

Original Article

Determination of Safe Needling Depth via X-ray at TE₁₇(*Yifeng*) and ST₇(*Xiaguan*)

Byun Hyuk*, Kang Min-joo**, Jung Chan-yung*, Park In-shik*,
Jo Hyeon-seog*, Kim Gyeong-ho*, Lee Seung-deok* and Kim Kap-sung*

*Dept. of Acupuncture & Moxibustion, Graduate School of Oriental
Medicine, Dongguk University

**Lee Sung Soo Oriental Medical Clinic

Abstract

X-ray를 통한 예풍(翳風)과 하관(下關)에서의 안전한 자침 깊이에 대한 고찰

변혁* · 강민주** · 정찬영* · 박인식* · 조현석* · 김경호* · 이승덕* · 김갑성*

*동국대학교 한의과대학원 침구학교실

**이성수한의원

목적 : X-ray를 통해 안면마비에 다용되는 예풍과 안면통에 다용되는 하관에서의 안전한 자침 깊이에 대하여 고찰하여 보고자 하였다.

방법 : 건강한 지원자들에게 원치 않을 경우 언제든지 시험을 중지할 권리가 있다는 것을 공지한 후, 시험에 동의한 남녀 각각 2명의 피험자들을 대상으로 대학병원 침구과 전문의가 예풍과 하관을 직자(直刺)(40mm×0.35mm 일회용 침)하였다. 피험자의 이상 반응 유무를 살피며 안면신경 혹은 삼차신경이 지나가는 경로로 알려진 깊이까지 진침(進鍼)하였다. 유침(留鍼) 상태에서 Skull X-ray의 AP view와 Lateral view를 촬영하였다.

결과 : 피험자들은 침병이 피부에 도달 하는 동안(40mm 직자) 자침 혈위에서 중창감(重脹感)을 자각하였으며, 추후 어떠한 이상 반응도 보이지 않았다.

결론 : 안면마비와 안면통의 효율적인 치료를 위하여 안면신경과 삼차신경에 근접할 수 있는 혈위인 예풍과 하관에서의 40mm 직자는 신경염이나 뇌 손상과 같은 이상 반응을 유발하지 않았다.

핵심 단어 : 안면마비, 안면통, 예풍, 하관, X-ray

· Acceptance : 2007. 11. 22. · Adjustment : 2007. 11. 23. · Adoption : 2007. 11. 23.

· Corresponding author : Lee Seung-deok, Department of Acupuncture & Moxibustion, Dongguk University International Hospital, #814, Siksa-dong, Ilsan-gu, Goyang-si, Kyungi, Republic of Korea

Tel : 031-961-9122 E-mail : chuckman@dongguk.edu

I. Introduction

Electroacupuncture(EA) has beneficial effects on microcirculation, inflammation and nerve damage¹⁾. For that reason, it has frequently been used for Bell's palsy and trigeminal neuralgia. Indeed, EA has been found to benefit facial nerve regeneration^{2, 3)}.

The World Health Organization has identified more than 40 medical conditions effectively treated with acupuncture⁴⁾. The American Academy of Medical Acupuncture has suggested a listing for use by hospital credentialing committees in which the matter of medical acupuncture privileges are considered⁵⁾. Between both categories, trigeminal neuralgia is a complete overlap.

Traditionally, medical classics suggest that TE₁₇ (Yifeng) and ST₇(Xiaguan) are beneficial for peripheral facial paralysis(PFP) and pain.

Despite such considerable evidences for the application of acupuncture in the treatment of these conditions, there are surprisingly no clinical studies that consider why TE₁₇ and ST₇ are comprised in the acupuncture points to treat these complaints. Therefore, in this study, we discuss how the acupuncture at TE₁₇ and ST₇ might work upon PFP and pain, and we unequivocally support the use of TE₁₇ and ST₇ with safe needling depth resulting from X-ray.

II. Materials and Methods

1. Materials

2men and 2women volunteers, aged 25~31 years were included. They had no sign of disease, and felt healthy.

Possible risks of acupuncture were explained(infection, fainting, hematoma, life threatening risks in case of improper handling of the needle). They were informed that they could stop participation in the study at any time.

2. Methods

The subjects were placed in a sitting position.

A Korean medical doctor who is the specialist in acupuncture and moxibustion clinic found the acupuncture points with a palpatory technique.

TE₁₇ is located in the depression between the mandible and the mastoid process. He placed his index finger in the notch between the mandible and the mastoid process and work it superiorly, moving it vertically back and forth. Only when there is an induration in the depression, this point is indicated.

