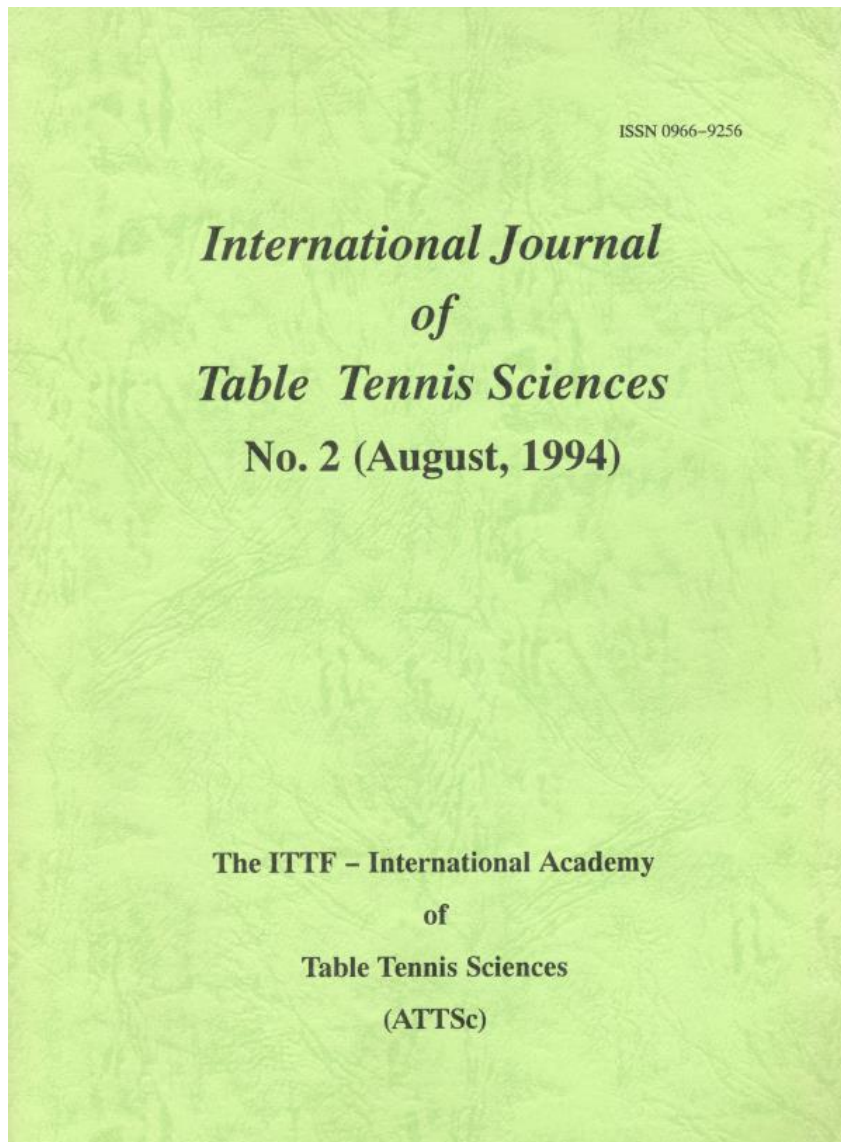


BOOK OF ABSTRACTS – 1993

NOTICE!

In front of the 3rd ITTF Sports Science Congress Book of abstracts was not published but it was included in second issue of the International Journal of Table Tennis Sciences



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Summary of Addresses of the 3rd ITTF Sports Science Congress

(Falkenberg, Sweden, 7-10 May, 1993)

- (1) TITLE: **Elaboration of a software for the simulation and drawing of ball trajectories. Application to a comparative study of starting conditions and curved tracks according to different forms of playing table tennis.**

NAME: DUREY, Alain (France) & SEYDEL, Roland (Germany)

Interactive PC software for calculating and trajectories of balls was developed based on prior modeling of trajectories (SEYDEL) and rebound of balls (DUREY). The software uses the windows environment in order to facilitate interactivity.

It was designed to be used without specialist knowledge of physics and computers, and to specially appeal to professional table tennis players and coaches. The software possibilities enable the handling of specific parameters that allow the conditions to perform different strokes in 3D and their context,

One can also modify the speed of the ball in intensity and direction, the spin of the ball in intensity and direction and the starting point of the ball. One can also define other possible rules concerning the ball and the net (dimension, weight, etc...).

These possibilities enable one to simulate the new conditions of the game and to evaluate them. With regard to a predefined objective, for instance the slowing down of the game, one can try different solutions such as enlarging the ball, increasing the height of the net, etc.

- (2) TITLE: **Impact between tt-ball and tt-bat (offensive equipment).**

NAME: TIEFENBACHER, Konrad (Germany) & DUREY, Alain (France)

The work here in Cachan has always been near to the sport so that now it's possible to answer many of the current questions concerning the impact.

The present impact model was designed near to the experimentation. This model includes two parameters (EPar and TPar) to characterize the different types of equipment. EPar signifies the "speed" of the bat in the normal direction and TPar the "speed" of the bat in the tangential direction and the ability to produce "spin".

A first plan for the report:

In brackets enclosed: aspects for which experimental results will be given.

Impact model, experimental results and results of simulation

The change of frame of reference

Dividing into components

Normal component

Wood (stiffness, fixation)

Covering (in comparison to the case of non-covering: thickness of sponge: speed glue)

Ball

Tangential component

Wood

Covering (Type: quality: stickiness: speed glue: thickness of sponge)

Simulation and its results

Various aspects

Speed glue (Types: dilatation of the sponge: covering wearing)

Bouncing method

The result of the fact that the tt-ball is not an ideal ball

Contact times

- (3) **TITLE:** **Modelisation of the regulations space time during the development of a stroke.**

NAME: RAMANANTSOA, Marie-Marin (France) & DUREY, Alain (France)

- (4) **TITLE:** **Functional model of table tennis play for the diagnosis, the prognostic and the remedying.**

NAME: ORFEUIL, Francois (France) & DUREY, Alain (France)

- (5) **TITLE:** **Three dimensional analysis of racket movement during service.**

