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Case Report

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# Occurred Facial Pain during Acupotomy at a Site 5 pun Left of GV16: A Case Report

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This study evaluated a case of trigeminal nerve stimulation during acupotomy at a site 5 pun left of GV16. The study participant was a 52-year-old male suffering from upper neck pain and numbness, which was managed by acupotomy at a site 5 pun left of GV16. During acupotomy, the patient experienced unexpected numbness and stiffness of the left zygomatic bone. This area corresponds to the distribution of the maxillary nerve, which is the second branch of the trigeminal nerve. After approximately one month, symptoms of numbness and stiffness disappeared without rendering medical treatment. These side effects are presumed to be associated with the trigeminocervical complex and stimulation of the trigeminal nucleus within the spinal cord. Thus, during the acupotomy of the upper neck, especially at GV16, the needles should be inserted slowly, and the patient's response should also be monitored.

**Keywords:** Acupotomy; Facial pain; Trigeminal nerve

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## INTRODUCTION

Acupotomy is widely used to treat musculoskeletal pain disorders, such as chronic neck pain disorders, disc herniation, and myofascial pain syndrome [1]. However, compared with acupuncture, acupotomy involves greater stimulation and deeper insertion of needles, which could lead to greater pain and intraoperative risks of complications. The common side effects of acupotomy include stinging, bleeding, paralysis due to nerve injuries, pain and numbing caused by nerve root and junction injuries, infections, organ damage, spinal cord injury, and brain damage [2].

The hypodermic area of GV16 is innervated by the greater and third occipital nerves. Moreover, as GV16 is close to the cerebellum, medulla, and spinal cord, the needling angle and depth should be carefully considered [3].

Previous studies reported that acupuncture at GV16 caused hemorrhage in the third, fourth, and lateral ventricles of a 44-year-old male [4], and a subarachnoid hemorrhage in the cerebellum of a 32-year-old female after 3-cm-deep needling [5]. This is the first study to report a case of stimulation of the maxillary nerve, the second branch of the trigeminal nerve, which occurred during acupotomy needling near GV16. No other studies have reported the incidence of facial pain during an acupotomy procedure proximal to the GV16.

## CASE REPORT

**1. Patient information**

A 52-year-old male.

**2. Chief complaints**

Pain and numbness in the upper neck region and tremors in both upper extremities (right > left).

**3. Date of acupotomy**

June 28, 2022.

**4. Current medical history**

A 52-year-old male with an average physique presented to the Korean Medicine Clinic for acupotomy. He reported an aggravation of radiating neck pain with a score of 6, as assessed using the visual analog scale (VAS) in September 2021. He was diagnosed with C5/6 cervical radiculopathy based on the results of the magnetic resonance imaging of the cervical spine that was performed at the Department of Neurosurgery, Dong-Eui Hospital, in October 2021 (Figs. 1, 2). He underwent treatment at various medical institutions prior to coming to our clinic.

**5. Past medical history**

No relevant medical history.

**6. Acupotomy method**

Acupotomy was performed in the prone position with a 20-degree cervical flexion to stimulate the posterior atlanto-occipital membrane. A 0.35 × 40 cm acupotomy

**Fig. 1.** Cervical spine magnetic resonance imaging sagittal view.

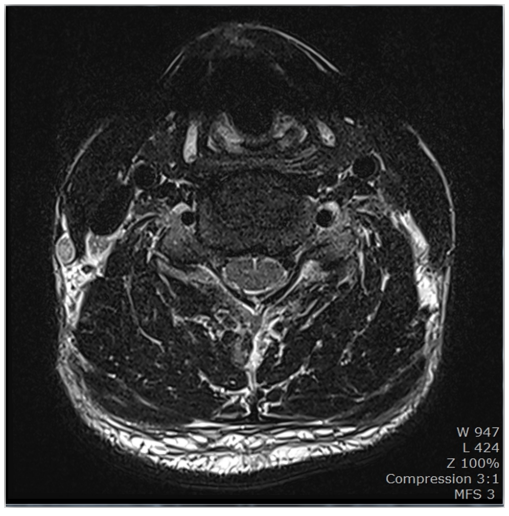


**Fig. 2.** Cervical spine magnetic resonance imaging axial view C5/6.

needle (Maanshan Bond Medical Instruments Co. Ltd.) was inserted at a depth of 1.5–2 cm, 5 pun left of GV16. A Korean medical doctor with 13 years of experience in acupotomy performed the procedure for the pressure separation of the needle and insertion of the needle parallel to the GV16. The needle was inserted slowly for 2–3 seconds and then removed slowly.

### 7. Symptoms

During the procedure, the patient complained of numbness and stiffness of the left zygomatic bone. Intraoperatively, the patient believed that the sensation was a result of his face being pressed against the treatment bed since he was in the prone position, of which the operator was not aware. As the symptoms persisted even after the termination of the procedure, the patient notified the operator.