ST₇ is located on the inferior border of the zygomatic arch in the depression anterior to the mandibular condyle. It is approximately two finger-

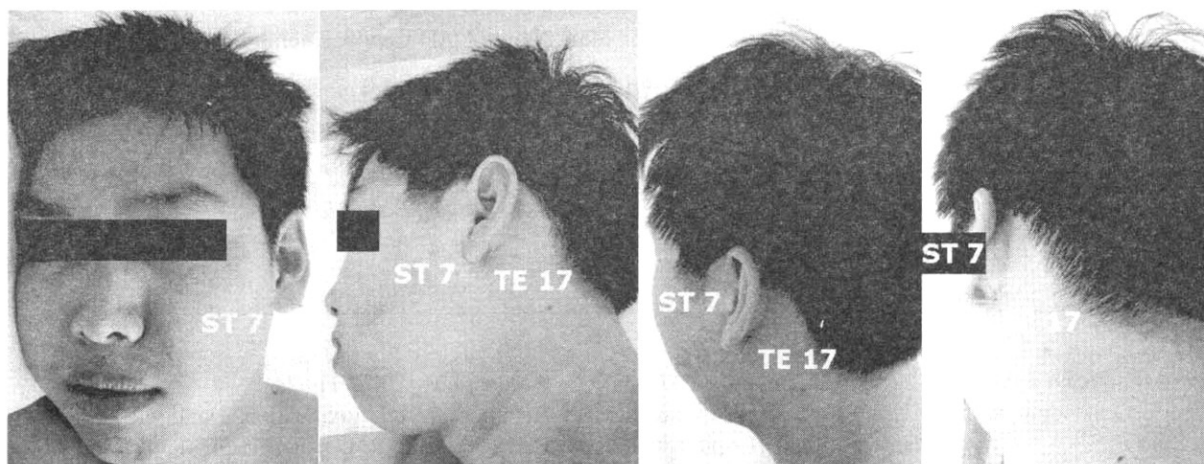


Fig. 1. Acupunctured State at TE₁₇ and ST₇

widths anterior to the ear. When the mouth is opened, the condylar process moves forward and the hole closes. The Korean medical doctor traced his finger along the bottom of the zygomatic arch, starting from just in front of the ear. The point is tender.

TE₁₇ and ST₇ were prepared using 75% alcohol prep pads. The Korean medical doctor applied acupuncture with pre-packed, sterile, disposable 40mm×0.35mm needles. The needle tips were gone vertically on to where the facial nerve or the trigeminal nerve would be placed.

We conducted skull X-ray in anteroposterior and lateral views while maintaining the acupunctured state at TE₁₇ and ST₇(Fig. 1).

III. Results

While the needles were passing through the tissues, the subjects felt de qi sensation described as an aching, distension or heaviness. The depth of



Fig. 2. Anteroposterior View
 † Handle ◆ Acupuncture needle → Tip.

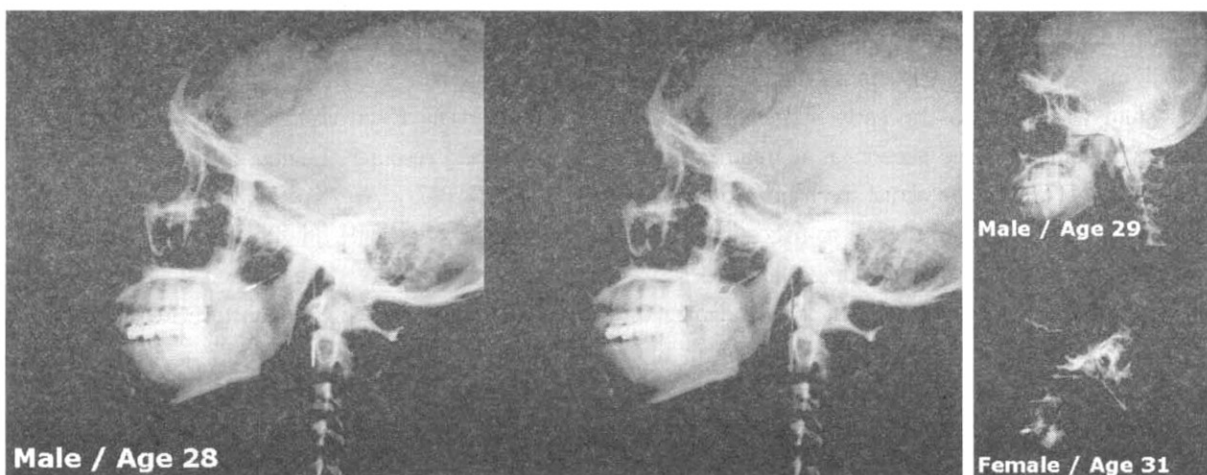


Fig. 3. Lateral View
 † Handle ◆ Acupuncture needle → Tip.

perforation of the needles was limited in 40mm by the handle of acupuncture needles.

