

ACUPUNCTURE THERAPY FOR TRAUMATIC 3RD AND 6TH NERVE PALSY (CASE REPORT)

Dr. Siham Mohamed Fahmy*

Lecturer of Traditional Chinese Medicine, Faculty of Physical Therapy, Egyptian Chinese University, Lecturer at Military Medical Academy and Acupuncturist, Kobri El Koba Military Medical Complex, Cairo, Egypt.

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*Corresponding author: Dr. Siham Mohamed Fahmy

Lecturer of Traditional Chinese Medicine, Faculty of Physical Therapy, Egyptian Chinese University, Lecturer at Military Medical Academy and Acupuncturist, Kobri El Koba Military Medical Complex, Cairo, Egypt.

ABSTRACT

Background: Paralytic strabismus is a neurological disorder affecting the cranial nerves of the eye (Third, fourth and sixth cranial nerves), one eye or both eyes may be affected and leads to diplopia or double vision. It is a serious problem among patients with diabetes mellitus, stroke, cerebral tumors, and traumatic brain injury. Treatment at beginning involves medical management of systemic predisposing factors and conservative measures to release symptoms followed later by surgical intervention in non-resolving ocular nerves palsies. **Subjects:** Two cases are presented in this study; the first is traumatic third nerve palsy after accidental head injury affected for more than six months without any recovery with various kinds of medications, and the second case was vascular sixth nerve palsy. **Methods of treatment:** Both cases were subjected to acupuncture therapy using disposable stainless steel acupuncture needles and were clinically evaluated by the ophthalmologist after each session. Each session extended to 25 minutes, 3 sessions per week till full recovery, a course of 24 sessions needed for the first case and a course of 6 sessions was enough to the second one. **Result:** clinical improvements were noticed in the 1st case (3rd n.palsy) after 8 sessions with gradual progression till be with completely normal eye movement after 24 sessions and in the second case (6th n.palsy) was clinically improved after 6 sessions. **Conclusion:** Acupuncture can be considered as an effective therapy in treatment of diplopia in addition to conservative therapy.

KEYWORDS: Paralytic Strabismus, Ocular nerves, Acupuncture, Qi(Vital Energy), Yin, Yang, Case report.

1. LITERATURE REVIEW

1.1. Medical Review

1.1.1. Anatomical considerations

Movements of the eye are controlled by the three ocular motor nerves (cranial nerves number three, four and six), which supplied the 6 extraocular muscles of each eye (Figure 1). The third cranial nerve called oculomotor

innervates the medial, inferior and superior rectus muscles, and inferior oblique muscle, also the levator palpebrae muscle. The fourth cranial nerve called the trochlear innervates the superior oblique muscle, and the sixth cranial nerve called abducens innervates the lateral rectus muscle.^[1]

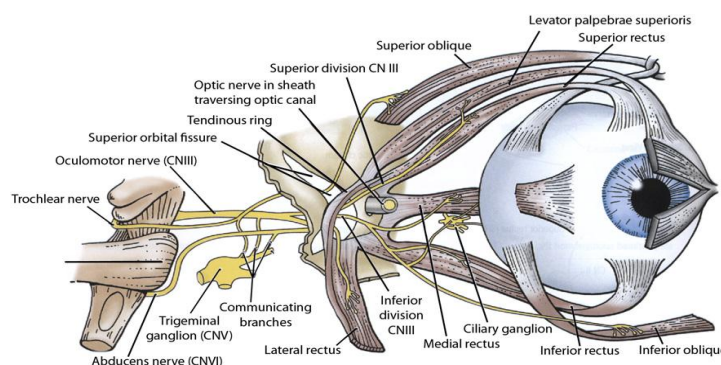


Figure 1: Anatomic structures of the right eye (lateral view).

The oculomotor nerve (CNIII), trochlear nerve (CNIV), and abducens nerve (CNVI) arise from the brainstem. The oculomotor nerve divides into superior and inferior divisions, and finally supplied the superior rectus, inferior rectus, medial rectus, inferior oblique, and levator palpebrae muscles. In addition, parasympathetic fibers of the third nerve synapse in the ciliary ganglion then innervate the papillary constrictor muscle. The trochlear

nerve supplied the superior oblique muscle. The abducens nerve supplied the lateral rectus muscle.^[2]

(Adapted from Agur and Dalley, 2009)

1.1.2. Clinical features of ocular nerves palsy

Lesions of ocular motor nerves lead to the following clinical features (table 1).

