

## KINETIC METHODS OF TREATMENT IN WHIPLASH – REAR-END

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**Key Words:** whiplash, injury, collision, treatment, physical therapy.

### **Abstract:**

Whiplash is a neck-head trauma, and is most commonly encountered in auto accidents or sports in which speed is one of the contributory factors. The mechanism relates to the collision between two vehicles. The important factors to be considered are the direction of impact, speed and vehicle type.

**Research hypothesis:** application of kinesiology methods in rehabilitation after whiplash, leads to rapid decrease of pain, increase of flexibility, increase of ROM (RANGE OF MOTION) of the cervical spine.

### **Materials and methods**

The experiment was conducted at the Swimming Pool and Kinesiology Complex, University 'Stefan cel Mare of Suceava ', taking as a case study, two people, C.M. and G.D., who were involved in whiplash, rear-end collisions. Subjects were initially evaluated and periodically every month, then finally every four months, applying the neck disability index (GDI) for pain assessment and quality of life and testing them for mobility at the cervical region, measuring the index from menton to stern, tragus to acromion, menton to acromion, occiput to the wall.

### **Results**

After the final evaluation was a significant improvement such as decrease of pain intensity and increase of life quality.

The amplitude of movement at the cervical level increased from one to another assessment, observing that at the final assessment the flexion, extension, side movements and rotation are very close to the normal limits of ROM, for patients receiving kinesiology treatment.

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vehicles. The important factors to be considered are the direction of impact, speed and type of vehicle. At the time of impact the thorax moves forward quickly. In the next moment of inertia of the head, there is acceleration, which is relative to the back of the head and the neck.

The collisions that occur through the front impact, the chin hits the sternum before the cervical spine makes the movement with maximum amplitude.

In side collisions, the head hits the shoulder before the cervical spine makes the movement with maximum amplitude.

When the collision occurs by hitting the back and the seat back is not sufficiently high, there is no limit for the hyperextension movement. For this reason this type of collision is considered the most traumatic and the symptoms persist up to a year and even more than that.

Diagnosis of these injuries is sometimes very difficult due to lack of concrete evidence, even after the MRI or X-ray, despite of the existing symptoms.

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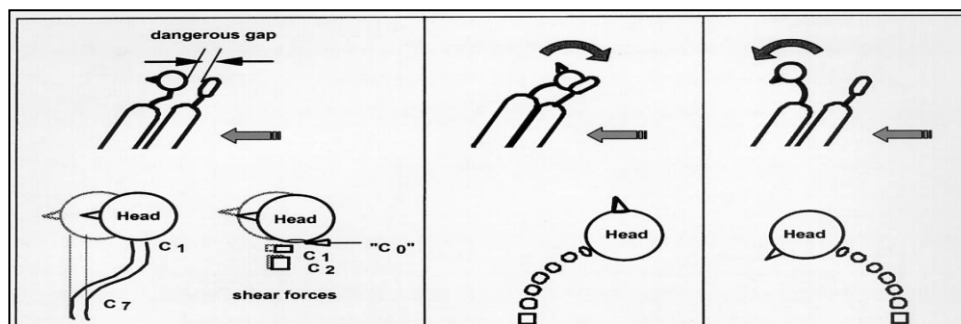
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*Fig. no. 1. The mechanism of injury in rear end collisions (By Felix Walz)*



Phase I  
Phase II.  
Phase III  
Transition  
Extension max  
Coming back to flexion

In diagnosis, assessment and treatments plan a lots of experts from many fields are involved: orthopedists, surgeons, neurosurgeons, chiropractors, physical therapists, kinesiology specialists, occupational therapists, massage therapists, psychologists.

Whiplash causes migraine type headaches, insomnia, neck stiffness symptoms due to primary injury. They may last a year or even more than that. This injury affects the muscles, tendons, ligaments, nerves, joints, bones and viscera of the neck and much more. In these cases, ethics and conduct, patience and professionalism are very important, also sedative drugs, analgesics, and anti-inflammatory medication, to be followed and taken as prescribed to prevent recurrences.

Whiplash phases are:

- Acute phase-Whiplash I;
- Sub acute phase-Whiplash II;
- Chronic phase-Whiplash III.

**Acute phase lasts 24-48 hours to 2 weeks.**

Because of the hyperextension of the head and cervical spine, SCM is the most affected, it contracts, enters into spasm or may suffer fibers strains. If the speed is high at the beginning of impact, the longus colli muscle can be overloaded and stretched or strained, also the anterior longitudinal ligament (ALL) and the fibrous ring may be affected. During the hyperextension, the joints surfaces may suffer capsular stretching or even worse, ruptures. Generally the pain is minimal and the mobility is normal immediately, after whiplash occurred. Symptoms appear later in 24-48 hours or even up to two weeks later. Also there may be cracks, fractures in the vertebrae, elongation of the nerve root, spinal cord contusion. Therefore, radiography and MRI are important.

