

**MINISTRY OF EDUCATION
NATIONAL UNIVERSITY OF PHYSICAL EDUCATION
AND SPORT IN BUCHAREST
DOCTORAL SCHOOL**



**PROPHYLAXIS OF JOINT TRAUMA IN PERFORMANCE
ATHLETES – FOOTBALL-TENNIS ATHLETES THROUGH
PHYSICAL EDUCATION AND SPORTS**

**SUMMARY
THESIS**

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ABSTRACT

Key words: football-tennis, joint injuries.

Introduction

The game of football-tennis is among the sports where acyclic movements predominate. In a football-tennis match, the technique of hitting the ball differs from that applied in soccer as well as that used in tennis. It stands out that the name of the football-tennis discipline, along with its foundation (theoretical and practical) is independent of the sports branches (football and tennis).

Football-tennis is a sports discipline whose scientific foundation is still insufficiently known, and theoretical data about it are limited. The present paper deepens the theme of this sport, which I also presented in the dissertation work in which I highlighted the fact that football-tennis is a sports discipline characterized by dynamism, but which also leads to injuries.

Depending on the sport practiced, the favorable and etiological factors of traumas are manifested to a variable degree. In football-tennis, the contributing factors are involved in the gradual degeneration of the fibro-cartilaginous structures. For example, meniscus tears generally do not occur on a normal meniscal structure, but on a degenerated one.

The occurrence of joint injuries in the life of a non-athlete is not a tragedy, on the other hand, the same cannot be said about the high-performance athlete who is forced to stop his sporting activity for a period, be it short or long, depending on the severity of the trauma which he endures. That is why we must first know the causes to be able to prevent injuries.

Temperament detection and the correlation between temperament type and injury risk presented a permanent concern throughout the doctoral studies.

The motivation for choosing the theme

The current topic is of utmost relevance and requires extensive studies to substantiate it from a theoretical and practical point of view.

At the same time, I am also a practitioner of this sport and I have achieved very good results: the distinction of "Master Emeritus of Sports" obtained in 2017, Honorary Citizen of the Municipality of Lupeni, Hunedoara County, national champion from 2012

until now, 10 times winner of the Romanian Cup, 14 world titles and 14 European titles, during the last 12 years, and my desire is to make this sport known.

There is also another personal reason, I myself was in a situation to avoid a surgical intervention at the level of the cruciate ligaments recommended by the specialists. My intention is to contribute to the prevention of joint trauma by implementing an exercise program.

I have not found any bibliographic sources at the national and international level that describe aspects regarding the development of this game.

Part I of the thesis

It consists of 4 chapters and contains the theoretical substantiation of the work with updated information about the relationship between the severity of trauma and psychological factors in different sports branches and the role of personality and temperament in the occurrence of injuries in athletes.

Andersen and Williams proposed a model to understand the relationship between psychological variables and injury occurrence (Andersen & Williams, 1988).

"The model suggested that when an athlete is faced with a potentially stressful sporting situation or environment, a stress response to that environment results."

Andersen and Williams' model highlighted the effect of anxiety, depression, anger, negative mood, and competition anxiety on injury frequency and severity.

Andersen and Williams model (1988) was revised a decade later (Williams & Andersen, 1998).

This model assumes that an athlete, faced with a stressful situation, puts out a response (called stress) as a result of its cognitive evaluation, causing physiological (increased muscle tension) and attentional (inadequate focus of attention) changes that increase the probability of being injured.

From the proposal of the two models, most studies have focused on the analysis of the relationship between psychological factors and the occurrence of trauma in athletes, using it as a theoretical basis, as was also done in our work on the sports branch, football-tennis.

The conclusions of the first part of the thesis are as follows:

- Athletes' main objective is the prevention of trauma, achieved through correct training (warm-up, core and recovery).