### 8. Prognosis

The operator thoroughly explained the causes of the symptoms and prognosis. Subsequently, with the patient's consent, the operator observed the patient's progress without rendering medical treatment for the symptoms.

On June 28, 2022 (on the day of the procedure), the symptoms were observed during the procedure. Later in the day, the numbness intensified, spreading to the ipsilateral zygomatic region and lower lid. The patient had a VAS score of 5.

On June 29, 2022 (1 day post-acupotomy), the numbness decreased in the morning. However, its frequency increased along with an increase in activity, with the severity levels fluctuating throughout the day. It slightly increased when the eyes were squinted. The patient showed a maximum VAS score of 6.

On June 30, 2022, the numbness in the zygomatic area surrounding the eyes slightly decreased. The patient showed a VAS score of 4.

On July 1, 2022, the numbness in the zygomatic area surrounding the eyes slightly decreased, and the onset of symptoms was occasional. The patient showed a VAS score of 3.

On July 5, 2022 (8 days post-acupotomy), the numbness in the zygomatic area surrounding the eyes slightly decreased, and the onset of symptoms was occasional. The patient showed a VAS score of 1 or 2.

On July 11, 2022 (2 weeks post-acupotomy), the numbness persisted around the eyes. The patient showed a VAS score of 1.

On July 18, 2022 (3 weeks post-acupotomy), occasional numbness persisted around the eyes. The patient showed a VAS score of 0 or 1.

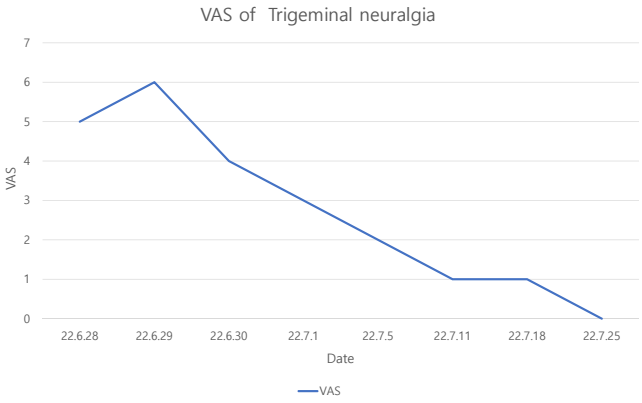


**Fig. 3.** Visual analog scale (VAS) of trigeminal neuralgia.

On July 25, 2022 (4 weeks post-acupotomy), all symptoms were alleviated (Fig. 3).

## DISCUSSION

Historically, GV16 requires careful manipulation during needling because of its proximity to the spinal cord and medulla. In ChimGuJibSung, the recommended needling depth is 0.2 cun, whereas in SheungJiZongLu, the recommended needling depth is 1 cun [3].

Nuclei of the trigeminal nerve are found in the midbrain, pons, medulla, and C1–C3 cervical vertebrae. Of these, the nuclei in the spinal cord are involved in pain, heat, and tactile sensations. In the trigeminal nerve nuclei of the spinal nerve, the fibers of the ophthalmic division are most ventral, those of the mandibular division are most dorsal, and those of the maxillary division are intermediate and descend more caudally than the other divisions [6]. In our patient, the observed symptoms may have been caused by two possible mechanisms: stimulation of the trigeminocervical complex or indirect physical stimulation of the spinal nuclei of the C0–C1 trigeminal nerve.

The name of the trigeminocervical complex suggests that the nociceptors of the trigeminal and cervical nerves overlap in the caudalis nucleus. Although the nuclei of the trigeminal and cervical nerves are anatomically separated, the cells of these two nuclei may receive two or more functional inputs from different sources. The activation of the trigeminal nerve causes symptoms along the distribution of the trigeminal and cervical nerves, with the activation of the cervical nerve simultaneously inducing symptoms in the cervical and trigeminal nerve

regions.

The most common examples are the strong stimulation of the trigeminal nerve nociceptors occurring after the extraction of the incisors or molars, which activates both trigeminal nucleus and spinal cord, stimulating the cutaneous areas innervated by the greater occipital nerve, inducing headache in the areas innervated by the ipsilateral supraorbital nerve, which is the first branch of the trigeminal nerve [7].

An electrophysiological study has clearly explained the trigeminocervical complex. The electrical stimulation of the ophthalmic nerve leads to the contraction of the sternocleidomastoid muscle. This trigeminocervical reflex response is induced by the stimulation of the accessory nerve motor neurons located in the spinal cord along with the trigeminal nucleus [8].

Moreover, when the C2 branch of the greater occipital nerve is chemically or electrically stimulated, excitability of the neurons in the meninges and trigeminal nerve increases simultaneously. The pain neurons of the trigeminal nerve consist mostly of A-delta fibers with a few C fibers. A-delta fibers are sensitive to acute pain signals that are produced by mechanical or thermal stimulation, which may lead to the simultaneous perception of pain through the A-delta fibers of the C2 dorsal root ganglion [7,9].

