

SCIENTIFIC CONFERENCE XL ANNIVERSARY
OF THE MEDICAL-SURGICAL RESEARCH CENTRE

CIMEQ

Physiotherapy as an alternative treatment for sixth cranial nerve palsy.

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Summary:

Objective: We present a case of paralysis of the sixth cranial nerve treated with regional magnet therapy, HIVAMAT and exercises of the ocular musculature with the aim of demonstrating the usefulness of physiotherapy in the management of this disease.

General details of the case: A 49-year-old male patient with a pathological history of arterial hypertension who on 27 February 2019 began to have difficulty seeing and increased blood pressure. He came to our physiotherapy clinic with a diagnosis of paralysis of the sixth cranial nerve for rehabilitation treatment. In the strabismus test we found endotropia in the primary gaze position and in the forced ductility test only response to ductile movements and version with an absence of abduction movements corresponding to the paralysed muscle. Three cycles of rehabilitation treatment with magnetotherapy and HIVAMAT and eye muscle exercises were indicated, resulting in total regression of the ocular paralysis after 21 days of rehabilitation treatment.

Conclusions: After having analysed the case and its rapid evolution after rehabilitation treatment, we can conclude that physiotherapy constitutes a less invasive, effective and more accessible therapeutic alternative for the treatment of sixth cranial nerve palsy.

Keywords: Paralysis, sixth pair, HIVAMAT, magnetic field Summary:

Objective: It is the presentation of a case of the palsy of the sixth nerve cranial that the treatment was regional Magnetotherapy, HIVAMAT and exercises of the ocular musculature with the objective of shows the utility of the physiotherapy treatment in the handling of this illness.

General data of the case: Male patient of 49 years old, with pathological antecedents of high blood pressure. On February 27 of 2019 began with difficulty for the vision and increase of the blood pressure. He goes to our physiotherapy consultation with the diagnosis of the sixth cranial palsy for physiotherapy treatment. In the estrabòlogyc test we find an endotrophy in the primary Position of the look and in the forced ducçiòn test only answer to the ducçiòn movements and version with an absence of the abduction movements corresponding to the paralyzed muscle. Three cycles of rehabilitative treatment were indicated with magnetoterapy and HIVAMAT and exercises of the musculature of the eye being obtained a total regression from the ocular Patsy at twenty one days of the physiotherapy treatment.

Conclusions: After having analysed the case and their quick evolution after the rehabilitative treatment we can conclude that The physiotherapy constitutes an alternative therapeutic less invasive, effective and of better access to the patients for the treatment in the sixth cranial couple's Patsy.

Key words: sixt nerve patsy, HIVAMAT, magnetotherapy.

INTRODUCTION

Oculomotor paresis and paralysis involve all those processes likely to produce a partial or total deficit of eyeball movements. The lesion may be in any part of the oculomotor system including the cerebral cortex, brain stem, nerves, neuromuscular plate and the muscle itself. Paresis and/or paralysis of the external rectus muscle or cranial nerve VI is one of the most common in medical practice. Although there are many causes such as cerebral aneurysms, cerebrovascular accidents, traumatism, tumours, among others, the cause is often unknown and can return within a period of three months.¹ It is usually the result of small vessel disease, particularly in diabetics, as part of a disorder called multiple mono-neuropathy, but can also be the result of ischaemia or hypertension.^{2,3} In many patients, cranial nerve palsies resolve once the underlying disorder is treated. Idiopathic and ischaemic palsy can usually return within 2 months. Treatment is primarily medical with:

Steroids: With the aim of deflating the nerve.

. Prisms. This consists of compensating for distance deviation by means of prisms, which are placed in a spectacle in order to eliminate diplopia. The prisms correct the deviation, and therefore allow binocular vision to be stimulated. It is useful in cases of small deviation (10-12 dioptries), when there is minimal torticollis, in cases of surgical undercorrection and in situations in which, for various reasons, the patient is unwilling or unable to undergo surgery.

2. Mechanical exercises. In isolation they do not solve a complete traumatic paralysis, but like any rehabilitation exercise they improve muscle spasms, reversible contractures, as well as bruising in the

own muscle. These exercises may also be necessary in the immediate postoperative period.

3. Sectors. This consists of placing a localised, partial occlusion in an area of the visual field to eliminate or reduce diplopia in that particular field. They can be used on an ad hoc basis.