Table 1: Clinical Features of Ocular Nerves Palsy (adapted from Marais and Barrett, 2013).^[3]

Oculomotor nerve palsy	Trochlear nerve palsy	Abducens nerve palsy
(1) weakness of the levator with ptosis (2) eye abducted in primary position due to unopposed action of the lateral rectus muscle (3) normal abduction (4) intorsion of the eye which increases on down gaze due to intact function of superior oblique muscle (5) limited adduction due to weakness of medial rectus muscle (6) limited supraduction due to weakness of superior rectus and inferior oblique muscles (7) dilated pupil with defective accommodation due to parasympathetic palsy.	(1) acute onset of vertical diplopia in the absence of ptosis (2) characterised by a head posture (3) features of nuclear, fascicular and peripheral CN IV are clinically identical (4) all except the nuclear palsies produce a contralateral superior oblique weakness. *signs of a left CN IV palsy (5) left hypertropia (left over right) in primary position (6) increase in left hypertropia on right gaze due to the left inferior oblique overaction (7) limitation of left infraduction on adduction.	Signs of left CN VI palsy (1) left esotropia in the primary position due to unopposed action of the left medial rectus (2) esotropia worse for distance target and less/absent for near fixation (3) marked limitation of left abduction (4) normal left adduction. Patients also show compensatory face turn into the field of action of the paralysed muscle to minimise diplopia, so that the eye does not need to look towards the field of action of the paralysed muscle.

1.1.3. Causes and Prognosis

The most common causes of ocular nerves palsy are:

1. Idiopathic 25%,
2. Vascular diseases (diabetes, hypertension): most of the cases gained recovery of motility deficits from microvascular third nerve palsy, typically in 8 to 12 weeks.
3. Aneurysm and tumor: Slowly progressive nerve palsies occasionally occur due to growth of a primary tumor of the nerve.
4. Traumatic: Although the resin good prognosis for recovery following traumatic third nerve palsy, the resin a high incidence of secondary aberrant regeneration.
5. Infection, inflammation and neoplastic processes: the main cause of combined third, fourth and sixth nerves palsy.^[1]

1.1.4. Management

The treatment of diplopia may include monocular patching or prisms. Once ocular misalignment from ocular nerves palsy has been stable for 6 to 12 months, surgical correction can be considered. The complexity of the cases depends on whether the nerve palsy is complete or partial^[4]. The risk of surgery should be weighed carefully in the decision to treat patients with ocular nerves palsy. Patients should be warned that more disabling diplopia may occur following strabismus surgery, as the images from each eye become perceived much closer together. Correction of ptosis accompanying third nerve palsy is usually easily accomplished but

carries some risk of corneal exposure^[3]

1.2. Acupuncture Therapy Review

1.2.1. Historical consideration: With a history of 2000 to 3000 years B.C., Traditional Chinese Medicine based on the theories of five elements, Yin and Yang and Qi (vital energy).

The World Health Organization recommended the use of TCM on treatment of many cases although TCM depended on philosophical ideas but the positive results documented by different type of investigations recorded the real vital effects of it.

Traditional Chinese medicine treatment starts with the analysis of the entire system, and then focuses on the correction of pathological changes through readjusting the functions of the zang –fu organs.

1.2.2. Previous studies: Acupuncture has been part of the health care system in China and is designed to correct the imbalance of energy flow (Qi) along specific channels throughout the body. Responses to skin stimulation include the release of opioid peptides accounting for an analgesic effect, an alteration in the secretion of neurotransmitters, and the regulation of blood flow.

Acupuncture has been reported for treating and alleviating a variety of ocular conditions including dry eye, myopia, paralytic strabismus, retinitis pigmentosa, optic atrophy, iritis, conjunctivitis, cataract,^[5] and

modulation of intraocular pressure as an additional therapy in patients with open angle glaucoma.^[6]

In China several studies from many years investigated the effect of acupuncture and moxibution in treatment of ocular motor nerves palsy with different etiology.^[7,8,9]

Zhang et al, 2009 compared between acupuncture and medications for treating paralytic strabismus. he treated 58 patients with acupuncture therapy using needle stimulation for Jingming (BL1), Tongziliao (GB1) and Shangming (Extra ordinary point) as acupuncture group, controlled by another group consists of 42 patients received conservative medications only.

