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Physiotherapy for Back Injuries Prophylaxis of Tennis Players

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Abstract: *Tennis – one of the most popular sports in last decades – is practiced regularly by hundreds thousands of people in the whole world. Its huge popularization makes the sports traumatism investigation at tennis players very live question. The traumatism prophylaxis is important from sport-technical point of view as well as from medical-social point of view. In order to improve the prophylaxis means effectiveness, from one hand the traumatism reasons should be investigated thoroughly and from other – to elaborate appropriate, based on evidentiary materials methods for their prevention. Originating in the spine pain is a complex diagnostics and therapeutics challenge for different experts – medical doctors, physiotherapists, sport educationists, etc. It is not age, profession or sports activity specific. The reasons that can cause it are different – single or repeatedly external traumas, osteoporosis, static overload, muscle overstrain, and also stress.*

Keywords: *physiotherapy, back injuries prophylaxis, tennis players*

1. INTRODUCTION

Although low back pains (LBP) are most widely spread and affect 60-90% of adult population, the pain symptomatic and spinal area traumatism data between tennis players is scarce or missing. The specifics of sports traumatism, according to Karpman V.,(1980), Brooks M., et al. (1992) are:

1. Mainly affected are children, teenagers and young peoples.
2. There is specific traumas frequency and localisation. The most affected are lower limbs (Moezi A., 2002). The upper limbs traumas frequency is significantly lesser. The rarest are the body affecting traumas. The most affected are joints, where the knee joint traumas are 50% of all sport injuries.
3. The sports traumatism is relatively light. The light traumas (90%) are dominant, the ones that consequence in 3-5 days of sports activity loss to the athletes. The medium traumas are 9% – those with sports activity loss of up to 1 month and heavy traumas are 1% – the loss of sports activity is more than 30 days.
4. The traumatism frequency, localisation and type depend highly on the sport type. Their classification is as follows:

- *Very Traumatic* – high speed sports (skiing, motor sports), sports with acute and strong interaction (combat sports, football, hockey, box, etc.), and the ones with complex movements coordination (gymnastics, acrobatics, etc.);
- *Moderate Traumatic* – some of sports games (volleyball, tennis, gymnastics, races in track athletics, etc.);
- *Lightly Traumatic* – swimming, table tennis, golf, etc.

5. Traumas are mostly as a result of a hit (fall or collision with adversary, object, device, etc.), followed by abnormal amplitude of joint movement (overstretching and tissue rupture). The rarest mechanism is compression (when landing, pulling, etc.).
6. The micro-traumatism, with sharp or chronically origin is with big frequency.

As many other sports, the amateurs tennis or on professional level place the participants in risk of injury, which sometime means temporary disability. The absence from work could have considerable social-economic consequences for the person and for the society. That is why is important to study the

risk factors for traumas and the preventive measures in order to keep prolonged sports life (GranataK., et al., 2001; Gramatikova M., et al. 2015, 2016) Pećina M., Bojanić I., 2003, Popova D., 2007, Kantchev D., 2011). Different activities, connected with sport are in cause and effect connection with the high frequency of the low back pains (Chard M., LachmannS., 1987; Hosea T., et al., 1996; McCarroll J., 1996; Sward L., et al., 1990; Kelm J., et al., 2002; Eremiev M., 2011; Gotova J., 2012). The traumas are often and important reasons for many tennis players to put an end to their sports activity. That is why it is important to work out methods for preventing the sports traumas for tennis players. Every trauma, if not cured in time and with competence is provoking another. In the late phase of restoring after traumas, and/or after surgical intervention the trainer can effectively help the rehabilitation process with suitable typical sports measures like specific stretching and motion exercises to eliminate the muscle overstress and functional strength training to improve the muscle trophy and remove muscle deficiency and imbalances (Kraydjikova L., 2011;Gotova J et al., 2015; Popova et al., 2014).

2. METHOLOGY

The investigation was carried out in Valley Tennis Centre, Dheryneia – Cyprus in the period 2010-2013. In the investigation are included 98 men from 30 to 50 years old, training tennis in their free time three times per week and training tennis more than 5 years. 58 of them have chronic LBP syndrome (complaining more than 3 months). We divided the tennis players with chronic pains in lumbosacral area on two groups: A – experimental group (EG - 30 persons) and B – control group (CG – 28 persons). The groups were settled according to their will to execute additional exercises that makes the training 30-40 minutes longer.

Criteria for including in the investigation

1. Sex: male.
2. Age: 30 to 50 years.
3. Playing tennis over 5 years.
4. Three trainings per week.
5. Chronic LBP syndrome at least for 3 months.
6. Signed inform consent.
7. Lack of backbone disk hernia, tumour, trauma, inflammation.

