STUDY ON THE EFFECTIVENESS OF THE KINETIC METHOD IN PATIENTS WITH RHEUMATIC DISEASES AND TEMPOROMANDIBULAR JOINT DYSFUNCTION

Maria Daniela Havriş¹,², Codrina Ancuţa³,⁴, Cristina Iordache¹
Rodica Marieta Chiriec³,⁴
1. Ph.D. student at University of Medicine and Pharmacy “Grigore T. Popa” - Iaşi
2. University “Ştefan cel Mare” Suceava
University of Medicine and Pharmacy “Grigore T. Popa” - Iaşi
School of Medicine
3. Discipline of Rheumatology - Balneophysiotherapy
Rehabilitation Hospital Iaşi
4. Department of Rheumatology

STUDY ON THE EFFECTIVENESS OF THE KINETIC METHOD IN PATIENTS WITH RHEUMATIC DISEASES AND TEMPOROMANDIBULAR JOINT DYSFUNCTION (Abstract): selecting the appropriate treatment decision is essential for achieving optimal results in the management of algo-dysfunctional syndrome of the temporomandibular joint (TMJD). The study aims to decide on the most effective (symptomatic control, preserved motility) kinetic program in patients with TMJ involvement. Material and Methods: prospective observational study on 83 consecutive patients with rheumatic diseases and TMJ dysfunction. Clinical assessment (pain, noises, muscle spasm, range of motion, ROM) was performed at baseline and after 3 months of specific kinetic rehabilitation program. Change in clinical parameters and TMJ index was reported, p<0.05. Results: over 45% TMJ involvement at baseline as defined by TMJ index (mean value of 13.56) and only 36.66% at 3 months (p<0.05). Significant improvement in pain (presence, severity) was demonstrated at 3 moths (p<0.05): 18.05% spontaneous pain, 75.9% provoked pain, with 12.11% respectively 2.41% decreased in nocturnal respectively diurnal pain. Significant decrease (p<0.05) in joint noises at movements: 27.71% when opening and 12.04% when closing the mouth, 8.43 at protrusion and 3.61% at retraction, while 18% at the side movements. Conclusions: Complex accurate kinetic reeducation is mandatory for achieving correct posture (head, neck and trunk), normal mastication, swallowing and respiration, as well as correction of neuromuscular imbalances in patients with TMJD secondary to rheumatic disorders. Key words: TEMPORO-MANDIBULAR JOINT DYSFUNCTION, THE FUNCTIONAL ASSESSMENT, TREATMENT, REHABILITATION.

About 40% to 70% of adults have experienced at least one symptom related to the temporomandibular joint dysfunction (TMJD), but in the majority of cases it was treated superficially leading to worsening of the symptoms. Due to the complexity and variability of the manifestations, the painful TMJD can initiate significant structural and functional changes, finally leading to impaired work capacity, reduce opportunities to carry out daily activities, and subsequent impaired quality of life (1).
Both inflammatory and degenerative rheumatic conditions may secondary involve TMJ being responsible for a range of pain and mandible dysfunction. (2). Pain, joint cracklings and affected restricted range of motion (ROM) are the mainstay of the clinical background of TMJ participation (2). Therefore, it is widely recognized that the kinetic therapy, through its effects and the applied noninvasive methods, can improve the existing symptoms and may change the patient’s opinion regarding the condition of suffering.

Establishing a treatment plan customizes all general data regarding the clinical, functional and laboratory aspects, as well as the synopsis of all clinical and biological, functional, psycho-socio-economic and behavioral indices. Subsequent kinetic approach requires an accurate functional diagnosis of the TMJ involvement and a choice of the optimal therapeutic solution, based on the theoretical and practical achieved experience, but also on general and local treatment.

Moreover, the kinetic treatment is essential in the setting of persistent TMJD aiming to maintain or restore the functionality at this level leading to structural, functional and aesthetic changes. Choosing the appropriate treatment plan coupled with appropriate therapeutic management is the ideal option for achieving superior results in the treatment of the painful-dysfunctional syndrome of the TMJ.

Given the complexity and variability of the algo-dysfunctional TMJ syndrome, the current study aims to decide on the most effective kinetic program in patients with TMJ involvement.

**MATERIAL AND METHODS**

We performed a prospective observational study during October 2009 and September 2011 on eighty-three consecutive patients with different inflammatory and degenerative rheumatic disorders and secondary TMJ involvement in order to elaborate a complete and correct protocol for TMJD evaluation and treatment.