NAME: HIRUTA, Shuichi, FURUKAWA, Kazunori, SHIMAOKA, Midori YOSHIDA, Kazuto, IIMOTO, Yuji, TAKEUCHI, Toshiko, SUZUYAMA, Ken'ichiro, YUZA, Nobuo (Japan)

Key words: *Three dimensional analysis, Racket movement, Service*

Racket movement during service was investigated. An electromagnetic motion sensor was used to record Cartesian coordinates (X,Y,Z) and orientation angles (azimuth, elevation, roll) of center of racket during two different services ('under spin' and 'knuckle') with similar form on four table tennis players (two male and two female). Mean horizontal distance of center of racket from the table edge for under spin service is 6 cm longer than that for knuckle service at the time of ball impact. Mean angle of elevation of racket at the time of ball impact for under spin service is 19 degrees wider than that for knuckle service. The results of this analysis provide useful information for the objective evaluation of racket manipulation during service.

- (6) **TITLE:** **Biomechanical analysis of table tennis players using cinematographic technique.**

NAME: AL-KURDI, Z. D. (Jordan)

Biomechanical analysis of any sporting events help to assess the players to modify technique with the object of improving performance. The purpose of this study is to examine the nine learning technical point for fore-hand stroke using cine camera. The nine technical points are stance, Table position, length of stroke, timing, Body position, bat arm, free arm, Recovery, Anticipation. Eight male and two female players, from five different countries participated in the Arab-world Table-tennis Championship which was held on April 1992 took part in the study. The results and finding in this work showed wide variations in the parameters considered i.e. different length of stroke, stance, body position etc.... was reported. ... Recommendations were made for further study.

- (7-1) **TITLE:** **The ping-pong ball path with allowance for air influence.**

NAME: LOKHOV, Y. & REZNIKOV, A. (Russia)

As well known in the space without air the only force acts to the flying body (ping-pong ball for example): this is the gravity force. In this case the perpendicular to gravity force velocity part remains constant all flight time, and the ball lies in the plane made by velocity and gravity vectors (falling plane), i.e. the ball has no shift in lateral direction.

In reality (in the presence of air) two adding to gravity forces act to the ball: these are the resistance and Magnus ones. The resistance force acts in a reverse direction from the ball velocity and its magnitude for velocity V being approximately more than 6 m/s (rather quick ball moving) is

$$F_r = \pi \cdot \rho \cdot V^2 \cdot R^2,$$

where $\rho = 1.3 \text{ kg/m}^3$ - air density, R - the ball radius (see the previous article of the same authors).

The Magnus force exists if the angular velocity ω doesn't equal zero and acts in perpendicular direction to rotation axis and velocity vector. Its magnitude is

$$F_m = 2 \cdot \pi \cdot \rho \cdot R^3 \cdot [V \times \omega],$$

i.e. in the general case the ball moves in lateral direction and falling plane turns provided that the angular velocity has the vertical component.

In this article for simplicity authors considerate low ball path case only in which the vertical velocity part less than horizontal one and assume that angular velocity directs perpendicularly to falling plane (it is horizontal), i.e. the Magnus force acts in down direction and hasn't lateral component and results in abrupt ball falling. The results of the calculations are following.

The ball moving equations are:

$$X = \tau_r \cdot X_0 \cdot \ln(1 + \tau_r) + X_0$$

$$? \dots \dots \dots g/2 \cdot \ln(1 + \tau_r) \cdot \tau_r^2 + Z_0$$

where M - ball mass, X_0 and Z_0 , X_0 and Z_0 are the initial coordinates and velocities of the ball respectively; $\tau_r = M / (\pi \cdot X_0 \cdot \rho \cdot R^2)$ and $\tau_m = M / (\pi \cdot \rho \cdot R^3 \cdot \omega)$ are two time constants corresponding to resistance and Magnus forces respectively and their ratio is $\tau_m / \tau_r = X_0 / (R \cdot \omega)$. The time constants have the following meaning: the influence of corresponding force (Magnus and resistance in our case) becomes appreciable after the time which approximately equals time constant. For quick ball velocities.....?

(7-2) TITLE: **Ball flight aerodynamics questions.**
NAME: LOKHOV, Y. & REZNIKOV, A. (Russia)

As known the ball flight path is determined by aerodynamics resistance force depending on the forward motion velocity V , the ball angular velocity ω which governs the Magnus force direction, and ball cover deformation (if it occurs) made by hydrodynamics head.

If for time interval $\tau = d/V$, where the ball displacement length equals the ball diameter $d = 4 \text{ cm}$, the ball rotation is negligible (i.e. $\omega \cdot d/V \ll \pi$) the Magnus force is neglected too. In the other case when $\omega \gg \pi V/d$ the ball rotation is the main part which is influenced on ball path.

Let's call the paths, in which for all flight time

$V_{\parallel} \gg V_{\perp}$ (where V_{\parallel} and V_{\perp} are the parallel and perpendicular to table surface velocity components respectively), low paths. For "high" paths $V_{\parallel} \ll V_{\perp}$.

In forward ball motion case the aerodynamics resistance force $F(R)$ depends on Reynolds number ($R = Vd/\nu$, where $\nu = 0.15 \text{ cm}^2/\text{s}$ is the kinematics viscosity). If $R < 1$ (i.e. $V < 1 \text{ cm/s}$) the resistance force,

$F(R) = 2 \cdot \pi \cdot \rho \cdot d \cdot V \cdot \nu = 2 \cdot \pi \cdot \rho \cdot \nu^2 \cdot R$ is linear function of velocity (the "Stocks equation"), $\rho = 1.2 \cdot 10^{-3} \text{ g/cm}^3$ is the air density.

In the case when $V > 1 \text{ cm/s}$ the $F(R)$ magnitude is determined by laminar band layer on ball surface

and $F(R) = 2 \cdot \pi \cdot \rho \cdot v^2 \cdot R^{1.5} \sim V^{1.5}$. The relation $F(R) \sim V^{1.5}$ holds true in the R number range $1 < R < 5 \cdot 10^3$ (i.e. $1 < V < 200$ cm/s).