At the assessment, the skin shows redness, and the local temperature in the muscles is increased. Palpation assessment reveals stiffness and rigidity. The spasm or contractures are present. Local edema and swelling are present. Also it can be detected palpable muscles strains or even ruptures, in the proximal third of the neck.

**Sub acute phase lasts from 2-10 weeks.**

Superficial muscles such as SCM and the longus colli muscle are relaxed and no longer present contractures. In this stage, some testing can be performed, that are avoided in the acute phase. The pain is deep with lots of trigger points in different areas: between shoulder blades, shoulders, arms.

Edema disappears and the heat is local. ROM is improving considerably. The facets joints of the cervical spine vertebrae, which are known that, they are the size of the little finger IF distal joints, suffer micro-lesions and at the capsular level and these may cause stiffness or joints degeneration.

**Chronic phase**

In the chronic phase symptoms of irritation of the somatic deep structures are present. The pain is diffuse, deep, persistent trigger points that are referred in the head, shoulders and sub occipital. False type headache migraine caused by trigger points of the multifidi muscles at the level of the vertebrae C4, C5, C6, are present. As a result of the healing process, the joints fibrosis occurs.

Total recovery takes long time.

**Research hypotheses:** Application of kinesiology methods in rehabilitation after whiplash leads to rapid decrease of pain, increase of flexibility, increase of ROM of the cervical spine.

Next to physiotherapy, the exercise and massage have a significant role beyond traditional methods with medication. Both mobilizations and PNF exercises are essential to recovery and social reintegration of those who were victims of whiplash.

**Materials and methods**

The actual experiment was conducted at the Swimming Pool and Kinesiology Complex, University "Stefan cel Mare of Suceava " taking as a case study two people, C.M. and G.D., who were involved in whiplash, rear-end collision.

G.D. has received medication and psychological counseling.

C.M. has received medication, psychological counseling, kinesiology treatment, which consisted of massage, manual therapy, passive mobilizations, passive-active, active and active resisted mobilizations, for four months going through acute, sub acute and chronic phases.

*Acute phase - 2 weeks*

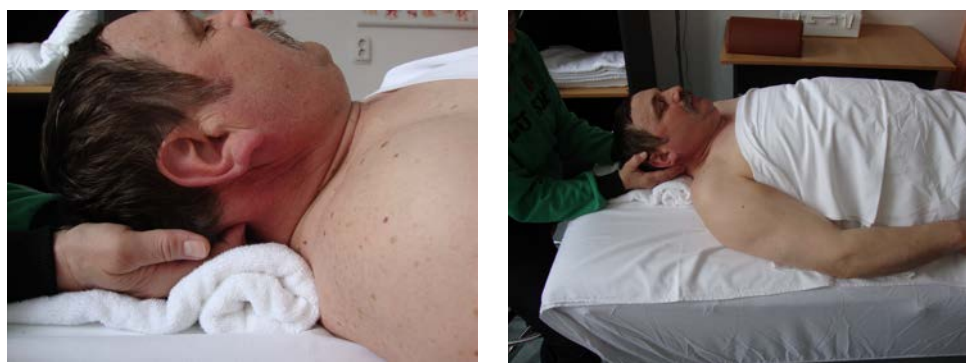
*Objectives:*

- Decrease of pain and pain relief;
- Decrease of inflammation;
- Maintain correct posture;

*Treatment:*

- Use an appropriate special neck support (collar type), to control muscle relaxation and good posture;
- Hot-cold applications;
- Good posture, analgesics (fig. no. 2);
- Massage to release contractures and pain (Fig. 3).

In about a week the patient should be instructed to perform active cervical spine rotation to keep the ROM.



*Fig No.2-N 3 Positional posture - Massage to decrease contractures.*

*Sub acute phase, 6 weeks*

Treatment was performed three times a week for the first 4 weeks, and 2 times per week for the next two weeks.

*Objectives:*

- Pain relief;
- General and local relaxation;
- Increase of flexibility of the neck;
- Analytical strengthening of the muscles;

*Treatment:*

- Stretching exercises (*fig. no. 4*);
- Active and passive mobilization exercises (are significant to rapid recovery) (*Fig. no.5*);
- Massage on the SCM muscle and on the longus colli muscle to reduce contractures and to increase flexibility;
- Muscle strengthening exercises for the muscles on the back of the neck;

- Breathing exercises to help eliminate free radicals and metabolites in cervical muscles.