The study was approved by the Ethics Committee and all patients signed the informed consent before enrollment.

Clinical signs and symptoms of the TMJ involvement were systematically registered at baseline and at three months, including: pain, muscle spasm, noises and bruxism, as well as range of motion (ROM).

Specific medication, physical and kinetic management were promoted in all patients according to the disease and the stage (acute, sub acute, chronic) of the TMJD, aiming to control muscle spasm, referred pain and to restore mandible motility rebalancing the agonist and antagonist muscles groups of the neck and face and proprioceptive recovery. Orthodontic care was required to restore normal occlusion.

All patients were included in a complex kinetic program: 3 sessions per week for the first two weeks, 2 sessions per week for the next two weeks and 1 session per week up to 3 months. The duration of a session was settled between 60 to 90 minutes, intending to obtain the local and general relaxation of the patient.

Several methods and rehabilitation techniques were currently used including general massage of the head and neck; relaxing massage for muscles spasm control (temporalis, masseter, medial and lateral pterigoids, suprahyoids, infrahyoids, digastrics); techniques for detecting and treating trigger points (face, head, neck); passive and active stretching exercises lowering of the mandible, side movements, protrusion and retraction; passive stretching exercises performed through specific movements of the trunk and neck; techniques of intra- and extra-oral mandible
Study on the effectiveness of the kinetic method in patients with rheumatic diseases

Manipulation; resistance exercises for opening and closing the mouth; corrective exercises for posture (head, neck, trunk); proprioceptive exercises of TMJ; diaphragmatic breathing exercises and swallowing rehabilitation exercises.

Statistical analysis. Both descriptive (mean, standard deviation, percentage) and analytic statistics (t-test) were used to analyze difference between visits; statistical significant “p” was settled below 0.05.

RESULTS

Pain

Baseline clinical exam has revealed TMJ pain at palpation (external auditory canal, pretragus, jaw muscles) and mobilization of the mandible, but also during chewing in all patients. After three months, we demonstrated the decrease in pain intensity, as well as the increase in the number of patients presenting moderate and mild pain compared to the initial assessment as shown in figure 1; besides, two patients had no pain. Only 18.05% of cases presented with spontaneous pain and up to 75.9% provoked pain at visit 2; in addition we reported a decrease of 12.11% in the nocturnal pain and 2.41% in the diurnal TMJ pain.

Noises

At the initial assessment 50% of the analyzed cases complained noises at the level of the TMJ: more advanced stage of the disease, more frequent noises in the joint. After three months of treatment we revealed the decrease, even the absence of the joint noises during different movements as follows: 27.71% noises when opening the mouth, 12.04% noises when closing the mouth, 8.43% at protrusion, 3.61% at retraction, while 18.07% of cases presented with noises at the side movements (fig. 2).
**Muscle testing**

The manual muscle testing was performed in all patients on masseter, temporalis, medial and lateral pterigoid, digastric, sternocleidomastoidian and longus colli muscles, looking for the presence of pain, spasm and atrophy. The initial testing showed pain in the majority of cases (84.61%) in the masseter muscle, as well as in 65.38% of cases in the temporal muscle, the main masticators muscles. After three months of specific kinetic treatment, we demonstrated a decrease of pain in the tested muscles, about 25 to 30%. Keeping the same algorithm of muscle pain, the main masticators muscles (temporal, masseter) remained the most affected.

**Muscle spasm and muscle atrophy**

Muscle spasm was accompanied or caused by pain and was reported at baseline in about half of patients (51.91%) in the masseter, 26.92% in the temporal, 13.46% in the median and lateral pterigoids, and in 17.30% in the sternocleidomastoidian muscle. Muscle spasm significantly decreased (p<0.05) after three months of treatment and allowed proprioceptive mandible movements in various positions with increasing amplitude and severity.

On the other hand, muscle atrophy was present in a small proportion of patients as compared with other parameters both in the initial and final testing.

**Range of motion**

Baseline assessment showed a decrease in the ROM at the TMJ as follows: 15.38% for opening of the mouth, 29.9% for the side movement, 21.15% for protrusion, 1.92% for the retraction movement. Limitation of the mandible mobility resulted in diet restriction, disruption of daily activities and impaired quality of life. After three months of kinetic treatment, ROM at the TMJ significantly (p<0.05) improved, the majority of patients showing even normal parameters, with significant progress of quality of life.