The further speeding up ($V > 200$ cm/s) results in instability of laminar band layer and its turbulization. In this case only rear side of band layer is created turbulence. So, the ball surface may be divided on two parts: on ball front the band layer is laminar and on rear side it is turbulence. If the R increases then the dividing surface moves in front ball part direction. This mixed $F(R)$ relation realizes in the range $5 \cdot 10^3 < R < 2 \cdot 10^4$. In the turbulence band layer $F(R)$ is proportional approximately to V^2 .

The aerodynamics resistance force equation of transient velocity regime may be written in the form:

$$F(R) = 2 \cdot \pi \cdot \rho \cdot v^2 \cdot R^{1.5} \cdot \exp(-(R-R^*)/R^*) + \pi \cdot \rho \cdot v^2 \cdot R^2/4 \cdot (1 - \exp(-(R-R^*)/R^*)), \text{ where } R^* = 5 \cdot 10^3.$$

This relation is right for the following velocity range:

$$2 \text{ m/s} < V < 8 \text{ m/s}.$$

For $8 \text{ m/s} < V < 80 \text{ m/s}$ the resistance force $F(R) = \pi \cdot \rho \cdot v^2 \cdot R^2/4 \sim V^2$.

The further V speeding up results in turbulence band layer separation out of ball surface, after that the resistance force drops ("the resistance crisis").

The ball rotation with the ω angular velocity results in band layers' asymmetry: the sum air flow velocity of band layer $V_r = V + \omega \cdot d/2$ on the side where the ball surface linear velocity of rotation is coincide with the V , and $V_r = V - \omega \cdot d/2$ on the side where the ball surface velocity of rotation is in a reverse direction from V . This resistance force asymmetry results in anomalous resistance force moment influenced on rotating ball. When the rotation is at a high rate (ω is large) the band layer thickness δ is determined by the ω magnitude only. $\delta \sim (v/\omega)^{0.5}$, V in the previous case must be substituted by $\omega \cdot d/2$.

The asymmetry presence in air flow velocity distribution (addition and subtraction owing to rotation influence) results in adding Magnus force (this relation results from D. Bernoulli's law)

$$F_m = 2 \cdot \pi \cdot \rho \cdot v^3 \cdot [V \times \omega],$$

which acts in perpendicular to motion direction.

With the aid of above relations the ball motion equations with allowance for rotation can be written. With the aid of their solution the ball flight path can be obtained.

(8) TITLE: **A description of a computer model to train professional table tennis players.**

NAME: BARCHUKOVA, G. & LOKHOV, Y. (Russia)

Key words: *Computer model to train, Model of playing, Aerodynamics*

Modeling is used in various situation to find effective solutions for the problems of every day activity. The use a modeling in sport is not new. However, this essay explores new possibilities in modeling. The system must take into account the individual styles expressed by different professionals players.

A model that prepares a player to compete with a known opponent must include the following elements:

- sportsman data base;
- adversary data base;
- model of playing in the table tennis;
- models of aerodynamics of the ball's flight, interaction of the ball with racket and table's surface;
- model of functional and psychological preparation of adversary and player.

The models should be created with the following parameters: temporary and implant conditions of competition activity; extent of actions; technical equipment; effectiveness and stability of technical and

tactical actions; relationship between the speed of the ball successful of the player; rotation of the ball that is caused by a tennis-player; and how the flow of a match affects the stability of the adversary's game. Physical preparation includes the player's movement speed and advantages of different ball speed and tempos of play during a match; psychological preparation includes the indices of effective playing and the activity of psychological preparation with the sportsman's serves and the serves of adversary with different scores including critical scores.

The data base for the player and the adversary allow: 1) to model a strategy and tactic of playing; 2) expose strong and weak features of players; 3) to plan the optimal tactic of playing; 4) to make a prediction for the result of the game and, more important, 5) to get individual recommendations of how to prepare for a specific match.

The designed model on aerodynamics of the ball's flight calculates: 1) the relationship between the force of the air resistance and the value of the translational motion and the direction of the ball's rotation; 2) objective laws of contact between the ball and table's surface and the racket, taking into account the characteristics of types of bases and coverings. Thus, the model allows the sportsman to perfect different types of volleys on a computer and to form individual methods with his functional features. This model allows one to select different bases and coverings.

An important use this system is computer modeling of "decisive balls": beginning of attack, counter-attack, and final play for a point. The modeled playing situation may include a sequential combination of 3-4 plays for a point at the same time.

This model includes principles of preparation for a sportsman and allows one to get necessary recommendation that take into account the individual features of a tennis-player.

- (9) TITLE: **Medical supervision on world champions of table tennis.**
NAME: GUAN, Yan (China)

This paper has made a summary of medical supervision work in the Chinese National Table Tennis Team during 1959-1991 where 71.5 world championships have been awarded, including 35 boys and 31 girls. It has made analysis of the general information of 66 players in the men team, including age, years of sports, height and weight. It also made analysis of and summary of world championships' heart function, lung function, nerve system, urine protein, examination and others. It has further summarized the rehabilitation ways used for years.

- (10) TITLE: **The evaluation of the training intensity and physiological load for adolescent table tennis players.**
NAME: WANG, Xin (China)
Key words: *Training intensity, Physiological load, Heart rate*

The aim of the study is to put forward objective evaluation indexes in fixed quantity for the training intensity and physiological load of adolescent table tennis players so as to improve scientifically the training of table tennis. The method of experiment was used in the study. Heart rate telemeter was used test the subjects of the 24 groups of adolescent Players and more than 1,800 data have been collected. Twenty-four heart diagrams showing high, medium and low intensity of training load have been drawn. According to the analysis of the table of averages numeral value, the load for high training intensity is 27.2 beats/10 seconds, for medium training intensity is 23.8 beats /10 seconds, and for low training intensity is 22 beats/10 seconds. It can be found that high intensity and high heart rate is above 30 beats/ 10 seconds, low intensity and low heart rate is 25-29 beats/10 seconds just in between the high and the low. Physiological load index equals average heart rate/quiet pulse before training intensity load. The average physiological load index of our experiment is 2 for high training intensity load 1.8 for medium training intensity load and 1.5 for low training intensity load. These indexes are basically in conformity with the evaluation table of indexes listed by sports medicine. According to practice, heart rate can be used to evaluate the indexes of training intensity and

physiological load of adolescent table tennis players. Owing to the fact that the indexes of the physiological load are greatly affected by the quiet pulse before training session, measurement must be carried out with accuracy and complete reliability. Training intensity is closely related to the level of table tennis technique and physical fitness, therefore, it must be applied accordance with different individual.

