistical analysis for developing strategies for direction during competition.

**Key words:** *notational analysis, table tennis, competition, format*



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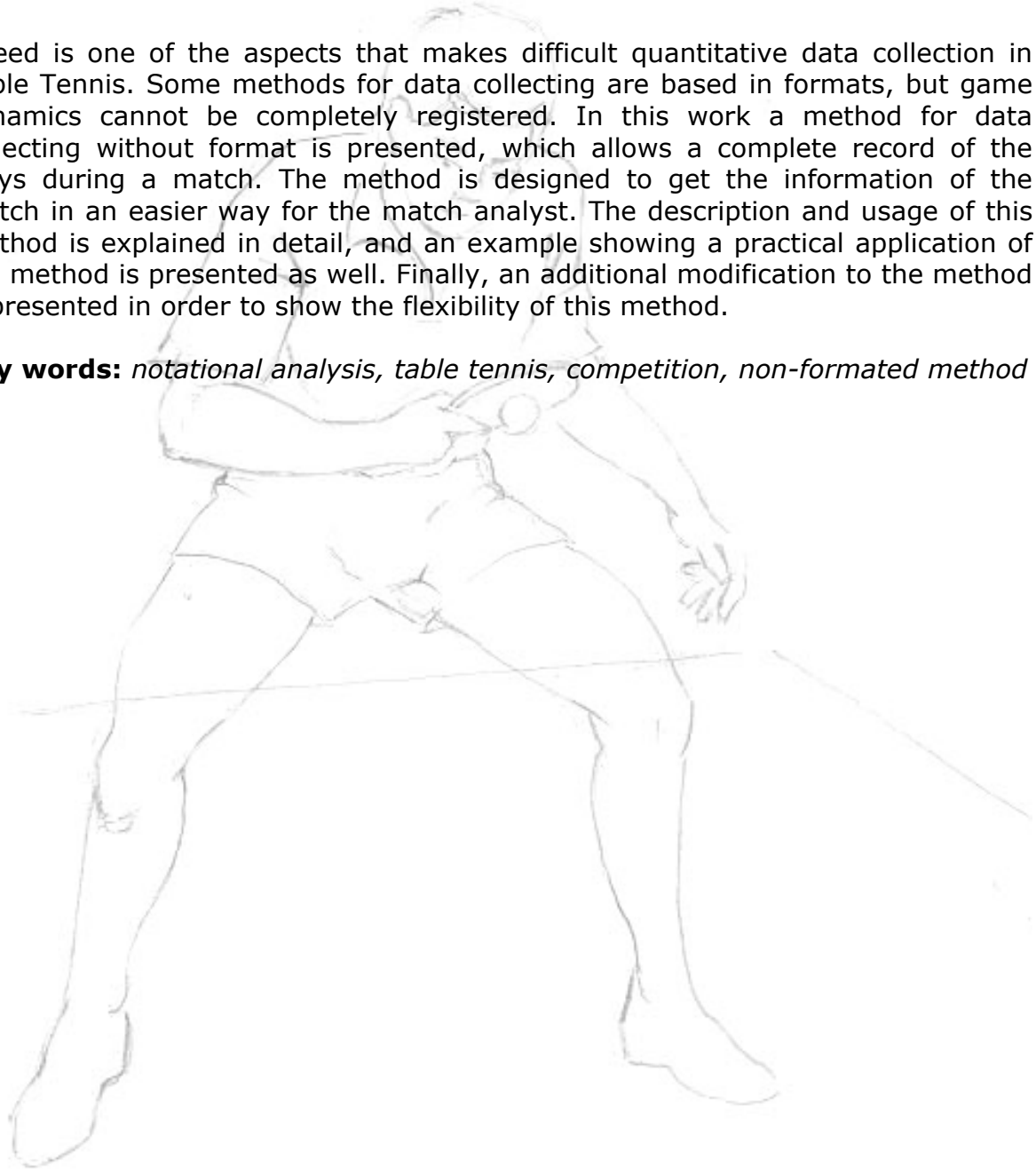
# NOTATIONAL ANALYSIS FOR COMPETITION IN TABLE TENNIS (PART II): NON FORMAT METHOD

**Abstract**

Speed is one of the aspects that makes difficult quantitative data collection in Table Tennis. Some methods for data collecting are based in formats, but game dynamics cannot be completely registered. In this work a method for data collecting without format is presented, which allows a complete record of the plays during a match. The method is designed to get the information of the match in an easier way for the match analyst. The description and usage of this method is explained in detail, and an example showing a practical application of the method is presented as well. Finally, an additional modification to the method is presented in order to show the flexibility of this method.