**TMJ index**

Furthermore, a TMJ index was calculated for each patient; the TMJ index is centralizing data on pain (severity and duration), joint noises, vicious habits, joint ROM and muscle status. We obtained an average value 13.56 at the initial testing, meaning a TMJ involvement of over 45%. After three months, TMJ involvement was reported in only 36.66%, indicating a decrease in joint dysfunction along with an increase in the physical and psychological comfort of the patients (fig. 3, tab. I).

**TABLE I**

<table>
<thead>
<tr>
<th>TMJ INDEX</th>
<th>No</th>
<th>MED</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Testing</td>
<td>83</td>
<td>15.01</td>
<td>3391</td>
</tr>
<tr>
<td>Testing after 3 months</td>
<td>83</td>
<td>11</td>
<td>2798</td>
</tr>
</tbody>
</table>

![Fig. 3. Evolution of the TMJ index](image-url)
Moreover, in our study we obtained a correct posture of the head, neck and trunk, a normal mastication, deglutition and respiration, as well as the increase of the range of motion in the TMJ, overcoming the neuromuscular imbalances.

DISCUSSION
It is actually widely recognized the benefit of kinetic therapy in the rehabilitation of the algo-dysfunctional syndrome of the TMJ, with subsequent improvement of quality of life (3). Besides, key goals of the rehabilitation process in patients with different rheumatic conditions affecting TMJ involve: local and general relaxation; the control of the painful symptoms, muscle spasm and residual tensions; the increase of the range of motion; the restoration of the morphology and aesthetic aspect of the face. Rebalancing the agonist and antagonist muscle groups of the neck and face, muscular coordination, proprioceptive rehabilitation, as well as restoration of the normal body movement through an accurate mental representation of different mandible functions and maintaining a correct posture of the head, neck, trunk and scapular-humeral joint are also promoted in the complex TMJ rehabilitation process (1, 6). All these objectives can only be achieved by an early, aggressive, sustained and continuous treatment.

Three main stages are actually recognized in active rehabilitation of TMJD including rehabilitation through visual control of the patient, rehabilitation of the patient without visual control, only by touch and the performance of the movements without visual or tactile control, proprioceptive rehabilitation(4).

In the current context of modern medicine emphasizing the weight of patient’s comfort and quality of life, we have quoted the relationships that can be established between different therapeutic backgrounds and the clinical-biological, socio-economic and psycho-behavioral parameters, as well as the individual post-therapeutic feedback.

The TMJ index shows the degree (%) of the global dysfunction of the TMJ; in our study the assessment of this index was systematically done in all patients indicating a positive course of TMJD and demonstrating the benefit of complex kinetic approach. Furthermore, we have demonstrated a significant improvement in all parameters defining the TMJ index including pain, muscle and joint involvement.

After three months of kinetic treatment, only 37% of patients presented with dysfunction of TMJ secondary to different rheumatic disorders; data was comparable with the literature (6).

It can be assumed that complex multi-disciplinary (rheumatologist, dentist, kinetic therapist, physiotherapist and psychologist) work-team is essential for achieving positive results in the rehabilitation of patients with algo-dysfunctional syndrome of the TMJ. In addition, the active role of patient should also be mentioned. The main goal of the rehabilitation team is to improve as much as possible the TMJ status, to restore the patient’s capacity to live in an integrated manner, physically and psychosocially and, finally, to improve quality of life. The complex issues generated by the algo-dysfunctional syndrome of the TMJ capture and attract the interest of practitioners and researchers in the field. Therefore, our research has tried to highlight new emerging concepts on TMJ rehabilitation, particularly in the settings of rheumatic field.
CONCLUSIONS

Correct and complex analysis of patient’s medical records (medical history, clinical and functional laboratory tests) is essential in order to provide the optimal therapeutic approach.

The kinetic program depends on the quality of therapist-patient communication, motivation, perseverance, as well as patient collaboration, being the most important issues in TMJ rehabilitation. Clear, well established objectives should be encouraged advancing long-term improvements. A short-term care is classically associated with increased risk of the recurrence and, even, complications.

Furthermore, accurate kinetic recovery is a prerequisite condition for a proper mastication in patients with algodysfunctional TMJ syndrome.

A significant improvement in the TMJD syndrome was reported after the kinetic management in patients with various (inflammatory, degenerative) rheumatic disorders and secondary TMJ involvement as suggested by the modification of the TMJ index, leading to better quality of life.

REFERENCES