After 5courses of acupuncture therapy, the results showed that the recovery rate of 94.8% in the acupuncture group was higher to that of 85.7% in the medication group.^[10]

Guo et al, 2008 observed the therapeutic effect of acupuncture combined with western medicine in treatment of paralytic strabismus for 90 patients divided randomly into3 groups; acupuncture group, western medicine group who depended on vitamins, and the third group who received acupuncture therapy and western medicine. The cured rate of 66.7% in the acupuncture-medicine group was significantly higher than 26.7% in the acupuncture group and 26.7% in the western medicine group.^[11]

Tian et al, 2008 observed the therapeutic effect of acupuncture on 72 diabetic paralytic squint patients. His study recommended the more beneficial effect of acupuncture therapy when added to conservative medications (95.7% improving rate) than using of acupuncture therapy only (87.5%) or medications only (54.5%).^[12]

In Korea, a case study for Kim, 2006 represented A76-

year-old man with oculomotor nerve palsy for 4 weeks without any improvement with medications .The patient treated with electroacupuncture for 20 min. twice per week. After two sessions, the ptosis and eye movement were slightly improved. From the fourth session, the patient's symptoms showed more improvement and by the end of the eighth session, he was able to open his eyelid and move his eye freely with normal pupil reactivity.^[13] Kim depended on his study to previous case study introduced by Frenkle and Frenkle, 2002; using the same program and course of acupuncture therapy.^[14]

2. Methodology of the study

2.1. First case presentation

(Third cranial nerve palsy)

2.1.1. Subject

A 21 year- old man presented with 6months history of traumatic 3rd cranial nerve palsy was referred by ophthalmic physician to Traditional Chinese Medicine outpatient clinic, Kobri el koba military hospital, Cairo, Egypt.

The onset of the problem started after car accident with fractures of right radius bone and damage of right auditory nerve and olfactory nerve. MRI showed brain contusion on the right side due to head trauma.

After six months of medications, there was no significant improvement of the oculomotor nerve palsy.

On examination according to Traditional Chinese Medicine, he had pale facial complexion, cold extremities, purple tongue color, fur, weak pulse, patient was irritable and suffered from deafness, tinnitus on right ear and loss of smell.

Complete right-sided ptosis was observed clinically, when elevated the upper eye lid manually. The inability of adduction, supraduction, infraduction of the right eye. The pupil was dilated and not reactive to light (Fig.2).



Figure 2: Patient presented by complete ptosis of right eye with inability to turn the eye upward, downward or inward when elevated the upper lid manually.

Case Analysis: According to Traditional Chinese Medicine

The diagnosis of his current condition was meridian Qi stagnation around the eye and deficiency of liver-Yin or inability of the liver to nourish and control its opening.

2.1.2. Therapeutic Tools: using stainless steel disposable acupuncture needles (0.2 diameter and 2.5 cm length), cotton, and alcohol 70%.

2.1.3 Treatment

i. Objective

1. To restore normal flow of Qi around eye.
2. To rebalance between liver yin and yang.

ii. Selected acupoints

The plane of treatment depended on the general condition of the patient and deal with the body as a unique not only with the problem so tonify liver yin and rebalance between liver yang and liver yin through liver and gallbladder channels and tonify kidney yin depending on the mother-child relationship by

stimulating the controlled acupuncture points: (DU20, GB20, LI4, ST36, KI3, SP6, LIV3, GB37. Insertion depth is according to point location).

And soothing qi around eye through stimulating local eye acupoints for (BL1, BL2, GB14, ST2, Yuyao, Taiyang) on right side. Insertion depth for each point is about 0.3-0.5cm (Fig.3).



Figure 3: Acupuncture session 1.



Figure 4: The left eye voluntary opened and moved normally in all directions after 24 sessions of Acupuncture.

2.2. Second case presentation (Sixth Cranial Nerve Palsy)

2.2.1. Subject

A diabetic patient 65 years- old was referred by the ophthalmologist to the TCM outpatient clinic, presented with sixth cranial nerve palsy for six weeks, he was unable to turn the left eye in outward (abduction) position (Fig.5).



Figure 5: Patient cannot turn the left eye outward.

C.T. of the brain showed marked chronological aged changes, CBC reported high glucose level.

First it was important to control the blood glucose level with suitable insulin dose by the diabetic physician.

Case Analysis According to TCM diagnosis

It's a case of liver yang hyperactivity lead to consumption of liver and kidney yin due to failure of yin to control yang or more liver fire and so failure of liver

iii. Course of Treatment

Acupuncture treatment was applied 25 minutes for each session, three sessions per week for 24 sessions.

2.1.3.. Result

After eight acupuncture sessions, the patient can elevate his upper eye lid normally and eye movement were slightly improved. From the twelfth session onwards, the patient's symptoms continuously improved and by the twenty four sessions he was able to elevate his eye lid and move his eye normally in all direction (adduction, supraduction, infraduction, abduction) and no more complain of double vision but pupil reaction to light was not recover (Fig.4).

to control the eye.

