THE DOCTORAL THESIS ABSTRACT
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Thesis title: PROPHYLAXIS AND THERAPY ON ELBOW’S TRAUMA THROWER ATHLETES BY PHYSICAL EDUCATION MEANS

KEY WORDS: thrower athletes elbow, recovery

To coordinate a good shape for an athlete needs a plan included in micro and macro cycle of training, which includes intervals between competitions series.

The disturbance of this rhythm of training by pathological aspects (overtraining, accidents, etc.) broke the circles and put out the athlete from the competitive activities and from the specific preparing.

Overloading trainings, accidents and the pathological diseases associated with a sport discipline are, unfortunately, inherent phenomena into an athlete lifetime.

Recovery and turning back to performance shape are the major wishes, with a maximum interest for the athletes and for the whole interdisciplinary team around theme: coach, doctor, physiotherapist, nutritionist, psychologist, masseur, etc.

In this work we make an original, personal contribution, materialized in introduction of physical education means, borrowed from the specific physical preparedness of the thrower athletes, even from the first beginning of the recovery period.

These athletes need to have a total recovery, in the shortest time, with minimum of secondary effects.

The purpose behind general physical preparedness is to still get in cardiovascular shape, but to do in a way that incorporates general physical strength and speed.
Effort of these samples is one power throw in the speed regime in terms of skill.

An incomplete recovery creates a zone of permanent injury prone to similar accidents.

Full recovery does not only grades and strength but the whole segment functionality.

Recovery includes learning all measures to prevent injury.

The thesis was split in three parts:

- The first part is a theoretical substantiation of the thesis and contains:
  - the motivations in choosing the theme – represented by the activity in CF2 Clinical Hospital, in which we founded many cases, especially we were attracted by athletes cases, that needs a special treatment and a special recovery,
  - the importance of the theme for the performance sport – the throwing athletic contests history is long and a retrospective look shows how active and consistent the performances increased in this time.
  - In this area is found a relatively high frequency of the elbow injuries compared with other parts of the body.
  - A good recovery of these injuries is the main condition to regain the good sport shape.
  - retrieval in the national and international literature - concerns about this subject are many and old, that is why we consider welcome our effort to accomplish the knowledge level.
  - anatomy and biomechanics notions – we described anatomy and biomechanics notions as a condition to start our research, to complete the necessary information.
  - reviews of the throwing technique (weight, hammer, disc, spear) - knowledge-throw technique justify the appearance of specific pathology.
  - aspects of biomechanics applied in athletics to the throwing contest,
  - the biological model of the thrower - thrower athlete must meet a number of characteristics and features that should be taken into account in recovery also.
  - selection items (primary, secondary, final) – present these characteristics,
- physiological characterization of the effort, recovery after the training and contest effort,
- the sports elbow’s trauma and the main implications - this chapter presents the main classes of diseases and factors that determine promote, maintain the elbow injuries.
- the sports injury prophylaxis - is a chapter which contains a series of recommendations (general and special) to prevent any accidents. They must be for any responsible sports a way of life.
- clinic and laboratory exam - are ways of investigating and establishing the diagnosis.
- physical educations and sport’s means used in sports elbows trauma (specific, unspecific and others) - are means and methods used so far and presented in the literature. Were pooled and divided into specific, nonspecific and others.

The second part represents the pilot study, and its goal is to prepare main research, to prevent the eventual difficulties, to test the methods and to anticipate the result.

The pilot research represents a general rehearse of the actual research and includes: premises, goal, objectives, tasks, subjects, the place where the study was made, the methods and means.

Pilot study hypothesis is the statistical hypothesis (or null), and is opposite to the research hypothesis: it expects that after recovering program there are no significant differences between first evaluation and the intermediate one.

The study was made on 20 subjects group, all of them tenured to different sports clubs, from Bucharest or the rest of towns, belonging to seniors and youth groups.

They were hospitalized in our Clinic Hospital, during 2006 – 2010, in order to recover traumatic elbow pathologies.

Because the cases were many and various, we selected the similar cases, in order to conceive a homogenous group of study, for relevant and correct results.

We selected cases with inflammatory manifestations, especially: tendonitis, bursitis, sprains (first and second degree), epicondylitis, tenosynovitis, etc.

This chapter contains also the research stages, conceived according with time intervals and the research steps.

The ongoing place was the Recovering Center, from the “CF 2” Clinical Hospital, Orthopaedic and Traumatology Department.
The methods and means used in pilot study were:

Specialty works study, observation, the muscle and joint testing, the functional mobility coefficient, talking, the experiment, statistical methods (arithmetic average, median, standard deviation, variability coefficient, Cohen item, etc).

The pilot study targeted the first and the second (intermediary) evaluation, in order to see if there are progresses after applying our recovery program.

Processing data showed significant progresses between two evaluations, and also refute the pilot hypothesis and recommend continue the research.

— Third part of the thesis represent the personal contribution.
That is why we split our contribution in two stages:
- The first stage – refers to the normal, unsportsmanlike elbow recovery, in 85% - 90%, when “luxury angles” is missing.
  Yet, the patients can do the activities of daily living, to do his job; the motion amplitude and pain has a functional level.
  But this is not enough for making performance.
- Second stage – includes the final angles and prepares the athlete passing to the general and specific physical preparedness, in the competitive shape.