4. Occlusion. This may be the complement in desperate cases, prior to surgery or when, despite several procedures, diplopia is disabling. It should be performed alternatively to avoid muscle contracture. Occlusion of the healthy eye is not easily tolerated by the patient, since it is the paretic eye that induces past-pointing and therefore its suppression produces greater comfort.

5. Botulinum toxin. This is the treatment of choice in the acute phase of paralysis. The main objective is the disappearance of diplopia, torticollis and the correction of partial or total limitation of movement. It also prevents the appearance of secondary contracture. The action of the toxin has been studied in numerous publications and it is now known that there are motor, sensory and proprioceptive changes, as well as changes in the central nervous system. These changes produce an ocular alignment, in some cases permanent, related to several factors acting at the same time. Thus the improvement in muscle contracture, structural modifications in the injected muscle, the change in sensory homeostasis and an action at the central level, alone or together, can produce a permanent orthoposition.

Surgery: In the case of acquired paralysis, surgery should be considered only after spontaneous improvement has completely stopped. This is usually not earlier than six months to one year from the date of onset.^{3,4,5}

The Hivamat 200, which stands for histologic variability manual technics, causes an intermittent electrostatic magnetic field with

deep oscillations acting on the connective tissue by means of electrostatic fields that produce an intense resonant vibration in the tissues involved. The mechanism is provided by a semiconductor plate and a small electrostatic field established between the hands of the physiotherapist and the patient's tissue. The repetition of this phenomenon in rapid succession generates rhythmic deformations of the tissue, which is pumped through the complete oscillation. This action allows the tissues to gain motility and flexibility and to regenerate thanks to the increased production of ATP. It acts primarily on the intercellular circulation of the interstitial connective tissue. This treatment results in the normalisation of the fluidity of circulation in the treated area. This intensified massage system that is used successfully in various areas of Physical Medicine Therapeutics uses deep mechanical oscillations to create low frequency gentle electrostatic impulses that 'knead' the skin tissue by attracting and releasing it between 5-250 times per second. This therapy has a clinically significant influence on inflammation, pain and muscle contracture as well as an anti-fibrosis, haematoma resorption and wound healing effect. Based on anti-inflammatory, oedematous and antioxidant phenomena, including lymph oedema, reinforcing the flow of nutrients; detoxification by treating cellulite and stimulating collagen production and cell regeneration, it lifts and tones muscles and improves skin elasticity. It has been scientifically researched that the frequencies can penetrate the surface tissue by 8 -12 cm. The gentle mode of action is the reason why it contrasts with other electrical and mechanical therapies and there is no contraindication to immediate therapy. ^{6,7,8}.

The pulsed electromagnetic field (PEMF) is an effective therapy that creates microcurrents in the body's tissues. These microcurrents produce specific biological responses that depend on the parameters of the magnetic field such as amplitude, frequency, and waveform. The body contains multiple electromagnetic fields of its own with a unique shape in each tissue and organ. Computed tomography and magnetic resonance imaging take advantage of this phenomenon to create a map of the body's tissues. While diagnostics benefits from PEMFs and is accepted and

widely used, practitioners are still realising the therapeutic benefits of PEMFs. In 1954, Japanese scientists first reported on the piezoelectric properties of bone. In 1995, scientists at the University of Kentucky found that every type of soft tissue responds favourably to electromagnetic fields. Since then clinical research has documented the biological and therapeutic effects of electromagnetic fields. For example, it has been shown that the magnetic field is capable of lowering glycaemia levels, cholesterol, triglycerides and blood viscosity. While it raises high-density lipoproteins. The electromagnetic field has also been shown to help heal damaged nerve tissue after an acute stroke. Benefits have also been reported in the treatment of multiple sclerosis and diabetic neuropathy due to its tissue regenerating effect and those described above on metabolism.^{9, 10}

Since in our environment the conventional treatment of cranial nerve palsy with prisms is limited to specialised centres and is more difficult to access for the population, the administration of botulinum toxin and surgery are invasive methods that are also applied in specialised centres. The administration of botulinum toxin and surgery are invasive methods that are also applied in specialised centres. Therefore, we consider that magnetic field and deep oscillation therapy could replace conservative medical treatment of this condition due to their anti-inflammatory, muscle relaxant and regenerative effects, constituting therapeutic tools that are more widely available to the population in primary health care areas.