Precautions!

- Do not mobilize hyper mobile joints.
- Joint mobilization is performed in the limit of pain.
- The ROM must be increased using manual analytic therapy.



*Fig. no. 4 - Stretching Exercise mobilization*



*Fig. no. 5 Auto-passive mobilization*

#### *Chronic phase, 8 weeks*

In this phase were applied 3 times a week some common kinesiology techniques associated with massage and spinal manipulation once a week. Each treatment session lasted approximately 45 *minutes*.

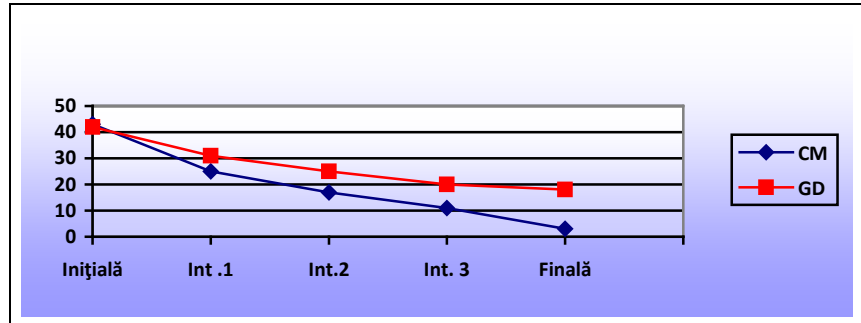
Objectives:

- Reduction of joint fibrosis acquired as a result of the healing process;
- To increase ROM, especially extension movement;
- To increase muscles strength.

#### **Results and discussion:**

Subjects were initially evaluated periodically every month and finally every four months, applying The neck disability index, (GDI) for pain assessment and quality of life and testing the mobility at the cervical segment, measuring the indices: menton-stern, tragus-acromion, menton-acromion, occiput-wall.

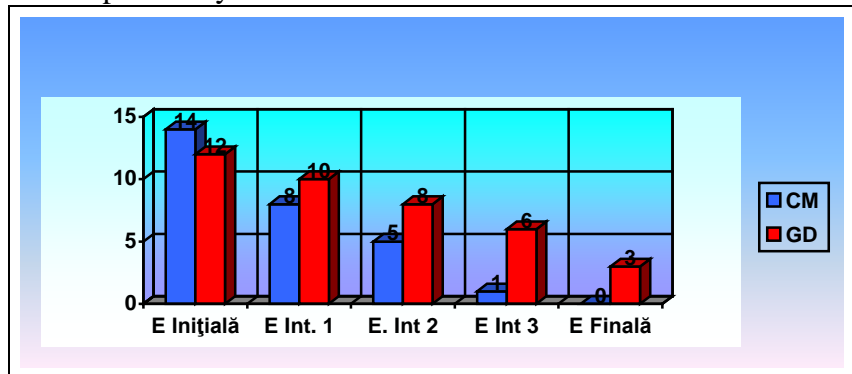
Graphic 1: dynamic of IDG evolution



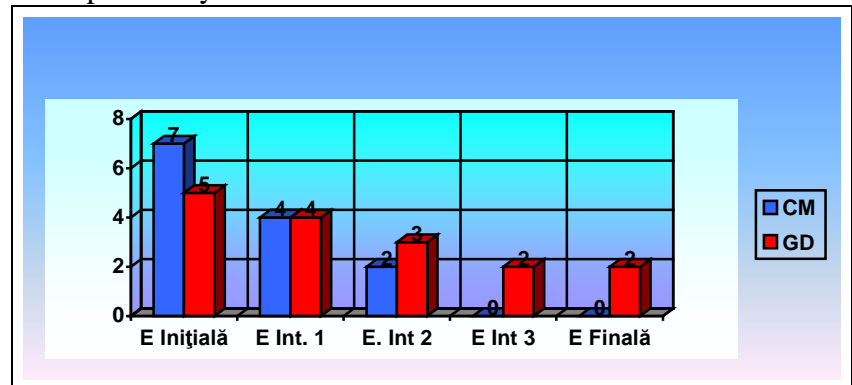
After the final evaluation was a significant improvement by reducing the intensity of pain, increase of the ability to perform certain activities, increase of capacity to concentrate, increase of sleep quality in patients receiving kinesiology, according to the index of GDI.

The ROM of the cervical spine, increased from one to another assessment, observing at the final assessment that: the flexion, extension, side movements and rotation values approaching to the normal limits for patients receiving kinesiology.

