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## Massage versus Kinesio Taping. Possibilities to Enhance the Kinetic Program in Mechanically Triggered Neck Pain

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### Abstract

Mechanically triggered cervicgia is frequently encountered in persons holding a fixed, monotonous position and it causes pain at the level of the cervical paraspinal muscles and ligaments which may be associated with muscular contraction, with stiffness and blocking of the upper thorax and shoulders.

The study we have undertaken started out from the assumption that massage, on the one hand, and kinesio taping, on the other hand, in association with physiotherapy, can yield different effects in obtaining painlessness, diminishing discomfort and enhancing the range of motion in the cervical region.

For testing purposes we used: the pain numeric scale (0-10), the neck disability index (NDI) and the range of motion testing (CROM). The patients belonging to the experimental and control groups were dynamically tested at the beginning of the study and after a week during which they underwent differential treatment.

The test results showed a minimal difference between the two groups from the point of view of pain, discomfort and range of motion in the cervical region; the patients benefiting from kinesio taping recorded a more rapid reduction of pain.

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*Keywords* : cervicgia, kinesio taping, massage, physiotherapy;

### 1. Introduction

Mechanically triggered neck pain is frequent in the case of persons maintaining monotonous, fixed position for extended periods of time and represents a pain at the level of the para-spinal muscles and ligaments, which may be associated with muscular contraction, stiffness and blocking of the upper thorax and of the shoulders (Bickley and Szilagyi, 2009).

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Школа кинезиотейпирования "KinesioCourse"

Multi-modal therapy proved efficient in mechanically triggered neck pain (Neubauer et al., 2006; Cuesta-Vargas et al., 2013). Neubauer et al. (2006) noticed that (subsequent to a study conducted in 2006) the association of several kinetic means, both specific and non specific, with modern therapy methods fosters a more rapid reaching of the treatment objectives, a single form of approach being insufficient.

In a study conducted in 2012 on 80 subjects, Saavedra-Hernandez et al. (*apud* Cordun, 1994) highlighted the similitude of the results obtained following the use of two forms of treatment, respectively cervical thrust manipulation and kinesio taping in patients with mechanically triggered cervical pain; the pain and the disability were diminished in both groups, and the amplitude in the cervical region improved more in point of rotation movement in the group to which manipulation was applied.

Massage is a non specific means of physiotherapy and consists in the “methodical, mechanical processing”(Cordun, 1999, p. 268) of soft anatomical structures with a relaxing, decongestive and vasodilation effects for the case we analyse (Gonzalez-Iglesias et al., 2009).

Kinesio taping, a passive intervention method, used in the mechanically triggered neck pain, proves efficient in diminishing pain by stimulation of blood circulation and induction of muscular relaxation (Cordun, 1999; Saavedra-Hernandez et al., 2012; Gonzalez-Iglesias et al., 2009).

The effects as well as other considerations relating to the two forms of treatment chosen in this pilot study are illustrated in the table below (see Table 1) (Gonzalez-Iglesias et al., 2009; Saavedra-Hernandez et al., 2012).

Table 1. Massage/Kinesio taping Parallel

	Massage		Kinesio taping
Effects on tegument	Vasodilatation		Vasodilatation Rarely, allergic reactions
Muscular effects	Relaxing, decongestive		Relaxing Muscular facilitation Ensures positional stimulus of tegument, muscles, or fascial structures Limits the amplitude of affected tissues movement
Circulation effects	Venous – fosters return circulation Lymphatic – fosters resorption of edema Arterial – increase blood flow		Reduction of edema by decrease of exudative substances Increases local circulation
	NS effects	Sedative	Insures an input specific to CNS
	Analgesic		Analgesic
Procedures cost	XX		XXX
Physiotherapist effort	XXX		X
Medicines	XXX		-
Environment conditions	XXX		X

NS – nervous system, CNS – central nervous system, X, XX, XXX - Involvement level- minor, medium, high