The total confidentiality of the data is guaranteed, and its use only for scientific work.Before starting the training program every tennis player from the experimental group were trained in the stretching exercises. The distribution of the monitored sample according to age, sports experience, and the length of the period of low back pain complaints, is presented in the Table 1.

Table1.*The Contingent in Control and Experimental Groups Distribution*

Group	Age (years)		Sport experience (years)			Complaint duration				
	30-40	41-50	5-10	11-15	over 15	3-6m.	6-12 m.	2-5 years	6-10 years	over 10 years
EG n=30	18	12	12	10	8	5	7	6	8	4
Control n=28	17	11	8	11	9	3	8	7	6	4

In order to take into account the effectiveness of the additional training program in the two groups we investigated the parameters in the beginning and in the end of the three month period of observation. During this period the sportsmen of experimental group executed stretching program before and after each training, and in the days without trainings (three times weekly) – self dependant training at home. One year after the beginning of the experiment we used questionnaire in order to register relapsing lumbosacral pain.

3. RESULTS

Pain intensity The dynamics of the pain intensity in the control and experimental groups is presented in Table 2. In the experiment beginning, both groups have similar levels of pain intensity – 5.20 ± 0.96 for experimental and 5.57 ± 0.84 points for CG (fig.1), the difference between them is statistically unreliable.

Table2.*Results for Pain Intensity in Both Groups*

Pain	n	I study		II study		Growth		Statistical significance	
		X_1	S_1	X_2	S_2	d	d%	Z(T)	P (t)
EG	30	5,20	0,96	1,60	0,97	-3,60	-69,23	4.92	100,00
CG	28	5,57	0,84	3,29	1,15	-2,28	-41,03	4.76	100,00
Difference		-0,371		-1,686		-1,314			
Statistical significance	Z(U)	1,604		4.73		8,18			
	P(U)	89,10		100,00		100,00			

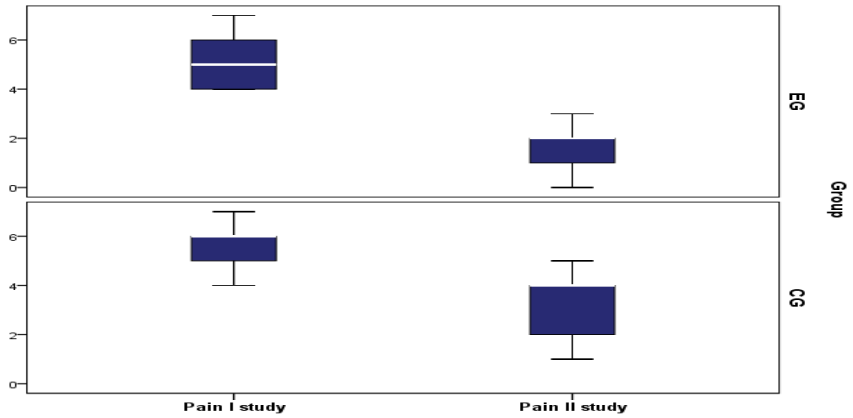

Fig1. *Pain Intensity of Both Groups*

In the course of monitoring the EG tennis players realise reliable pain reduction with 3.60 points. In a lesser extent (2.28 points) statistically significant changes occurred in the CG subjects as well. The fact that the difference in the tennis players state from the two groups at the end of the experiment (EG - 1.60±0.97 and CG - 3.29±1.15 points) is statistically significant, but the pain intensity reduction for EG was statistically significantly greater than that of the CG is indicative for the good analgesic effect of the additional training program. In the first study, this indicator has a similar level in both groups. Minimal difference of 0.04 points is statistically unreliable. At the end of the experiment, the reduction of the shortening in the two groups is statistically significant. The muscle relaxes significantly better in EG (54.84%) thus the difference in the final data for the two groups (EG – 0.93±0.52 and CG – 1.64±0.49) is statistically reliable.

4. CONCLUSION

The observed tennis traumatism is light and rarely causes the training activities termination. The upper limb is most frequently affected, because of wrong technique, grip or racket position to the playing arm. The next are spine and lower limb traumas with almost equal percentage, provoked by disturbed integration processes, reflecting the completeness of the strike at combining the separate phases in one whole technical action. The frequent hyperextension motions of the spine in combination with errors in the technical implementation and in the combination of strike phases (especially in extreme conditions) are the main cause for muscle imbalance and chronic lumbosacral area pain development in tennis players. Applied before and after every training session programme, with specialised stretching exercises, improves the motor control over the muscles and their relaxation ability that results into reliably expressed reduction of muscles shortening in the EG. This reduces significantly the pain intensity, and affects the participants' disability level.

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