(11) TITLE: **Oxygen consumption during practice and game in table tennis.**

NAME: KASAI, Jun'ichi (Japan), DAL MONTE, Antonio, FACCINI, Pierro & ROSSI, Del (Italy)

Object of this research is to make the cardiorespiratory response during practices and games clear and to obtain the basic information for best method to evaluate of cardiorespiratory function of table tennis player.

We measured oxygen consumption, ventilation, heart rate and blood lactate concentration during practice and game in Table Tennis. At the same time, all plays of Table Tennis are recorded on videotapes. A professional table tennis 3 men players in the top national team of Italian Table tennis Federation are participated in our study. Firstly, maximum oxygen consumption, ventilation and heart rate are detected in treadmill running by telemetry system K2, and blood lactate concentration is analyzed by blood sampling from finger tip. Secondly, some parameters of practice and game of Table Tennis are detected by telemetry system K2, and blood lactate concentration is analyzed by blood sampling from ear. Many ball method is used to all practices. The coach hits the balls 60 times on 1 min. Player hits the balls toward to target point on another court. Practices are 2 regular footwork and random footwork. Each footwork practice includes various strokes (control, topspin and smash). Basic one footwork practice are consist of eight practices and each practice time are 2min and 1min rest for blood sampling. 3 strokes (control, top spin and smash) and moving conditions (0cm, 60cm and 120cm) are combined. Player hits the balls toward to target point of another court by forehand stroke only. Basic footwork 2 practice are consist of 6 practices (control, topspin and smash). Each practice time are 2min and 1min rest. Player hits 4balls in backside position of his court after he hits 4 balls in foreside position. In each position, player hits 2 balls by backhand after he hits 2 balls by forehand. Player is instructed to hit 4 balls by same stroke repeatedly. Random footwork practice are consist of 6 practices (control and topspin), and each practice time are 2min. and 1min. rest. Firstly, coach hits the ball toward to center point on another court (No.1). Secondly, coach hits the ball toward to right or left point of another court randomly (No.2). Coach repeats this movements from NO.1 to 2. Player is instructed to hit the ball toward to target point on another court by forehand if possible he can. 3 players have the single match which are 5 games on 21 point. If either of the two takes 3 games, the match ends at the time. Oxygen consumption, ventilation and heart rate are miniaturized and recorded during the match by telemetry system COCMED K2. Blood sampling is taken immediately after each game ends.

Basic footwork 1 practice: We can see that the value of oxygen consumption, ventilation, heart rate and blood Lactate concentration on all strokes of all subjects become higher as moving distance is extend, especially smash and topsin stroke. Each subject shows the highest value of oxygen consumption in topspin stroke at moving distance of 120cm. Mean value of oxygen consumption of 3 subjects of top spin stroke in moving distance of 120cm is 60.7ml/kg/min. In this case, the mean value of heart rate is 197b/min. We can see that the lowest value of oxygen consumption, ventilation, heart rate and blood lactate concentration of control stroke in less moving distance. In this case, the mean value of oxygen consumption is 40.8ml/kg/min, and heart rate is 145b/min.

Basic footwork 2 practice: We can see that the values of oxygen consumption, ventilation, heart rate and blood lactate concentration on smash and topspin stroke are higher than control stroke. Especially, the mean value of oxygen consumption, ventilation, heart rate and blood lactate concentration of topspin stroke in basic footwork 2 practice is the highest one, those are 106l/min., 55ml/kg/min., 188b/min. and 4.0mmol.

Random footwork practice: We can see that the value of oxygen consumption, ventilation, heart rate and blood lactate concentration on topspin stroke is higher than that of control stroke. The mean value of oxygen consumption, ventilation, heart rate and blood lactate concentration on topspin stroke is 103l/min., 52ml/kg/min., 188b/min. and 3.7mmol respectively. And, the mean value of oxygen consumption, ventilation, heart rate and blood lactate concentration on control stroke is 98l/min., 49ml/kg/min., 180b/min. and 3.4mmol.

5 games match: We can see that the value of oxygen consumption, ventilation, heart rate and blood lactate concentration of games is lower than that of practices without basic footwork 1 control stroke in less moving distance. The mean value of oxygen consumption, ventilation, heart rate and blood lactate concentration during match is 30.7ml/kg/min., 142b/min., and 1.17mmol respectively. Players are playing at lower cardiorespiratory function in games

We find that many ball practice during 2 min. is very hard training for players.

We suggest that player must do many ball practice in various conditions because he will be able to play at lower cardiorespiratory resources in games for raising cardiorespiratory function by many ball practice.

(12) TITLE: **Exercise intensity of table tennis practice and games by heart rate, blood lactate concentration, and RPE.**

NAME: WATANABE, M., KITAHARA, T., SHU, Jian Zheng & Nagata, M. (Japan)

Key words: *Exercise intensity, Heart rate, Lactate, RPE*

In order to clarify the exercise intensity of table tennis practice and games, heart rate (HR), blood lactate concentration (BLa), and rating of perceived exertion (RPE) were measured throughout the program of table tennis which contained 6 different practices, and regular game in Tokyo. Four one-time Chinese national class players(CNCP) and 7 Japanese university class players(JUCP), all male were employed as subjects. All subjects performed maximal exercise test by using bicycle ergometer in the laboratory before table tennis program, and game. Oxygen consumption(O₂) and HR were measured in order to obtain the regressive equation between O₂ and HR. Thus we can assess O₂ during table tennis playing from HR measured above exercise test. As expressed percentage of maximal O₂, the exercise intensity of table tennis practice were 56-73% and 56-78% VO₂max in CNCP and JUCP, respectively. CNCP showed lower exercise intensity in 5 practice of all 6 practice than JUCP. RPE showed higher scale than physiological parameter. Throughout the program of table tennis BLa had no changes in both groups. The superior player in technique showed lower estimated O₂ than inferior. In CNCP the intensity of regular game showed 59-73%VO₂max. The characteristics of table tennis playing is intermittent. Within short interval the player must recover physiologically, psychologically, and tactically if you want to win a game.