### 1.1. Aim of the paper

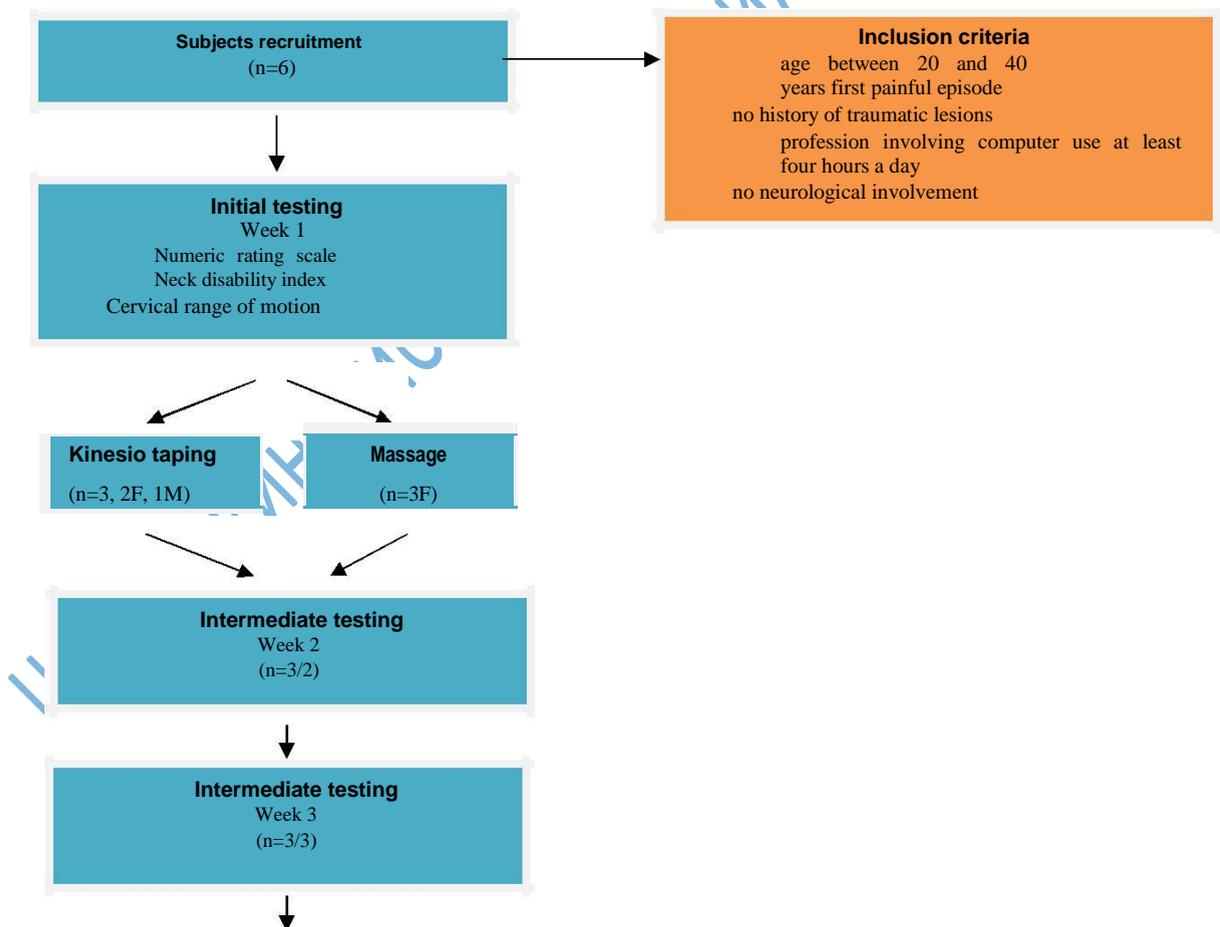
The study we aim to conduct is founded on the premise that massage, on the one hand and kinesio taping, on the other hand, associated with a kinetic program have different impacts in obtaining painlessness, minimizing discomfort and increasing articular amplitude in the cervical area.

### 1.2. Work hypothesis

Conducting a physical education program, preceded by massage or followed by the application of kinesio tapes, may generate diminution or disappearance of pain and increase of the cervical movement amplitude in persons having a static professional activity.

## 2. Methods

This study lasted four weeks and was conducted on six subjects, who came to the medical gym of the Medical Center for Diagnosis, Ambulatory Treatment and Preventive Medicine of Bucharest, with a recommendation for recovery treatment of mechanically triggered neck pain. The following chart illustrates the study algorithm (see Fig. 1).



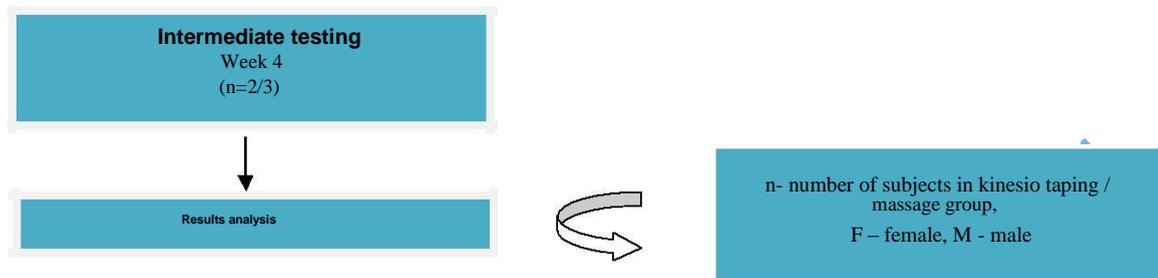


Fig. 1. Research algorithm

The patients included in the study were informed on the research we were conducting and agreed to participate, but expressed the wish that confidentiality be kept as to their identity. The groups were set at random, and the subjects were asked not to use anti-inflammatory drugs during this period.