It was followed the same structure as the pilot study: premises, goal, objectives, tasks, subjects, the place where the study was made, the methods and means.

The research hypothesis foresees that using the physical education and sports means, even from the first elbow recovery beginnings to throwers athletes, determine a significant improvements of the results.

The main research made:
- comparison between first and final 1 evaluations – stage I – to the unsportsmanlike;
- comparison between first and final 2 evaluations – stage II – to the athletes.

The evaluated items were: muscular testing – strength - (flexion, extension, pronation, supination), gripping, joint testing – amplitude – (flexion, extension, pronation, supination), functional mobility coefficient, visual analogue scale (for measuring pain).

Stage II connects recovery with the sports activity.

The exercises programs that we propose use very familiar movements for these athletes, movements that belongs throwing contest.
The main goal is shortening recovering time, minimizing loss, to make easier getting back to sports activities, to return to contests and performance.

Our exercise program intent to keep sports shape and to reduce as much as possible the secondary effects, hypotonia, decreasing segment functionality, etc.

The study was made on the same group of 20 subjects, in the same place (CF 2 Clinic Hospital, Bucharest).

The doctorate thesis ends with a chapter that includes the final conclusions (that arise from the theoretical documentation and the practical study), the novelty and original contributions, proposals and ends with over 170 bibliographic references.

The main conclusions that we can extract from this work were:

**Theoretical conclusions:**

The elbow damage to a thrower athlete is one of the most frustrating situations, having many implications:

- physiological aspects – pain and inflammation can not dispose of any treatment because of the doping risk;
- therapeutic aspects – an athlete’s trauma, on a very worked segment, specific to a sport discipline, creates a risk area, with a relapse threat;
- social - economic aspects – means lack of competitions, lack of results and performance.

These are serious arguments for taking things serious and making things right, every stage: worming up, the fundamental part and recovering.

Our work respond to necessities in avoiding athlete’s deconditioning in pathological situations.

Threat and recover an athlete must be an elite route, on the highest standard, with the best, latest and noninvasive technologies and medicine.

An inappropriate attitude may get out the athlete from the sport life and from the racing activities.

**Practical conclusions:**

The work propose its self to be an answer to the practitioners needs, working around the athletes, to creates an interdisciplinary attitude concerning the prophylaxis and accidents preventions, the specific trauma appearance, recovery and return to sports activities.

The prevention and prophylaxis represent a large area and includes every part of life: the training quality, density and professionalism, the diet,
material equipment, climate, psycho emotional climate, motivation, recovery after effort, fatigue, endowments, predisposition to various disease, etc.

Even when the disease appears, the principal preoccupation is the secondary prophylaxis.

A fast and efficient recovery is the main goal.

This work is trying to find and offers solutions in making the recovery program efficient by using physical education and sport.

**Conclusions taken from research:**

By processing data, the thesis propose its self to demonstrate what we found along our experience and formulated as a research hypothesis, that using the physical education and sports means, even from the first elbow recovery beginnings to throwers athletes, determine a significant improvements of the results.

For this, we used some methods and tests statistic – mathematics having as goal to demonstrate the research hypothesis and to deny the null (statistical) hypothesis.

We calculate: arithmetic average, standard deviation, median, Wilcoxon test, Cohen item, variability coefficient, amplitude, average difference.

All indicators highlight, in different ways, the presence of the improved results for every item.

Arithmetic mean, median shows the general trend of evolution of values.

Coefficient of variation and standard deviation show group homogeneity of values.

Wilcoxon test marks the existence of progress by differences between the two evaluations.

The Cohen item (size effect) shows quality results. Average difference shows how each indicator evaluated evolved. The highest values indicate the highest progress.

Amplitude shows scattering data, how they manifest after ours recovery programs.

All mathematical statistical indicators were calculated, interpreted and plotted.

They confirm the research hypothesis and deny the statistical (null) hypothesis.

These results come to support our work and to confirm that the results after our program (with physical education means) are obvious improved.
A very important chapter is the one where are mentioned the **novelty and originals elements of the thesis:**

The main element of novelty and originality is our proposal in using to posttraumatic elbow of the throwers athletes specific means to physical education and sports; more accurate, is about means belonging to specific preparedness – throwing school.

Starting from this idea, we create new exercise programs, adapted, original, split in two stages.

One other original element is to use the similarities and the knowledge from baseball throwers athletes.

Not the last, the ways processing data, methods and statistic-mathematic tests and the graphical representation.

**Proposals:**

After our theoretical, practical and research experience, we made the next proposals:

1. to takeover the tactical elements from the specific preparedness of these athletes, the adaptation, individualization and use in recovery;
2. also, we consider useful to extend using this means in other types of pathologies specific to these athletes;
3. to introduce in specific preparedness the prophylactic exercises and to prevent the trend specific pathologies for each sport discipline;
4. we recommend a preventive attitude of the athletes even from junior time, when necessary to a primary prophylaxis, while the seniors makes a secondary prophylaxis;
5. we recommend to publish and make known the results of the research in medical and sport areas also;
6. a better collaboration between the physical therapists and the coaches, as to know the stage of preparedness, the strategies used and optimal adaptation of these means to athletes necessities and needs;
7. to takeover and to adapt the knowledge already existing about optimal elbow recovery from baseball where the knowledge level is higher, because of the social economics implications;
8. we propose to specialized centers, that own necessary endowment to sustain and complete our work and to make known the results.