**Key words:** *notational analysis, table tennis, competition, non-formated method*



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# MERGING RECEIVE INTO AN ORGANIC WHOLE FROM "SMALL BALL" TO "BIG BALL"

## Abstract

May 1st 2006, when March of the Volunteers was played in the AWD-HOME gymnasium of Germany again marked Chinese men's team has wined the Swaythling Cup for three times from 2001 Osaka WTTC to current session of WTTC since the ITTF changed the "Big Ball" in 2000. It is not only opportunity but also a challenge to reform the regulations. Only the way out for Chinese team lies in innovation, "merging receive into an organic whole" emerges as the times require. Through contrasting the technique and tactics of China VS Sweden Men's team in the 40th and the second stage of the current session of the WTTC and counting up and analyzing the technique and tactics of Men's team in the second stage of current session of the WTTC. It is considered that "merging receive into an organic whole" is one of key factors of Chinese team's victory and one of the important innovations.

**Key words:** *table tennis, merging receive into an organic whole, innovation*

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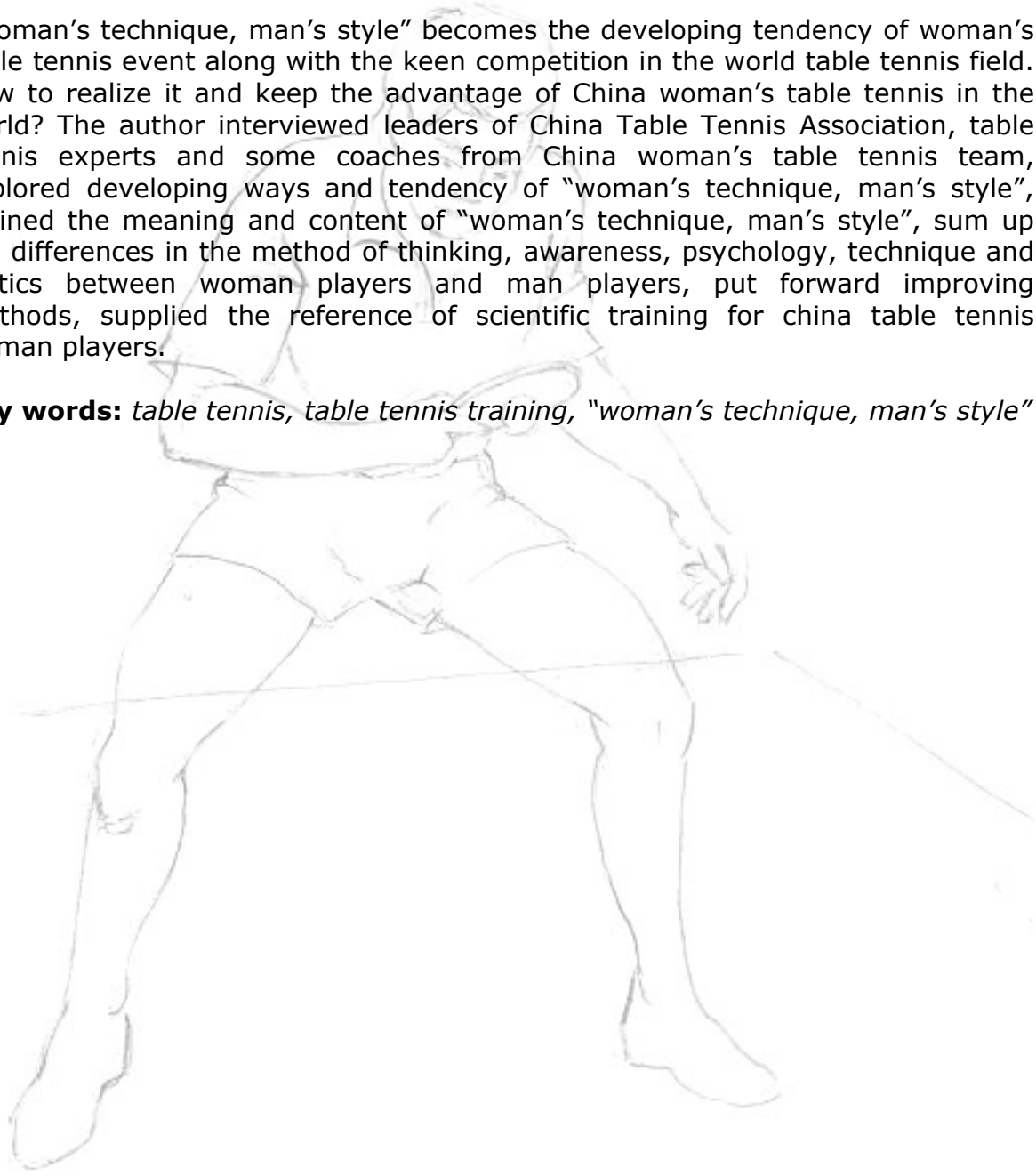
# EXPLORING "WOMAN'S TECHNIQUE, MAN'S STYLE" FROM THE THEORIES OF SPORT TRAINING