Here are the criteria for inclusion in the study:

- age between 20 and 40 years; first painful episode;
- no history of traumatic lesions;
- profession involving computer use at least four hours a day; no neurological involvement.

Subjects were initially tested with the pain numeric rating scale (0-10), the neck disability index (NDI), and the range of motion testing (CROM). The first two tests are subjective and depend, to a large extent, on individual particularities related to the pain threshold of each participant in the study; testing the range of motion is the method offering objective data for our study.

The pain numeric rating scale has 11 levels of intensity: 0, the subject has no pain, then mild pain (1-3), moderate pain (4-7) and severe pain (8-10). The patient tested with this scale needs to select a number corresponding to the pain intensity he/she feels in that moment.

The neck disability index has 10 items: pain intensity, personal care, lifting, work, headaches, concentration, sleeping, driving, reading and recreation. The patient needs to select the answer describing most precisely the situation at the moment the questionnaire is filled in. The numbers resulting from the answers are added to obtain the score. The double of the score represents the disability percent, which is: minimum (0-20%), moderate (21-40%), severe (41-60%), invalidating (61-80%), and bed bound (80-100%).

The device with which we use to measure the range of motion (CROM) is a state of the art instrument and offers a much higher precision than other existing measurement methods. We surveyed the amplitude of the movements involving flexion - extension, right – left lateral bending and right – left rotation of the cervical spine, without emergence of pain, with the device placed on the patient's head.

The three patients (two women and one man) of the first study group had kinesio tapes applied once a week, after having gone through a program of physical exercises. The kinesio tapes we used are 100% cotton and are made by Towatek Korea Co,LTD, they are 5 cm in width, are adhesive, water resistant, they are not impregnated with any pharmaceutical or medicinal substance and allow the skin to breathe.

We used a biomechanical application of the tapes from the position seated on the chair with the head bent (see Fig.2a). We cut two tapes in a “Y” shape and another one in a “I” shape. We applied the “Y” tapes on the cervical-thorax paravertebral muscles, between C2 and T2. We applied tape “I” over the first tapes, at the level of C7.



Fig.2. (a) Kinesio taping neck pain; (b) Kinesio taping neck pain with vertigo

The patients of the second study group made of three women, benefited from relaxing massage manoeuvres before each physiotherapy session. The position of the subjects was ventral and dorsal decubitus. For the massage we used olive oil, without any anti-inflammatory substances; at the end of the massage manoeuvres, we conducted passive mobilizations in the position dorsal decubitus and seated, in all directions and on the overall range of motion possible in that moment.

All subjects went through a program of physical exercises – active static and dynamic with resistance exercises three times a week, and on the first session of each week they were re-assessed. At the end of the four weeks of treatment, they were subject to final testing.

### 3. Results

The results obtained following initial and final testing are listed in the table below (see Table 2).

Table 2. Testing results

Name	E.N.	T.R.	T.R.	S.T.	B.A.	G.D.
Age(years)	36	27	37	32	37	27
Gender	F.	F.	M.	F.	F.	F.
Treatment	kinesio	kinesio	kinesio	massage	massage	massage
Pain scale(i./f.)	9/0	8/0	10/2	7/0	5/1	6/2
NDI(i./f.)	46%/8%	24.44%/2%	48%/14%	24%/2%	24%/6%	28%/12%
Flexion (i/f)	17.8°/37.3°	36.2°/40.1°	20.4°/44.6°	35.8°/42.6°	40.6°/51.2°	43.6°/50.4°
Extension (i/f)	40.6°/46.3°	45.4°/53.6°	38.2°/50.6°	45.3°/55.8°	46.7°/50.2°	40.7°/51.1°
r.L.B.(i/f)	22.2°/46.2°	30.1°/47.2°	28.3°/42.8°	33.8°/53.2°	42.8°/49.2°	40.7°/48.8°
l.L.B. (i/f)	28.5°/48.4°	37.4°/42.1°	23.4°/42.6°	30.5°/53.4°	40.3°/46.7°	40.3°/50.2°
r.R. (i/f)	46.3°/62.2°	52.3°/60.3°	32.2°/52.6°	53.3°/64.2°	55.8°/58.3°	54.3°/60.7°
l.R. (i/f)	57.2°/61.2°	50.1°/57.6°	34.1°/48.7°	57.2°/63.3°	53.4°/57.3°	55.2°/61°

F. - female, M. - male, i. - initial, f -final, NDI - neck disability index, L.B. - lateral bending, R. - rotation, r.- right, l.- left

In order to facilitate comparison of the progress of the two groups, we calculated the arithmetical average of the initial and final testing results (see Table 3), the balance between them as well as the inter-group average (see Table 4).