(13-1) TITLE: **Injuries and systemic disorders of table tennis players: Results of a survey (the second report).**

NAME: SHIDA, Y., SHIDA, S., SUZUKI, S., MURAKAMI, H., YUZA, N. (Japan)

Key words: *Table tennis, Sport injury, Disease*

<Objectives> While table tennis is currently enjoyed by more than one hundred million people worldwide, few studies have focused on the medical aspects of this popular sport. The present authors conducted a survey to obtain a profile of the injuries and disease prevalent among table tennis players who work for a company. Our previous study about university student players reported at The 2nd ITTF Sports Science Congress.

<Methods> The subjects were 210 table tennis players (111 males, 99 females) who were selected to participate in the Japan League Tournament (1991). Questionnaires consisting of 19 items about

injuries and systematic collected from the players before the closing ceremony. The response rate were 100 persons.

<Results>

1. Injuries were reported by 64.8% of the players, with injuries of the waist (lumbago) (25.1%) and shoulder joint (15.7%), knee joint (14.1%) being the most common.

2. Many of the reported disorders were referable to the specific nature of the practice. After treatment, more than ninety five percent of players had no hindrance in resuming the game.

3. Disease of the internal organs were reported by 16.7% of the subjects, with anemia (37.1%) and gastritis or peptic ulcer (22.9%) being the most frequent.

<Conclusion> These results indicate that the incidence of injuries which had been considered relatively rare in table tennis players could rise in the length of practice time. Re-evaluation of practice techniques and through health care are believed necessary for those high level players.

(13-2) TITLE: **Medical treatment of the first aid room at The 41st World Table Tennis Championships.**

NAME: SHIDA, Yukihsa, SHIDA, Satoko, SUZUKI, Shiro, MURAKAMI, Hiromi & YUZA, Nobuo (Japan)

Key words: *Table tennis, Medical treatment, World championships*

<Objective> The 41st World Table Tennis Championships were opened from 24 April to 6 May 1991. It was very important to keep in player's best condition during the championships in Japan. We conducted a survey to obtain a profile of the medical problems among players and official stuffs.

<Method> The subjects were the patients who consulted a doctor at the first aid room during the championships. We looked through the clinical recorded sheets, and analyzed conditions of the patients.

<Results>

1. Three hundred and ninety-four patients (86 players, 209 official stuffs, 55 spectators and 34 other persons) consulted a doctor at the first aid room. Because the doctor could not treat 13 patients at the first aid room, they went to the hospital.

2. Diseases related to internal medicine were reported by 260 patients and diseases related to surgery were reported by 129 patients.

3. Eighteen point six percent of all the players saw a doctor to the first aid room during the championships. Among the diagnoses noted common cold were most frequent. Four players went to the hospital, but nit admitted.

<Conclusion> These results indicate that more than 18.6% of all the players had medical problems during the championships. Through health care and medical support in foreign country were believed necessary for all the players.

(14) TITLE: **Simulated training - a study on its scientific principles and its application in the Chinese National Table Tennis Team.**

NAME: QIN, Zhifeng & WU, Huanqun (China)

Simulated training is one of the essential training methods that the Chinese National Table Tennis Team has been using to ensure its successful performance in the world competitions. In this article we intend to study this training method from a practical as well as theoretical basis in order to provide scientific principles for further application and improvement of the training method. 14 coaches and 29 players on the Chinese National Team were interviewed for more than 90 times to learn about their experiences in using simulated training.

Conclusion:

1. Simulated training enables the athletes to master certain technique or strategy and to apply them in competition. It is also a good method of mental training.

2. Simulated training consists three procedures : defining the playing features of opponents ; imitating the opponents ; and practicing with the imitators. The basic demanded are correct assessment of opponents, good imitation and effective practice.

3. Our study has summarized the experiences of applying simulated training by the Chinese National Table Tennis Team and can be of reference for other sport event of dual confrontation in using this training method.

- (15) TITLE: **Pedagogic entail in table tennis training.**
NAME: LIMA, Fernando (Brazil)

The several ways of coach/athlete relationship shows an interplay complex between personalities and behaviors, as a function of some goals, based in some structures, within a established period of time and following a kind if methodology. Entail is a term which means subordination condition, or impose an obligation to. The pedagogic entail is established between someone who teaches and someone who learns, aiming to modify, under some parameters, the attitudes, capacities and ideas of those who learn (Garcia, 1986). There is an entailing of the athlete to the coach in table tennis training, while it happens this pedagogical relationship process mentioned, where one teaches and the other learns. The purpose of this study is to show the importance of break, partially or totally, this pedagogic entail, aiming to form a good table tennis player, as well to suggest some relevant aspects to be considered for the consecution of this process, looking for an athlete with sufficient autonomy during the training program, guiding, being an active and independent subject i his own player construction; he will establish a cooperation (not entailing) relationship together his coach. The contents in leadership, reinforcement, motivation teaching methodologies and styles, a well the years if practice in table tennis coaching, will be used for the aiming of this study.