2.2.2. Therapeutic tools: using stainless steel disposable acupuncture needles (0.2 diameter and 2.5 cm length), cotton, and alcohol 70%.

2.2.3. Treatment

i. Objective

1. Restore normal Qi in the local eye meridians.
2. To suppress liver yang hyperactivity and tonify liver yin.

ii. Plane of treatment: soothing qi around eye through local eye acupoints (BL1, BL2, GB14, ST2, Yuyao, Taiyang on right side. Insertion depth about 0.3-0.5cm) (Fig.6).

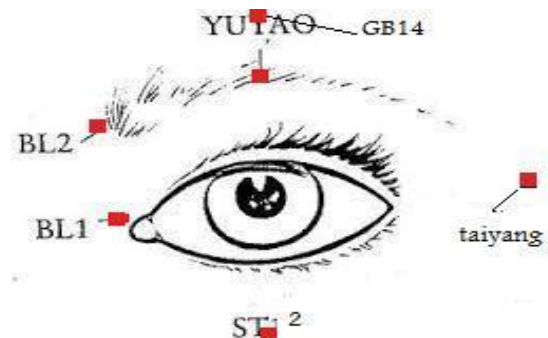


Figure 6: Local points around the eye.

And distal remote acupoints (DU20, GB20, LI4, ST36, KI3, SP6, LIV2, LIV3, GB37), the insertion depth of the needle according to each point location.

iii. Course of Treatment

Acupuncture therapy was applied for 30 minutes each session, three sessions per week for 6 sessions.

2.2.4. RESULT

After six sessions the patient was able to turn the left eye outward (Fig. 7).



Figure 7: The patient can turn his left eye outward normally.

3. DISCUSSION

This is the first trial on Egypt to treat oculomotor nerves palsy using acupuncture therapy, represented first traumatic oculomotor palsy after head injury without any improvement after six months of conservative treatment. The ophthalmologist decided surgical interference. But it was a chance to try acupuncture first. The patient was regular in attendance and did his maximum effort to follow the instructions during acupuncture sessions. It took two months of acupuncture treatment to recover completely. Second vascular abducens nerve palsy after six weeks acupuncture sessions started, complete recovery gained after 2 weeks (6 sessions).

The mechanism of acupuncture effects were investigated on several studies for animals and human being through the last decade in different area around the universe, some of these studies reported that:

Needle deeply penetration in the skin leads mechanical laceration results in release of big amounts of ATP from keratinocytes, fibroblasts and specific cells in skin; the sensory nerves occupied by ATP send impulses through ganglia to the spinal cord, the brain stem, hypothalamus and higher centers; the brain stem and hypothalamus contain neurons that send impulses to control autonomic functions, including cardiovascular, gastrointestinal, respiratory, urinogenital and musculo-skeletal activity.^[15]

Laboratory proof documented that acupuncture has the ability to change the potential charging of neurons, the concentrations of K⁺, Na⁺, Ca⁺⁺ and the content of neuro-transmitters such as aspartate, and taurine and the quantities of neuro-peptides such as beta endorphin and enkephalin. All changing are directly related to nerve cells.^[16]

Another study found that in a rat model (72 rats) of inherited retinitis pigmentosa (IRP), daily application of electro needling stimulation at low frequency electric current over the handle of the needle for 25 min over 11 days increased the expression of NGF and the NGF binding receptor TrkA, beside blood flow and thickness of the outer nuclear layer. Moreover, electro needling stimulated the secretion of brain-derived growth factor (BDGF), thereby Acupoints stimulation at specific points on the surface of the body stimulates the secretions of neurotrophins that services as pain killer for peripheral neuritis and enhances the neuronal growth, promotes nerve regeneration and repair.^[18]

Many investigators are ongoing on trials to support the mechanism of acupoints stimulation for the chemical mediators in the nervous and immune system of the human being.^[19]

These findings support the result of this case report and explained how acupuncture stimulates ocular motor nerves growth and regenerations.

4. CONCLUSION

Acupuncture treatment may have a role to improve ocular motor nerves palsy and have a role in decrease the recovery time.

5. Recommendation

Further controlled studies (using HESS SCREEN for example) are needed for more cases with documented statistical analysis to establish the basic scientific evidence for TCM effect on ophthalmic neurological deficiency.

Early starting with acupuncture treatment is recommended.

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