- Knowing the causes that can lead to the occurrence of traumas in the practiced sport is of particular importance, not only for the correct diagnosis, but, above all, for taking measures to prevent their occurrence.
- According to specialized literature, it was concluded that stress and anxiety were the two major psychological variables or predictors of injury in athletes. Both variables can influence the risk, frequency and severity of injury. With the help of the conclusions of the present studies it can be stated that stress and anxiety play a major role in the occurrence of accidents in athletes. These are the main two intrinsic risk factors that predispose an athlete to injury risk, as suggested by the Comprehensive Injury Causation Model.
- Personality and temperamental traits are basic psychological constructs that can explain and predict human behavior in various domains of life, including physical activity.

Part II of the thesis. Preliminary research on the incidence and severity of joint injuries in performance athletes - soccer-tennis athletes

As part of the approach of part II of the thesis regarding the preliminary research aimed at the incidence and severity of joint injuries in performance athletes - football-tennis practitioners, after studying the specialized literature, I compiled a substantiated material based on the following premises:

- Performance soccer-tennis players can achieve and maintain a high level of performance when their training programs represent an accumulation of knowledge related to related sports domains. The training process of the soccer-tennis player can be optimized through the effective cooperation between the coach, doctor, physiotherapist, sports psychologist and all others involved in the training process, in accordance with information from sports, exercise physiology, sports medicine, psychology, etc.
- Along with physical training, appropriate psychological techniques increase performance in sports along with joint trauma prevention methods, therefore, we must first know the causes to be able to prevent injuries, bearing in mind that joint traumas occur in the life of athletes practicing football - tennis players can interrupt the sports activity for a period, be it short or long, depending on the severity of the trauma.
- The subjects participating in the preliminary research have a good level of training, being members of the national soccer-tennis team, multiple world and European champions.
- Detecting the type of temperament of soccer-tennis players, members of the senior, senior and junior national team prevents the occurrence of joint injuries.

Research objectives

In order to confirm or deny the hypothesis, we set the following objectives:

Detection of a possible correlation between the studied athletes' temperament and the severity of joint trauma in the members of the 3 national football-tennis teams: seniors, seniors and juniors.

The purpose of the research

This purpose has been changed due to the COVID 19 pandemic and consists in detecting the temperament type of soccer-tennis players, members of the senior, senior and junior national team.

Our initial goal was:

- to detect the mechanisms of joint trauma production that may occur during the soccer-tennis game.
- to apply and verify the effects of using the specific means of physical education and sports in the prevention of articular traumas of the lower limbs in football-tennis athletes.

Research tasks

- Designing the questionnaire; for this I turned to a specialist - psychologist, PhD Associate Professor Radu Predoiu, teaching staff from UNEFS;
- Establishing the categories of athletes who will participate in the research, based on their informed consent;
- Application of questionnaires to researched subjects;
- Centralization, processing and interpretation of the obtained data;
- Elaboration of conclusions, in a position to verify the stated hypothesis and guide us in the elaboration of the preliminary research.

Preliminary research hypothesis

The temperament type of soccer-tennis players influences the severity of joint injuries.

Research methods

The research methods used in the preliminary research are: *documentation, survey, observation, statistical and graphic method*

Organization and conduct of research

The research was carried out on football-tennis athletes, on a group of 23 subjects, members of the national senior teams - female and male, and on the national junior team - male between November 2019 and July 2020.

The number of athletes in this sports game is small which is why, in order to carry out the proposed research, we approached these 3 national groups.

The research was carried out during the pandemic, and the subjects only sporadically trained in the open air, in the Carol Park in Bucharest, when it was allowed, in the Sports Hall of the National University of Physical Education and Sport in Bucharest.

Evaluation of subjects

The evaluation of the subjects was carried out on the basis of a temperament evaluation questionnaire and by consulting the athletes' medical documents.