## Abstract

"Woman's technique, man's style" becomes the developing tendency of woman's table tennis event along with the keen competition in the world table tennis field. How to realize it and keep the advantage of China woman's table tennis in the world? The author interviewed leaders of China Table Tennis Association, table tennis experts and some coaches from China woman's table tennis team, explored developing ways and tendency of "woman's technique, man's style", defined the meaning and content of "woman's technique, man's style", sum up the differences in the method of thinking, awareness, psychology, technique and tactics between woman players and man players, put forward improving methods, supplied the reference of scientific training for china table tennis woman players.

**Key words:** *table tennis, table tennis training, "woman's technique, man's style"*



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# THE TRAINING OF RESERVE FORCES FOR CHINA TABLE TENNIS WOMAN PLAYERS

## Abstract

Because of the change of table tennis match method in 2008 Beijing Olympic Games, the training concept will be renewed. How to adapt the laws change, to keep table tennis continuing development become the crucial question before the leaders of China Table Tennis Association and china table tennis team. According to the policy of "developing all kinds of playing style, taking our way as the dominant factor, learning from others, taking our own road", the author questionnaired 60 coaches and 1022 players from national and provincial table tennis teams, researched the type of playing style and training situation of provincial table tennis woman players, found out the problems of reserve forces of china table tennis woman players, put forward rationalization proposals of continuing development, supplied reference for the leaders of China Table Tennis Association to make strategic decision and for the coaches to practise.

**Key words:** *table tennis, sport training, training method, teen-agers*

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# EXPERIMENTAL STUDY ON NEW TRAINING MODEL OF TABLE TENNIS

## Abstract

As the 2008 Beijing Olympic Games comes near and the laws reform of table tennis is gradually adapted, the coach group of the national younger woman's team reformed 6 training methods on the basis of deep study on factors of competitive ability for excellent teen-ager table tennis players and on developing tendency of table tennis as well as training concept. During the period of assembly training from October 2005 to November 2006 in Huangshi city Hubei province, we made an experimental study to 28 younger woman table tennis players. The results showed that these reformed training methods accorded with factors of competitive ability for younger woman table tennis players and accorded with the developing tendency of table tennis event as well as training concept. It can effectively improve younger woman table tennis players' competitive ability. It can meet the demand of "woman' technique, man' style", so that it can train the reserve force better for national team.

**Key words:** *table tennis, training, training method, teen-ager*

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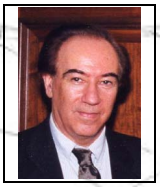
| 5 | **Baron, Ramon** |  | ramon.baron@univie.ac.at | University of Vienna, Faculty of Sport Science | AUT | |
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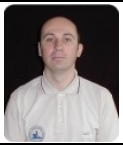
| 57 | **Kasović, Mario** |  | mario.kasovic@kif.hr | University of Zagreb, Faculty of Kinesiology | CRO | |
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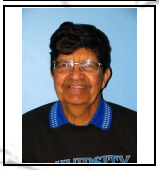
| 75 | **Madhosingh, Chandra** |  | chandram@interchange.ubc.ca | University of British Columbia | CAN | |
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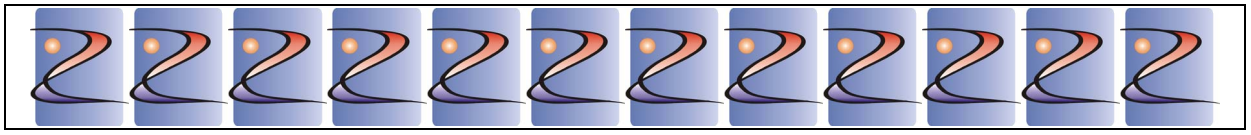

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