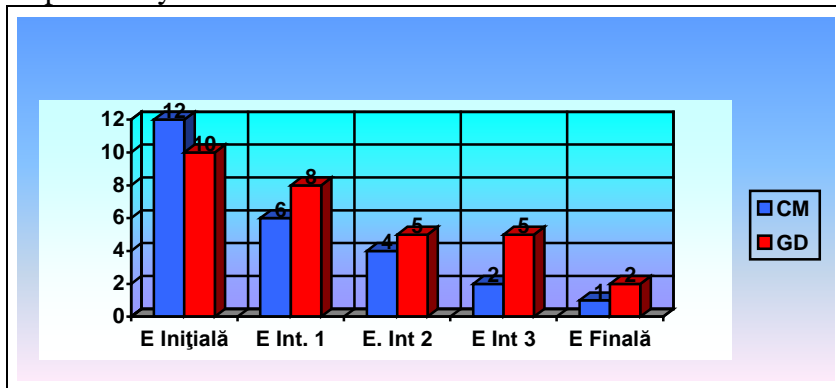
Graphic 2: dynamic of the evolution of the cervical flexion



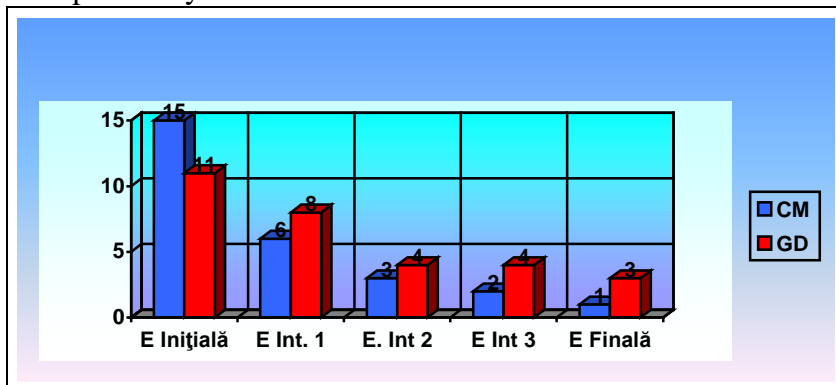
Graphic 3: dynamic of the evolution of the cervical extension



Graphic 4: dynamic of the evolution of the cervical side movement



Graphic 5: dynamic of the evolution of the cervical rotation....



The patient who followed the treatments with medication and psychotherapy, ROM has improved, but the values were lower in patients receiving kinesiology.

### Conclusions

- Application of kinesiology methods in rehabilitation after whiplash, leads to rapid decrease of pain, increase of flexibility, increase of ROM of the cervical spine.
- Pain is the only one to guide our subsequent treatment.
- The passive treatment prolongs the pain and symptoms; active exercises are the most effective.
- Next to physical therapy, exercise and massage plays an important role in recovery post whiplash beyond conservatory method of treatment with medication.



- Simple mobilizations and PNF exercises have proven to be essential in recovery and social reintegration of those who were victims of whiplash.
- The benefits of kinesiology are undeniable in improving and controlling the symptoms of this type of injury.
- A well organized and individualized treatment is to prevent recurrences and complications.

### **Discussion**

This work has partially restored Whiplash's complexity. I want to be a messenger in posttraumatic recovery, and to ask all the kinesiology specialists, to assess and to pay more attention to this type of trauma, frequently found in highly developed countries and where is allowed to drive with high-speed on highways and there is a large fluctuation of vehicles.

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**Titlu:** Metode de tratament kinetic in whiplash – rear-end (coliziune din spate).

**Cuvinte cheie:** whiplash, traumatism, coliziune, tratament, kinetoterapie.

**Rezumat:** Whiplash este un traumatism cervico- cranian care se întâlnește cel mai des în accidentele auto sau sportive în care viteza este unul din factorii favorizanți. Mecanismul de producere se referă la

coliziunea dintre două autovehicule. Factorii importanți care trebuie luați în considerare sunt direcția de impact, viteza și tipul de autovehicul

**Titre:** Méthodes cinétiques de traitement en whiplash - l'arrière.

**Mots-cle:** coup du lapin, des blessures, la collision, le traitement, la thérapie physique.

**Resume:** Whiplash est un traumatisme du cou-tête, et est le plus couramment rencontré dans un accident automobile ou les sports où la vitesse est l'un des facteurs contributifs. Le mécanisme concerne la collision entre deux véhicules. Les facteurs importants à considérer sont la direction du type d'impact, la vitesse et des véhicules.