Objective: The aim of this case study is to illustrate the usefulness of physiotherapy in the treatment of sixth cranial nerve palsy.

PRESENTATION OF THE CASE

A 49-year-old male patient with a history of arterial hypertension who on 27 February 2019 began to have difficulty in

for vision and increased blood pressure. Come to our physiotherapy practice for treatment.

Rehabilitator with diagnosis of sixth cranial nerve palsy. Physical examination:

Strabismus test: Primary gaze position in endotropia.

Forced ductility test: Response to ductility and version movements. Fundus: No oedema in the papilla, normal vascular pattern.

Complementary examinations:

MRI: Cerebral and cortical atrophy, preferably frontal.

Right maxillary and ethmoidal sinusopathy.

Intrasellar aragnoidocele

Mild bilateral hippocampal atrophy. Affecting the external rectus

muscle ID: Paralysis of the sixth cranial nerve or abducens nerve.

Objectives of rehabilitation treatment:

Relaxation of unaffected musculature

Reduction of inflammation of the affected nerve tissue Re-education of the weakened eye muscles.

Rehabilitative Treatment:

Magnetic field 50 Hz 50% in left eye. Exercises of the extrinsic musculature of the eye.

Second cycle: 3/4/2019 HIVAMAT in the region of the external orbicularis orbicularis region 100Hz 5 min 50 Hz 5min

Magnetic field 20 Hz 50 % solenoid in head region T = 15 min Extrinsic eye muscle exercises.

23/4/2019

HIVAMAT in the region of the external orbicular arch 50Hz 5 min 25 Hz 5min

Magnetic field 20 Hz 50 % solenoid in the head region T = 15 min Exercises of the extrinsic musculature of the eye.

In the study of ocular motility, a diagnosis of atypical acquired paresis of the left external rectus muscle of unspecified aetiology was made ([Fig. 1](#)).

The evolution was favourable, with disappearance of diplopia, endotropia in the primary gaze position and response to abduction and eversion movements of the eye in the forced ductility test within twenty days after the start of rehabilitation treatment. [Fig. 2](#)

Case discussion

In terms of treatment, many methods have been described to solve this problem.

Disease. From occlusion of the healthy eye to surgery. But with regard to treatment with physiotherapy, there are very few publications reported in the literature. We only found one study carried out in our country where a magnetic field with electro acupuncture was applied to patients suffering from neurogenic ophthalmoplegia whose main cause was a lesion of the third cranial nerve in comparison with other patients who received medical treatment. This study demonstrated the efficacy of rehabilitative treatment compared to medical treatment, with three out of four patients recovering in the rehabilitative treatment group. In the medical treatment group, only one out of four patients recovered.⁽¹¹⁾

The magnetic field is widely used in different diseases as a therapeutic option as it is attributed with biochemical changes in the organism, among which the induced movement of ionised substances in solution stands out, which makes it possible to mobilise and provoke changes in depth wherever the ions are located in our body, in the bloodstream, in the plasma or in the different tissues of the body. In addition, it facilitates the trophic effect, that is, by improving the blood flow in the treated area, it improves the absorption of nutrients and favours recovery. Therefore, the tissues will eliminate toxic substances faster and will be nourished and oxygenated in a more effective way.

more effective. Magnetic fields also normalise the sodium-potassium pump due to their effect on metabolism. ⁽¹²⁾

As far as deep oscillation therapy is concerned. As the bibliography states, it is a fairly new physical agent with a significant anti-inflammatory influence, stimulating the healing of tissues, the reabsorption of oedema and haematomas as well as a muscle relaxant. Although there are many studies where its effectiveness has been proven in the field of orthopaedics, sports medicine, oncology in the case of patients with lymphoedema and neuro-rehabilitation for the recovery of paretic areas even in children with infantile cerebral palsy. In the field of ophthalmology we did not find any study where this tool is used.^(13,14,15,16,17)

Conclusions

After having analysed the case and its rapid evolution after rehabilitation treatment, we can conclude that the electromagnetic field and deep oscillation therapy may constitute a less invasive, effective and more accessible therapeutic alternative for the treatment of cranial palsy of the sixth cranial nerve.

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Home of treatment



ten days later



After 21 days of treatment

rehabilitator