- (16) TITLE: **A study on the method of examination with 100 strokes in table tennis.**
NAME: WANG, Jiazheng & WANG, Xin (China)

Examination with 100 strokes, motor skill, technical diagnosis, quantitative evaluation The purpose of the study was to explore the method of examination with 100 strokes for technical diagnosis and quantitative evaluation in table tennis. Twenty-nine table tennis players from Beijing Institute of Physical Education and Qinghua University served as the subjects. Through the test in percentage of the two samples and rank correlation analysis, the significance and applicability of this method were analyzed. It has been proved that comparison between the results of examination and reexamination can reflect and quantitatively evaluate the effectiveness of training and teaching of various stages. Technical diagnosis may be obtained based in feedback information of the examination, thus offering basis for planning training. The rank correlation between the results of examination with 100 strokes and the places of players within the team suggested that more attention should be paid to the rationality and apply capability of technical items chosen for the examination for players of a certain training level, their playing style and pattern should be considered. The results of analysis indicated that the design and method of examination with 100 strokes was consist with the laws of exercise physiology about the formation of motor skill. As a way of technical diagnosis of table tennis players, this method has practical significance and may promote the development of scientific training and teaching in table tennis.

- (17) TITLE: **The special fitness training by means of the table tennis exercise and a TT Robot.**
NAME: SHPRAH, Sergei (Russia)

(18) TITLE: **Problems and prospects of the up-to-date training process of sport women.**

NAME: POKHOLENCHUCK, Yu. T. & POSEVIN, Yu. A. (Ukraine)

Training process of sportswomen as a specialized process of physical development, aimed at high sport results, has different aspects: pedagogical, social-psychological and medical-biological. Theoretical analysis of specialized literature and practical experience in different sport fields proved that the presented aspects are organically interrelated and interconditioned, however, they are at different levels of development. Pedagogical aspects of female sports problems should integrate all the research data on cooperation with sportswomen. The efforts of scientists and specialists are to be concentrated on urgent tasks, arising from problems identification, character estimation and topicality of its solution. - investigation and elaboration of scientific-methodological basis of women sports, in particular, for table tennis; - optimization of the training process of sportswomen as in the general meaning as with the consideration for specific sport fields; - sport orientation of sportswomen (specialization option); - planning and complex supervision of women sports; - social-psychological and medical-biological foundation of sportswomen training; - development of coach personnel for women sports; Solving of the above listed problems should result in the following: - effectiveness and reliability increase of training process of sportswomen on the basis of the deep analyzing of the requirements met by an organism in the course of competition activity and objective information about training effect of facilities and procedures applied at training of various age groups. At the moment there is an urgent demand in solving problems and development of training process of sportswomen. This is interrelated, first of all, with the distinctive peculiarities of female organism comparatively with the male one, the closer the results are to the critical, the more significant is the difference between men and women. In the period of training and competition there is a possibility for different violations that may relate to qualitative and quantitative origin of the energy sources, breakage of their transportation, mobilization and assimilation. All this results in expansion and deepening of the increased risk factors. The female organism possesses one principal biological peculiarity, complicated in its neurohormonal regulation - menstrual function, cyclicity of which significantly effects the whole organism, and its working ability, in particular. The neurohormonal regulation is considered to be the principal concept of the menstrual function regulation, the first three sections of the sexual system are identical in male and female organism. The sexual distinctions occur from the fourth and fifth links of the neurohormonal are, that are to become a foundation and should be considered at planning the training process. Nowadays the success of the work of a coach is mainly due to systematic increase of training process duration. Their failure to optimize the process meeting criteria - time expenditures, biological peculiarities and effectiveness - is a serious drawback resulting in premature exhaustion of psychological and functional sportswomen resources. In this connection a new computer programme is designed for accounting and supervision of a sportswoman (a team) accomplishment of training and competition tasks in a year-cycle course for playing sports with the account for individual/group, individual/team approach based upon biological adaptation of an organism which is called to alter the non-physiological approach aiming at uniformity of men and women training.

(19) TITLE: **Leadership behavior and its relations to table tennis coaching and players achievement.**

NAME: EL-KURDI, Ismat (Jordan)

One imperative variable that affect coaching of table tennis is adopting leadership style in order to assist the layers each the peak. This current study aimed to identify a leadership behavior relative to coaching first division of table tennis team in the Hashemite Kingdom of Jordan, and its relation to the achievement of team members during the general tournament which involved teams that affiliated to the JT.T.F. during the season of 1992-1993. The sample of the study was contained all accredited

coaches for that season. In addition to all registered players (n=40) who were chosen in a purposive base. A reliable and valid leaderships style instrument developed by Jazzazi (1987) was in this study. the instrument measures two main dimensions which represent the main duties to be accomplished by table tennis coaches. those two dimensions were : performance related and human related dimensions, each dimension represents couple sub-categories. The results of the study revealed significant differences among respondents (players and coaches). Additionally, significant differences were evident between coaches only on the first dimension (performance related type of behaviors). Although, there was no significant difference in the second dimension , the result of the study revealed High relationship between the second dimension and achievements of players. The researcher recommends that there is a desperate need to use an on going assessment technique in order to retain and reinforce the desired behaviors during the course of coaching and its processes, and modify the undesired ones. Also, one more necessity to be addressed is that coaches must leave room for enhancing friendship between coaches and players themselves from the other fold. Last recommendation to be considered is the potency of constructing special meetings, symposiums and workshops in athletic training as well as in professional preparation for coached as leaders to keep them updating in contemporary issues related to the profession.

- (20) TITLE: **Psychological attitudes among a sample of top table tennis players in Nigeria.**
 NAME: OLUGBILE, Femi (Nigeria)
 Key words: *Attitudes, Psychology, Culture, Motivation*

Most of the early work describing psychological methods of enhancing the performance of table tennis players in a competitive ambience has been done in Europe and some parts of Asia. Since, by definitions, psychology is culture-specific, it is not to be expected that knowledge gained in such situations cannot be applied with total success in another environment, unless adequate cognizance is taken of the beliefs, attitudes and mental set prevalent there. A questionnaire survey was carried out on a sample of 18 top Nigerian table tennis players during a national camping exercise. This was backed by individual interviews. The average age of the players was 23 years. There were questions on basic beliefs, family background educational history, and attitudes toward formal psychological training methods. The survey revealed a significant prevalence of superstitions beliefs and practice - despite a high level of denial and ambivalence. Although many of the players disparaged the possible benefits of formal psychology in optimizing their performance, there was a wide receptiveness to such techniques among the younger and better educated players. Many in the sample felt that the best motivation was the promise of financial reward and foreign exposure, Few felt that internal motivation using any psychological methods was sufficient to impel them to success in international competition. These observations are bound to be important to anyone hoping to work with such a group with the aim of helping to enhance their performance.

