

## SOFT TISSUE MOBILIZATION OF THE CERVICAL SPINE

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### Abstract

Based on 88 matches of 2014/2015 First Croatian football league we established the importance of penalty kicks considering the final outcome of the match and the competition. Using Mann-Whitney test and Pearson correlation coefficient we concluded that penalty kicks as situational efficacy indicators pose a statistically significant difference between the winning and the defeated team ( $p=0,04$ ), and there is a moderate negative relation to final placement in league system of competition ( $r=-0,54$ ). These results show that penalty kicks influence the outcome of the match, and if they are repeated, they have a negative effect on final placement.

**Key words:** penalty kicks, notational analysis, situational efficacy, football, warnings

### Introduction

Cervical spine is subjected to considerable dynamic and static loads due to its great mobility. It is often traumatized and trauma is a significant etiologic factor for vertebral disorders (K. Levitt, 1981). Improper posture of forward head, prolonged static load, muscle hypertonia and functional blockages are causing reduced mobility in this part of the spine, headache radiates to the temple, dizziness, feeling of numbness and heaviness in the shoulder girdle.

### Aim

The aim of this study was to approbate methodology for mobilization of the cervical region in functional blockages and improve muscle balance by manual soft tissue techniques.

### Material and methods

For the period December 2015 - March 2016, we treated 36 active athletes (16 men and 20 women) with cervical pain syndrome and a mean age 24.8 years. The treatment was conducted on an outpatient basis, on the premises of the Recreational center of "Goce Delcev" University in Štip. At the beginning and end of the treatment course we assessed:

- a) Manual diagnosis of joint mobility in the cervical segment from cranial to caudal (J. Dvorak et al., 1997);
- b) Assessment of muscle tone in static muscles (J. Dvorak et al. (1997);
- c) Goniometry of flexion with rotation - the limited motor function of the cervical spine (T. Todorov, 2005);
- d) Self-assessment of pain and subjective complaints visual analog scale;(VAS)
- e) Hautant test for latent dizziness (K. Levitt, 1981);

- f) Assessment of posture (K. Levitt, 1981).
- g) In 23 patients we established blockages on level C0 - C1, in 9 - level C1 - C2 in 6-level C2 - C3. After consulting with a specialist to exclude contraindicated pathologies for massage and mobilization, patients underwent a treatment for 30 days (2-3 procedures per week).
- h) Therapy program included 8-10 min infrared heat in combination with TENS and 15-20 min soft tissue mobilization of the cervical vertebra, manually applied axial traction and passive manual mobilization ventricle with dorsal inclination / reclination rotation by W. Schneider et al. (1989) repeated 15-20 times to achieve the unblocking effect of manipulation (K. Levitt, 1981). The procedure ends with post isometric relaxation (PIR) for the hypertonic muscles and exercises for auto relaxation recommended exercise at home.

### Results and discussion

The results were processed statistically by analysis of variance (with a limit of credible significance at  $p < 0,5$ ). Table. 1 presents the results from the manual diagnosis before and after the treatment.

Direct treatment of muscle hypertonia and vertebral blockages leads to a rapid normalization of muscle balance and correct "joint play" in the cervical spine.

Lasting effect of the unblocking was observed in 81.31% of joints in the cervico - cranial transition, where the most frequently blockages were - 60.53%. At the lower levels blockages are less common, but also the percentage of patients successfully unblocked decreases respectively of 88,89% of C1 - C2 and 83,33% of C2 - C3. The results of the muscle tone are presented in Table 2.

Table 1. Registered blockages

Assessment	Level					
	C 0 - C1		C1 - C2		C2 - C3	
	no.	%	no.	%	no.	%
Before	23	100	9	100	6	100
After	2	8,69	1	11,11	1	16,67

Table 2. Registered hypertonic muscles

Assessment	Hypertonic muscles							
	m. trapezius		m.levatorscapulae		m.sternocleido- mastoideus		mm. scaleni	
	no.	%	no.	%	no.	%	no.	%
Before	33	100	29	100	15	100	17	100
After	3	9,09	3	10,34	3	15	4	23,52

86,28% of the increased muscle tone, responded well to the applied manual mobilization methods. We registered decrease in muscle tone in all tested muscles, but most pronounced in m. trapezius and m. levator scapulae. Lesser relaxation was registered in m. Sternocleidomastoideus - 85% and mm. scaleni - 76,49% respectively. Static and dynamic pain in the head, neck and shoulder girdle is the main symptom due to which patients seek medical advice. It is influenced by both the intensity of the mechanical irritation of the cervical area (the degree and direction of blockages), and the reflective changes induced by muscle tone. Complaints have paroxysmal character. Pain is asymmetric, occurs most frequently after sleep, prolonged maintenance of awkward posture or a movement. Mobilization of intervertebral joints reduces the nociceptivestimulus, at the end of the treatment, pain was reduced by 6.3 percentage points ( $p < .05$ ). We registered residual pain of 1.8 points with cervical-occipital localization without frontal or temporal irradiation. With lower intensity, it manifests itself in fatigue and causes less subjective complaints in patients. Normalization of muscle tone and improvement of motion in the

cervical spine significantly improves agility, anterior flexion and rotation increased by 8,3 °, reaching an average 87,8 °. With improved coordination between the muscles, the movements are performed smoothly, harmoniously and painlessly.

As an organ for balance, the spine reacts to intervertebral blockages, muscle imbalance and pain by shifting the center of gravity, changes the posture and unevenly loads the legs. Any deviation from the physiological curvature is accompanied by greater muscular effort to maintain equilibrium. The test for static burden on lower limbs at the end of the treatment course shows normalization in 91.67% of the patient (difference of 0 to 2 kg). Only in three patients the difference between the two weights exceeded 5 kg, that can be considered (K. Levitt, 1981). In the initial study sample Hautanttest (showing latent dizziness) was positive in 80.56% of the patients (11 cases - left and 18 - right), after the treatment 5.55% (2 patients - right). The conducted manual treatment leads to disappearance of subjective complaints of numbness in the cervical spine and dizziness at 94.45% of the observed patients.

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## MOBILIZACIJA MEKOG TKIVA VRATNE KRALJEŽNICE

### Sažetak

*Cilj ove studije bio je procijeniti učinke neke tehnike masaže i mobilizacije na funkcionalne blokade u vratne kralježnice. Istraživanje je obuhvatilo 27 aktivnih sportaša sa sindromom boli i blokadama u gornjem dijelu vrata. Pacijenti su tretirani s ručnim tehnikama - trakcija, mobilizacija, masaža i post izometričke opuštanje. Prije i nakon tretmana ispitali smo mobilnost i zglobnu igru u vratu, mišićni tonus, stupanj boli, statička nosivost donjih ekstremiteta, Hautant test za procjenu latentnih vrtoglavica i subjektivne pritužbe pacijenata. Analizirajući rezultate, možemo zaključiti da je najčešći blokade nalazi u lubanjo-cervikalni prijelaz brzo podleći deblokadi i obnovu "zajedničkog igranja" uklanja bol u mišićima hipertonijske, poboljšava pokretljivost, normalizira statičko opterećenje na donjim ekstremitetima učitava cijeli kinetički lanac kralježnice i poboljšava držanje tijela.*

**Ključne riječi:** bol, vratna kralježnica, meko tkivo, mobilizacija

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