Although the needles were being inserted perpendicular to the skin into where the facial nerve and the trigeminal nerve each are laid, there had not been any pains or twitches that radiated along the facial nerve or the trigeminal nerve. In addition, until the body of acupuncture needles was inserted completely, it had not occurred any side effects such as dizziness, vertigo, nausea, fainting and weakness.

On X-ray readings, there were no significant differences in depth between men and women. At TE₁₇, the needles passed between the ramus of mandible and the styloid process. It didn't go close to the foramen magnum or into the calvaria at all. At ST₇, the needles passed the mandibular notch and reached where the lateral pterygoid muscle is sited.

The subjects showed no side effects such as neuritis or demyelination until one year after acupunctured(Fig. 2, 3).

IV. Discussion

Most cases of facial paralysis result from viral-induced inflammation of the facial nerve⁶⁾, or its compression due to vasospasm or oedema generally in the mastoid region⁷⁾.

The etiology of trigeminal neuralgia is not completely known. The common finding of an arterial loop lying against the trigeminal nerve near the brainstem was identified by early surgeons performing a trigeminal nerve section as a treatment for facial pain⁸⁾. However, the actual mechanism by which vascular compression contributes to trigeminal neuralgia remains unclear. The leading theory describes ephaptic transmission between locally damaged or demyelinated axons in the nerve resulting in the perception of pain in one of the trigeminal distributions⁹⁾.

Summing up, both problems are due to inflammation, compression or crosstalk of the nerves. Any intervention that improves local circulation is likely

not only to help release local nerve compression but also to assist nerve regeneration¹⁰⁾. By the way, EA leads to improvement of microcirculation, and there is the result that EA at acupuncture points over the nerve trunk has a better effect than EA at standard acupuncture points¹¹⁾.

The facial nerve passes through the inner ear and leaves the skull via the stylomastoid foramen nearby TE₁₇, where it divides into five branches that supply the muscles of facial expression. The mandibular nerve of trigeminal nerve exits the skull through the foramen ovale nearby ST₇, before it enters the mandible through the mandibular foramen. Because of such effects on microcirculation, inflammation and nerve damage, we would expect EA at TE₁₇ and ST₇ where the facial nerve and the trigeminal nerve emerge from the skull to be perfectly suited to the treatment of PFP and pain¹²⁾.

In conclusion, TE₁₇ is a good channel to approach the facial nerve, and ST₇ is the one to do the trigeminal nerve. There seems to be no risk such as neuritis or brain damage as far as a depth of approximately 40mm from skin(deeper in patients with increased subcutaneous tissue) for needle to reach the affected facial nerve at TE₁₇ or ST₇. We expect our results will be verified by further large sample-sized studies.

V. References

1. Mayor DF. Electroacupuncture : A practical manual and resource. Edinburgh : Churchill Livingstone. 2007.
2. Ya ZM, Wang JH, Li ZY, Tan YH. Experimental study about effects of acupuncture on facial nerve regeneration. Acupuncture Research(Zhenci Yanjiu). 1999 ; 24(2) : 111-15.
3. Ya ZM, Xiao DH, Wang JH, Li ZY, Tan YH. Effects of acupuncture on mRNA expression for NGF after facial nerve trauma. Acupuncture Research(Zhenci Yanjiu). 2000 ; 25(2) : 96-9.
4. World Health Organization list of common con-

- ditions treatable by Chinese Medicine and Acupuncture. Available at : <http://tcm.health-info.org/WHO-treatment-list.htm>
5. American Academy of Medical Acupuncture. Available at : <http://www.medicalacupuncture.org>
 6. Adour KK. Medical management of idiopathic (Bell's) palsy. *Otolaryngol Clin North Am.* 1991 ; 4(3) : 663-73.
 7. Bernal G. Helium neon and diode laser therapy is an effective adjunctive therapy for facial paralysis. *Laser Therapy.* 1993 ; 5(2) : 79-87.
 8. Jannetta PJ. Microsurgery of cranial nerve cross-compression. *Clin Neurosurg.* 1979 ; 26 : 607-15.
 9. Selby G. Diseases of the fifth cranial nerve. In : Dyck PJ, Thomas PK, Lambert EH, Bunge R, eds : *Peripheral Neuropathy.* 2nd ed. Philadelphia : WB Saunders. 1984 : 1224.
 10. Zanakis MF. Differential effects of various electrical parameters on peripheral and central nerve regeneration. *Acupunct Electrother Res.* 1990 ; 15 : 185-91.
 11. Cai GW, Zhu DY. Observation on the therapeutic effect of electro-acupuncture over nerve trunks combined with indirect moxibustion in simple facial neuritis. *Journal of Clinical Acupuncture and Moxibustion.* 1996 ; 12 : 65-6.
 12. Wong LP. Successful treatment of facial paralysis with acupuncture. *Am J Acupunct.* 1986 ; 14(3) : 217-23.