- (21) TITLE: **The role of personal characteristics of the table tennis player in providing efficiency and stability during competition.**

NAME: MATYT SIN, Oleg (Russia)

- (22) TITLE: **Internal relations between the excellent player's play style and their temperament type.**

NAME: ZENG, Zhen-hao & LI, Zhi-lin (China)

Key words: *Table-tennis player, Play style, Temperament type, Physiological characters*

During the table-tennis training, people have had the perceptual knowledge of the fact that some relationships might exist between the play style of table-tennis and the player's temperament type. But there is up to now little research into this issue. By means of questionnaire, observation and interview, we conducted a research in to the play styles and temperament types of thirty-seven players of China ping-pong team and fifty-eight of provincial and city teams. As a result, we have come to a fundamental understanding of the internal relations between them, The main results are as follows: It's better to choose the players who belong to type between sanguine temperament(ST.) and phlegmatic temperament(PT.), the type of ST. and the type between choleric temperament(CT.) and ST. for the loop play; the type between CT. for and ST., the type between ST. and PT. for chop and attack play. The paper provides some scientific basis and technique for the ping-pong players.

(23) TITLE: **Test of the general sportsman's preparedness in the table tennis.**

NAME: BARCHUKOVA, G. (Russia)

Key words: *Test, Physical, psychological preparedness, Speed of the ball flight, Speed characteristics*

One of the main problems which coach has now is a training of sportsman for the higher level of his sport life. Bat coach needs to know level of preparation for concrete competition.

Now exist many different tests allowing to find out: 1) general and specific characteristics of sportsman like speed, strength, quickness and e.t.a.; 2) psychological characteristics like quickness of reaction, reaction for a moving object, thinking, attention and e.t.a.;

Exist many tests allowing to find out degree of using different elements of game by indices of tempo, stability and precision.

However like researches of the best sportsmen showed high parameters of training confirm the high class of their playing not always. General characteristics for everybody may confirm the high class of playing as well.

We have defined examine for sportsmen by different tests does not allow to create a "full picture" of sportsman. Because any test gives answer for question about success of tested character only in the defined conditions.

In connection with that we have created and tried the test allowing to check a preparedness of sportsman at all. We test physical and psychological preparedness at the same time. Test includes a solving of the defined methods to defined zones of table. Take into account speed of sportsman's movement, speed of the ball's flight and his precision.

Solved researches have showed we have the relationship between precision of the ball's hit to defined zone of table and speed of the ball's flight.

This relationship may be presented by the following formula:

$$f_{om} = \frac{\sigma_0}{\alpha} \left(1 + \frac{1}{\nu} \cdot \frac{\alpha}{\Delta t} + \left(\frac{\alpha}{\Delta t} \right)^2 \cdot \frac{1}{2} \cdot \frac{1}{\nu^2} \right);$$

Putting the time $\tau = \frac{\alpha}{\nu}$ and put the ratio $\Delta t = \frac{\alpha}{\nu}$ into the formula we get relationship

between precision and speed of the ball's flight:

$$f_{om} = \frac{\sigma_0}{\alpha} \left(1 + \frac{\tau_1}{\alpha} \cdot V_{ball} + \frac{\tau_1 \tau_2}{\alpha^2} \cdot V_{ball}^2 \right);$$

σ_0

where α = error of sportsman solving method in ideal conditions; τ = total time which sportsman needs to make a decision and to do it: τ = it's individual time for the sportsman of defined class and it is connected with the level of preparedness.

It has showed graphic of the relationship between precision of the ball's hit to defined zone of table and speed of the ball's flight includes three parts: 1) straight-with low speed of the ball precision of hit is high and it defines by assimilation of the method; 2) linear-inverted relationship-precision goes down because error appear; 3) square-with very high speed of the ball precision goes down very quickly:

In this way the created method gives: 1) a chance to find out about the sportsman exactly by quality of solved methods; 2) to check speed characteristics; 3) to check a level of preparedness with conditions of the specific game.

(24) TITLE: **Glue use and abuse - an empirical study.**

NAME: GOTESTAM, K. (Norway)

Key words: *Glue, Habits, Health*

The habit of "fresh-gluing" T.T.-bats, and the adverse effects it may have on the players' health, has been a popular discussion-theme for the past years. Medical studies, concerning the solvents contained in tabletennis-glue (usually trichloroethylene or 1,1,1-trichloroethylene), have been known to show ill-effects ranging from dermatitis and fatal heart conditions to cancer of the liver/kidneys. Most of the studies, however, were looking at subjects who had ingested a much larger dosage than a T.T.-player would ever get close to. The amount of knowledge concerning long-term lowdosage health-effects is at the moment rather small. A higher risk of cancer is one of the things one can be relatively sure of. To be able to use the results of the medical studies it is necessary to map the players' habits in relation to "freshglue"-ing-activities. Such a study would help get a proper perspective on the health hazard the average "fresh-glue"-T.T.player is faced with. In this study, therefore, 50 Norwegian T.T.-players, ranked among the 30 best players in the country (males/females), were asked some questions regarding their habits, knowledge and general thoughts in relation to their "freshglue"-activities. It was hypothesized that the amount of knowledge concerning the glue and it's adverse affects would be coupled with the frequency of use as well as with the use if protection. In addition it was hypothesizes that player ranking and number of years since player started gluing would be positively correlated with frequency of gluing. The results of this study will, in addition to suggesting answers to the above hypotheses, give and idea of the frequency of "fresh-gluing" among ranked players, the amount of protection that is used, which types of glues are used and, finally, what effect a ban of "fresh-glue"would have from the players!point of views.

(25-1) TITLE: **Duration of the rallies in top table tennis: statistics and conclusions.**

NAME: SCHILTZ, Paul (Luxembourg)

Key words: *Duration of rallies, Too short*

Rallies are classified as one of two possible types: Type 1. The rally is very short, consisting of not more than 4 strokes including service. Type 2. The rally lasts for at least 5 strokes including service. Some 250 matches have been recorded. Rallies are normally too short to excite spectators more than two thirds of the rallies do not last more than 3 seconds.