Table 3. Arithmetical average of the initial and final testing results

	$\bar{X}_{ki}$	$\bar{X}_{kf}$	$\bar{X}_{mi}$	$\bar{X}_{mf}$
Pain scale	9	0.66	6	1
NDI (%)	39.48	8	25.33	6.66
Flexion (°)	24.8	40.66	40	48.06
Extension (°)	41.4	50.16	44.23	52.36
r. L.B. (°)	26.86	45.4	39.1	50.4
l. L.B. (°)	29.76	44.36	37.03	50.1
r. R. (°)	43.6	58.36	54.46	61.06
l. R. (°)	47.13	55.83	55.26	60.53

$\bar{X}_{ki/kf}$  - arithmetical average of the initial and final testing results of the group to which kinesiio-taping was applied,  $\bar{X}_{mi/mf}$  - arithmetical average of the initial and final testing results of the group to which massage was applied, NDI- neck disability index, L.B.- lateral bending, R- rotation, r.- right, l.- left

Table 4. The difference of arithmetical averages of the testing results

	$\bar{X}_{kf} - \bar{X}_{ki}$	$\bar{X}_{mf} - \bar{X}_{mi}$	$(\bar{X}_{kf} - \bar{X}_{ki}) - (\bar{X}_{mf} - \bar{X}_{mi})$
Pain scale	-8.34	-5	-3.34
NDI (%)	-31.48	-18.67	-12.81
Flexion (°)	15.86	8.06	7.8
Extension (°)	8.76	8.13	0.63
r. L.B. (°)	18.54	11.3	7.24
l. L.B. (°)	14.6	13.07	1.53
r. R. (°)	14.76	6.6	8.16
l. R. (°)	8.7	5.27	3.43

$\bar{X}_{ki/kf}$  - arithmetical average of the initial and final testing results of the group to which kinesiio-taping was applied,  $\bar{X}_{mi/mf}$  - arithmetical average of the initial and final testing results of the group to which massage was applied, NDI - neck disability index, L.B.- lateral bending, R - rotation, r. - right, l. - left

#### 4. Discussions

The study lasted four weeks, during which the patients underwent a bimodal treatment, consisting in physiotherapy doubled, in the case of one group by kinesiio taping, and in the case of the other group, by massage.

The group to which kinesiio tapes were applied recorded a more rapid decrease of pain score, though one of the patients had a vertigo episode immediately after the procedure, which determined us to modify the application (Fig.2b). Pain decreased from 9 to 0.66 points, and NDI reached 6% on the final testing, this highlights a diminishment from a severe disability level to a minimum one.

Both groups exhibited an increase of range of motion for each movement; the first study group experienced it especially on flexion movements (by  $7.8^{\circ}$ ), right lateral inclination (by  $7.24^{\circ}$ ) and right rotation (by  $8.16^{\circ}$ ), an issue we aim to further study in a future research.

One patient of lot one did not appear at the testing on the forth week, saying that she felt very well.

The massage session, three times a week, resulted in the diminishment of the pain score from 6 to 1, and the NDI reached 6,66% as compared to 25.33% at the initial testing.

One participant to the study did not attend, for personal reasons, the sessions of week 2.

The differences between the two study groups are not significant, the only parameter recording an obvious decrease was the pain score (-3.34), which for the kinesiio group lowered from the second week.

## 5. Conclusions

Though the differences between massage and kinesiio tapping are major in point of technique, the results obtained on the two study groups are similar.

All participants had good results regarding pain, NDI and range of motion, however, certain parameters increased in a different way between the two groups, which confirms the hypothesis of our study.

The modifications of the pain score were significant for the lot to which kinesiio taping was applied, it increased from 9 to 0.66, but it also recorded an increase in the amplitude of the flexion movements, of the right lateral bending and of the right rotation.

The study duration allowed us to notice the rapid effects of the treatment we applied; a larger period would be required to look at possible recurrences and massage long term effects, respectively those of kinesiio taping on cervical pain. Furthermore, for a higher efficiency of the methods applied, a larger number of subjects is required.

This research was meant to be a pilot study that would highlight the possibility to obtain favorable results by applying a relatively new method (kinesiio taping).

The short time required to apply kinesiio tapes, the unpretentious environment conditions, the minimum effort from the part of the physiotherapist, and also the benefic healing effects recommend kinesiio taping as an extremely important alternative in the treatment of cervical pain.

The association of kinesiio taping and massage with other treatment methods may be a subject of study for further research in order to contribute to the optimization of the protocol for the recovery from mechanically triggered neck pains.

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