Physical stimulation is a potential secondary source of trigeminal nerve stimulation other than the trigeminocervical complex. Anatomically, the trigeminal nucleus located in the spinal cord segment is positioned at the back of the spinal cord [6]. In the prone position with cervical spine flexion, the insertion of pressure-separation acupotomy needles, which are thicker than regular acupuncture needles, can reduce the distance between the patient's skin and spinal cord compared with that measured via magnetic resonance imaging. Therefore, the pain neurons of the trigeminal nerve may be stimulated indirectly by the neighboring vascular structures or soft tissue.

In Western medicine, the prevention of nerve injuries caused by the needles is a key precaution in anesthesiology, especially when performing nerve blocks. Thus, to minimize the risk of side effects caused by nerve blocks, the patient and operator should communicate intraoperatively. If the patient has complaints of abnormal pain patterns or sensations intraoperatively, the needle should be retracted immediately and reinserted. Moreover, needles with a short incline plane should be inserted parallel to the direction of the nerves and blood vessels [10].

In the present case, if the operator was aware before the procedure that symptoms of trigeminal nerve stimulation may occur during acupotomy of the upper cervical spine and had notified the patient, they would have been able to extract the needle and adequately assess the situation, thus minimizing the frequency of nerve stimulations. However, limitation of this case was that the presence or absence of trigeminal nerve stimulation after acupotomy could not be confirmed through neurophysiological examination relying instead on subjective appeals from the patients.

In conclusion, we reported a case of facial pain that might have occurred with acupotomy needling of the sites adjacent to GV16. The findings of this study are significant because it is the first report of facial pain as a side effect of acupuncture or acupotomy of the upper cervical spine.

## AUTHOR CONTRIBUTIONS

Conceptualization: EJL, SYC, CHK. Data curation: EJL, TKK, CMS. Formal analysis: EJL, JCS, CHK. Investigation: EJL, TKK, CMS, SWK. Methodology: EJL, TKK. Project administration: EJL, JCS, SYC, CHK. Resources: EJL, CHK. Software: EJL. Supervision: EJL, JCS, SYC, HMY, CHK. Validation: EJL, HMY, CHK. Visualization: EJL. Writing – original draft: EJL. Writing – review & editing: EJL, SYC, CHK.

## CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

## FUNDING

None.

## ETHICAL STATEMENT

This study was approved by the Dong-Eui University Institutional Review Board (IRB no.: DIRB-202311-HR-R-36). Before the study, the patient provided us with an informed consent form for the academic use of the medical records and answers to the questionnaire.

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## REFERENCES

1. Kwon CY, Yoon SH, Lee B. Clinical effectiveness and safety of acupotomy: an overview of systematic reviews. Complement Ther Clin Pract 2019;36:142-152. doi: 10.1016/j.ctcp.2019.07.002
2. Kim S. Clinical characteristics of poor responders to acupotomy and safety pretreatment management. J Korean Acupunct Moxibustion Soc 2008;25:117-125.
3. Meridians & Acupoints Compilation Committee of Korean Medical Colleges. Details of meridians & acupoints: a guidebook for college students. 7th ed. Jongryeonamu Publishing Co.; 2016; 520-525.
4. Choo DCA, Yue G. Acute intracranial hemorrhage in the brain caused by acupuncture. Headache 2000;40:397-398. doi: 10.1046/j.1526-4610.2000.00061.x
5. Tsukazaki Y, Inagaki T, Yamanouchi Y, Kawamoto K, Oka N. Traumatic subarachnoid hemorrhage associated with acupuncture. Headache 2008;48:1240-1241. doi: 10.1111/j.1526-4610.2008.01139.x
6. Joo W, Yoshioka F, Funaki T, Mizokami K, Rhoton AL Jr. Microsurgical anatomy of the trigeminal nerve. Clin Anat 2014;27:61-88. doi: 10.1002/ca.22330
7. Piovesan EJ, Kowacs PA, Oshinsky ML. Convergence of cervical and trigeminal sensory afferents. Curr Pain Headache Rep 2003;7:377-383. doi: 10.1007/s11916-003-0037-x
8. Milanov I, Bogdanova D. Trigemino-cervical reflex in patients with headache. Cephalalgia 2003;23:35-38. doi: 10.1046/j.1468-2982.2003.00454.x
9. Piovesan EJ, Kowacs PA, Tatsui CE, Lange MC, Ribas LC, Werneck LC. Referred pain after painful stimulation of the greater occipital nerve in humans: evidence of convergence of cervical afferences on trigeminal nuclei. Cephalalgia 2001;21:107-109. doi: 10.1046/j.1468-2982.2001.00166.x
10. Jung HJ, Im KS, Hong SH, Kim DY, Kim JB. Persistent brachial plexus injury associated with axillary brachial plexus block: a case report. Korean J Anesthesiol 2006;50:718-722. doi: 10.4097/kjae.2006.50.6.718