CONCLUSIONS PART II

Based on the recorded results, data processing and interpretation, we can formulate the following conclusions:

- ☐ 50% of the athletes of the national football-tennis team suffered joint traumas in the lower limbs, most of them being sprained ankles;
- ☐ Following the questionnaire applied to detect temperament, only four athletes of the national soccer-tennis team have an introverted temperament, more precisely, two senior male athletes and two senior female athletes.
- ☐ Both introverted and extroverted athletes experienced joint trauma, with the exception of the introverted athletes.
- ☐ *Research results highlight that certain components of extraverted/introverted temperaments such as: introverted thinking, introverted intuition and extraverted intuition correlate positively with the severity of joint trauma. **The research hypothesis is thus confirmed.***

Part III of the thesis. Actual research on the prophylaxis of joint injuries in the national football-tennis team

The premises of the research

In the actual research we start from the following premises:

- The subjects participating in this research have a good level of training, being members of the national football-tennis team, multiple world and European champions;
- Detection of execution errors of the diagonal attack to the right and left prevents the occurrence of traumatic relapses;
- We benefit from the material support of the National University of Physical Education and Sport and the FRFT-CAJ agreement, this actual research does not obstruct the teaching activity.

Research objectives

The theoretical and practical approach to the issue regarding the prophylaxis of articular trauma among the members of the national football-tennis team will be based on the clinical data collected in the context of the research.

The present research started from the hypothesis previously tested in the preliminary research which suggested that there is an incidence of joint traumas that is specific to the sports activity, namely football-tennis, and the type of temperament of the athletes influences the severity of their traumas.

Taking into account these considerations, in the case of identifying the incidence of the type of trauma in the performance athletes of football-tennis, the following was followed:

- Analyzing the existing information through a complex, descriptive and inferential (statistical) approach, which will allow a better understanding of the problem of the incidence of trauma among the members of the national football-tennis team;
- Identification of some correlations between positioning errors in the execution of the diagonal attack shot to the right and left and the incidence of trauma in this sport;
- Application and verification of the effects of using the means specific to physical education and sports in the prevention of joint injuries of the lower limbs in football-tennis practitioners.

The purpose of the research

The purpose of the research consisted in highlighting the positioning errors in the execution of the diagonal attack shot to the right and left, because these two shots are the most used in the football-tennis game, and also the most prone to the occurrence of joint traumas of football players. tennis.

The actual research aims at the importance of knowing the effects of positioning errors in the execution of the diagonal attack shot to the left and right, in order to positively influence sports performance, and finally in the prevention of articular traumas of the lower limbs.

Research tasks

During the actual research period, the following tasks were established:

- selection of samples included in the research;
- acquisition of kinematic data using the video camera;
- determining the number of positioning errors in the execution of the diagonal attack shot to the right and left for each individual subject;
- the application of the individual prophylactic program in order to correct positioning errors in the execution of the attack, but also to prevent traumatic relapses;
- analysis, processing and interpretation of the obtained data;
- drawing up conclusions and developing the actual research.

Research hypothesis

Detecting errors in the execution of the diagonal attack shot to the right and left and applying an individual program to correct them leads to the prevention of lower limb injuries in soccer-tennis athletes.

Research methods

In carrying out this part of the thesis I used the following as research methods: documentation and pedagogical observation as in the second part of the thesis, to which I have added other methods, as follows:

- method of video recording and data analysis;
- the pedagogical experiment method;
- descriptive and inferential statistics.

Organization and conduct of research

The research was carried out on football-tennis athletes, members of the national senior teams - female and male, during the period January 2021 - December 2021.

The research was carried out in the Games Hall of the National University of Physical Education and Sport in Bucharest on a group of 16 performance athletes (seniors) aged between 18-40 years, over a period of 10 months. The athletes involved in the research are multiple world and European soccer-tennis champions.

The subjects performed 3 training sessions per week in the Games Hall of the National University of Physical Education and Sport in Bucharest.