(25-2) TITLE: **Importance of service on winning the point.**

NAME: SCHILTZ, Paul (Luxembourg)

Key words: *Services, Rallies, Win, Loss, Comparisons*

Rallies are classified as one of three possible types: Type 1. The server wins the point directly through his service if the receiver fails to return it or if his return can easily be killed with a smash. Type 2. The rally is very short, consisting of not more than 4 strokes including service.(except type 1) Type 3. The rally lasts for at least 5 strokes including service. Some 250 matches have been recorded. The server wins about 54% of all rallies. #8% of points won by server and 32% of those lost by the server are "quick points" including the prenamed type 1 and 2. Only a few players, against some opponents or at some important moments of the game win a lot of points through service. On the other hand, very often the server loses the point quickly after having served. Comparisons are attempted between servers and receivers, winners and losers, Asians and Europeans.

(25-3) TITLE: **Type and proportion of balls crossing the net at a low distance to the net.**

NAME: SCHILTZ, Paul (Luxembourg)

Key words: *Height of the balls, Crossing the net, Strokes*

Two infrared beams generate different sounds when cut off by a ball crossing the net. The game and the sounds are recorded and analyzed later on. The following types of strokes are considered: service, defense, attack and fast topspin (long arm-motion), attack with a short arm-motion (over the table or during counter-attack), normal topspin. Push and block balls are not taken into account. The proportions of balls crossing the net at a height lower than 2 cm or lower than 3 cm are calculated for each stroke type. A critical discussion about the study and the its results is presented.

(26) TITLE: **A study of the effects of ordered training and disordered training on ping-pong player's responding ability.**

NAME: ZENG, Zhen-hao (China)

Key words: *Table-tennis, Ordered training, Disordered training, Responding ability*

The ping-pong athletics demands of player's the best responding ability. The training methods can be ordered or disordered. Past researchers tell us that each of two ways of training had its own effects on the player's competition skills and responding ability. However, this understanding is perceptual and empirical, lacking quantitative analysis and theoretical study. This paper, based on predecessors' experience, mainly adopting the methods of test research, reports the effects of the two ways of training, ordered training and disordered training on the ping-pong player's responding ability in the light of multiple reaction time and competition skills and the results of the two arrangements, ordered training first or vice versa when the two ways of train are used coordinately. It also obtains a series of test data and theoretical basis of relevant discipline. The findings are : Disordered training can raise remarkably the player's responding ability; training from ordered in enhancing the player's responding ability and competition skills. The paper provides some precious data related to the science of training as well as some new scientific basis with theoretical analysis for the training of specific skills of ping-pong players.

(27) TITLE: **Design of table tennis placement and collective net zoned tables and preliminary research of its applications.**

NAME: ZHANG, Zhijie (China)

Key words: *Sports training*

So far, table tennis players have been trained qualitatively in terms of control ability of ball placement and path changes. A new apparatus named the zoned table (ZT in short) is described in the paper to bring players' training into a quantitative stage with emphasis on training concept and methods with ZT. The specifications and dimensions of ZT are the same as those of a standard table

while the surface of ZT consists of several individual homogeneously -plastic plates of toy-brick type which are ready to be taken off or put into the table frame with a collective net under each plate to collect coming balls. Balls collected in the nets are transferred through transmission channels into a collecting box where a counter can be installed to count the collected balls and calculate the hitting rates. According to requirements of technical and tactical training for players of different ages and skill levels, a variety of ZT is available with various table surfaces such as 2-zone, 3-zone, 9-zone, 18-zone types...etc. The more zones the table surface is divided into, the more difficult quality of placement and path will be. In the paper we show some training methods for attackers and cutters by using ZT in order to improve their techniques, control abilities, footwork and so on. It is also helpful for players to arouse their interest and concentrate on their training.

- (28) TITLE: **Arab player and internationalism.**
NAME: HAFEZ, Amr (Saudi Arabia)

CHAPTER ONE - Address by the president of the Arab Union - Historical background of the Arab Union, which was established 36 years ago in Alexandria, Egypt under the name of the Arab International Union for table tennis. Most Arab countries have joined the championship. In 1975 the Kingdom of Saudi Arabia hosted the union's meeting in Riyadh, the Kingdom's capital. In the meeting it has been decided to move the headquarters to the Kingdom and change the name to the Arab Union for table tennis. Since then it continued its effort to organize championships every two years. These championships cover men, youngsters, women, single double and mixed. CHAPTER TWO Graphical comparison of Arab Union's results. CHAPTER THREE 1 - A questionnaire on both Arabic and English languages containing 40 questions for both the coach and players covering areas that deal with factors that will help and facilities Arab players to perform internationally. 2 - Questionnaire forms are distinguished in the 12th Arab Championship held in Syria in 1991 where 200 forms were distributed to 15 Arab countries and 105 forms were recollected back. 3 - Discuss replies in a graphic form 4 - results 5 - Recommendations

- (29) TITLE: **Table tennis in school and leisure.**
NAME: DISINGTON, Jens (Norway)

It's not directly science, but a book about ideas/new things for about training of children and youth. - 25 finish lessons for use in schools - Technics - differences - normal/ordinary school - table tennis - school/clubs - supply activities/idea-bank for use lessons

- (30) TITLE: **New education draft.**
NAME: ROKKJAER, Lars (Denmark)

- (31) TITLE: **A preliminary study of the new system of Swaythling Cup**
NAME: ZHANG, Yingui & WU, Xiuwen, (China)
Key words: *The new system of Swaythling Cup, Method of deciding orders of players, Reformation of Swaythling Cup system*

The new system of Swaythling Cup which will be adopted during the 42nd Table Tennis World Championship was scientifically analyzed in order to discover some valuable laws of the new system in this article.

1. By means of mathematical method, logical argumentation and number of examples, we mainly studied how a coach could make attacks on the weakness of his opponent with the strong points of his own team and finally win victory in the new system on the condition that the coach deeply know not