The subjects were included in the research with informed consent on the objectives of the research and respecting the confidentiality of identity data and personal results recorded during the investigations carried out.

Evaluation of subjects

The evaluation of the subjects was carried out on the basis of the dynamic video recording, initially we detected the execution errors of the diagonal attack to the right and left, then we repeated the evaluation after the implementation of an individual program in order to correct the errors and prevent the recurrence of joint trauma in soccer-tennis game athletes.

These athletes are complex players, that is they operate in the 3 positions: forward, defender and lifter (the one who puts passes), some less in the forward position, others more, which means that the errors differ from athlete to athlete, from the experience gained, but also from the seniority in the practiced sport.

CONCLUSIONS PART III

In the case of senior women of the national team, the number of errors refers to:

- a) the diagonal attack to the right decreased significantly ($p < 0.05$), in the case of the final evaluation (last stage of the Championship), compared to the initial moment (first stage).
- b) the diagonal attack to the left registered a significant decrease ($p < 0.05$), at the time of the final evaluation (in the last stage of the Championship), compared to the initial moment (in the first stage).

In the case of *senior men* of the national team, the number of errors refers to:

a) the diagonal attack to the right decreased significantly ($p < 0.05$), at the end of the research (the last stage of the Championship), compared to the initial moment (the first stage).

b) the diagonal attack to the left registered a significant decrease ($p < 0.05$), at the end of the research (the last stage of the Championship), compared to the initial moment (the first stage).

In both cases at the level of the senior men national team and at the level of the senior women national team, the number of errors, regarding the diagonal attack to the left and to the right from the initial testing (first stage) to the final testing (last stage) registered a significant decrease, which leads us to the conclusion that : ***The program implemented for the correction of positioning errors in the execution of the attack and the prevention of trauma relapses had a double effect*** (decrease in the number of errors and prevention of lower limb trauma).

Although they played a different number of matches, the senior women in the Championship participating in *6 stages* , on the other hand, the seniors having *8 stages foreseen in the competitive program* , it can be seen that between the two investigated groups, the senior women's group, respectively the seniors' group, (athletes who are members of the national team who are European and world champions), *there are no statistically significant differences ($p > 0.05$) between the results from the senior female athletes (median = 2.5) and the results found at the senior level (median = 2), regarding the recorded traumas (trauma severity score)*. Thus, we consider it interesting to mention what the statistical analysis of the data highlighted, namely the fact that the number of matches played in the Championship (taking gender into account) was not a determining factor in terms of the severity of the injuries suffered by the athletes top football-tennis practitioners.

The previous conclusions confirm the research hypothesis according to which: ***Detection of errors in the execution of the diagonal attack shot to the right and left and the application of an individual program for their correction leads to the prevention of injuries of the lower limbs in football-tennis practitioners.***

Elements of novelty and originality

The originality of this work is represented by the fact that the research was carried out on the athletes of the national Football-Tennis team, a sport that is not very widespread and publicized in our country, but has notable results.

It is also the first research conducted on performance athletes - soccer-tennis athletes in male seniors, female seniors and juniors in a framework organized at the level of the national team and aims at the prevention of articular traumas of the lower limbs.

Limits of research

Our research is the result of an ambitious approach, aimed at demonstrating the role of soccer-tennis at the national and international level, specifically the detection of positioning errors in the execution of the diagonal attack shot to the left and right.

There is no doubt, however, that this research also has certain limits.

First of all, it's the small number of subjects, but these are the members of the national soccer-tennis team, European and world champions in this sport.

Secondly, we propose in further research to see if the detection of positioning errors in the execution of the diagonal attack shot to the right and left, followed by the implementation of an individual program for the correction of errors and the prevention of traumatic relapses, can contribute to the increase of sports performance.

Recognition

This doctoral thesis was developed under the auspices of the National University of Physical Education and Sport Bucharest, in the Doctoral School Department based on the scientific research project approach by the Doctoral School Council.