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# Clinical Study for Inferior Alveolar Nerve Block with Anterior Technique

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**Abstract** The anterior technique of the inferior alveolar nerve block is the method for analgesia of semi-mandibule, which is usually used in clinical practice of oral surgery. We performed the research work for improvement of the inferior alveolar nerve block (IANB) to get high effect of anesthesia and reduction of complication. We established the anterior method of the inferior alveolar nerve block which prickle very thin needle about 1cm and inject the anesthetic and it applied in clinical practice on the basis of anatomical research of the pterygomandibular space. The advantage of this method is that maneuver of anesthesia is simple and effective and patients seldom feel fear and pain. We confirmed effectiveness of this method in 1 350 patients (852 patients in study group, 498 in control group) indicated for the inferior alveolar nerve block. In the anterior technique of the inferior alveolar nerve block, anesthetic effectiveness was 91.57% with 0.05% incidence of complication.

**Key words** inferior alveolar nerve block (IANB), anterior technique

## Introduction

The great leader Comrade **Kim Jong Il** said as follows.

**"In order to provide good medical services, it is imperative to improve the way diagnosis and treatment are carried out."**("ON THE FURTHER IMPROVEMENT OF THE HEALTH SERVICE" P. 12)

The anesthetic technique is the important skill which helps doctors to take several kinds of operation and treatment with patients feeling no pain. The inferior alveolar nerve block is the method for analgesia of semi-mandibule, which is widely used in clinical practice of oral surgery. In the inferior alveolar nerve block less amount of drug is used and wider region is anaesthetized for longer time than in the infiltration anesthesia[2, 5, 6, 11, 12].

There are different methods in the inferior alveolar nerve block.

The more correctly the anesthetic maneuver is performed, the higher possibility of injury of the nerve and blood vessels are, because all these methods regard nerve and blood vessel as target. Recently, it has been reported that the incidence of complication in the inferior alveolar nerve block is about 20%[1, 3, 6, 7, 8]. It also makes maneuver more complicated and patient felt fear and pain when was injected[1, 3, 4, 9, 10].

Recent survey shows drug injected near the mandibular foramen in the pterygomandibular space spreads rapidly and the spreads of drug finishes when injection of drug finishes, which is examined by X-ray TV and CT [1, 2, 4, 5, 8]. Drug injected in the pterygomandibular space spreads to the inferior alveolar nerve, and the nerve fiber is anesthetized, of which the effect is the same as nerve

block of mandibular foramen [1, 6, 7]. It shows anesthesia is performed if drug is injected into the pterygomandibular space even though not directly to the inferior alveolar nerve [3, 4]. According to the anatomical research results, the distance to the pterygomandibular space from the oral membrane surface is about 0.8cm. Therefore, a needle point approaches the anterior of the pterygomandibular space when prickle very thin and short needle and advanced about 1cm. So in the case of the anterior method of the inferior alveolar nerve block, maneuver gets simple than informer methods and patients hardly feel fear and pain. It also has little possibility of injury of the nerve and blood vessels, because drug is injected to the space around nerve.

We established the anterior method of the inferior alveolar nerve block and applied to clinical practice and examined effectiveness of anesthesia on the basis of anatomical research of the pterygomandibular space.

### 1. Research Object

We observed 1 350 cases indicated for the inferior alveolar nerve block.

It composed of 852 cases for study group (male 359 cases, female 493 cases) and 498 cases for control group (male 212 cases, female 286 cases) whose age was from 17 to 65(Table 1).

Table 1. Composition of Patients

| Division | Study group | Control group | All |
|---|---|---|---|
| Male | 359 | 212 | 571 |
| Female | 493 | 286 | 779 |
| All | 852 | 487 | 1 350 |

### 2. Material and Methods

#### 2.1. Drug and apparatus

In study group local anesthetic solution was 2% Lidocaine Hydrochloride with 1∶100 000 Adrenaline an ampoule (1.8mL) or was in syringe same amount of solution.

The dental needle used is 30G ($\phi$ 0.3mm×15mm or 0.3mm×21mm in diameter and length).

In control group, it used 2.5mL with same local anesthetic solution.

The dental needle used is 25G ($\phi$ 0.5mm×30mm in diameter and length).

#### 2.2. Anesthetic method

The patient is sited on the unite and his head is turned to the lesion. The tunica mucosa oris of the site to inject is sterilized two times with 0.1% chlorohexidine.

The surgeon makes a patient open his mouth, then syringe is placed over first molar at opposite side of oral angle, and stick the concaved area in the external margin of pterygomandibular fold.

Then the needle is advanced about 1.0cm. At this time, the tip of needle lies in the pterygomandibular space and anesthetic solution of about 1.8mL is slowly deposited.

The anterior technique was evaluated with the mandibular foramen technique as control group.

Anesthetic effectiveness were evaluated compared with control group with anesthetic sense, phonograph, anesthetic appearance and duration  success rate of the anterior method of the inferior alveolar nerve block as index.

## 3. Results and Discussion

### 3.1. Anesthetic sense

Sense change in the lower lip and apex or semi-lingue becomes standard the expression of the anesthetic effect.

We evaluated that the region was anesthetized if patient feels numbness in the tongue and lip.

We estimated to be excellent of anesthetic effect if patients feel numbness at the region distributed in the inferior alveolar nerve and lingual nerve, good if only at the region distributed in the inferior alveolar nerve, bad if only at the region distributed in the lingual nerve and poor if not(Table 2).

Table 2. Anesthetic sense

| Division | Study group ($n$=546) | Control group ($n$=398) |
|---|---|---|
| Excellent | 428 | 276 |
| Good | 75 | 47 |
| Bad | 42 | 70 |
| Poor | 1 | 5 |

$p<0.05$

As shown in table 2, the anesthetic sense of the anterior method of the IANB of study group was high than those of the control group.($p<0.05$)

### 3.2. Pain threshold

Pain threshold was estimated by measuring instrument. We measured 35 cases selected in the study group and control group before and after anesthetize by phonograph(Table 3).

As shown in table 3, after anesthesia, the pain threshold of anterior method of IANB of study group was high in lip and tooth than those of control group.

Table 3. Pain threshold/$\mu$A

| Division | | Control group | Study group |
|---|---|---|---|
| Before anaesthetize | Lip | 35.68±1.41 | 35.42±1.53 |
| | Tooth | 8.34±0.09 | 8.28±1.1 |
| After anaesthetize | Lip | 144.25*±1.46 | 131.51±2.70 |
| | tooth | 65.52*±1.38 | 58.68±1.96 |

* $p<0.05$

### 3.3. The appearance and duration times of anesthesia

Maneuver for operation needs both enough anesthetic effect and enough time.

As shown in table 4, in the tongue and lip, the appearance of anterior method of IANB of study group was quick and duration was long than those of control group($p<0.05$). It shows surgeon can take several kinds of maneuver for 1～1.5h after feeling anesthetized.

Table 4. The appearance and duration hour of anesthesia

| Division | Appearance time/min | | Duration time/min | |
|---|---|---|---|---|
| | Tongue | Lip | Tongue | Lip |
| Control group | 2.42±0.06 | 3.28±0.65 | 69.71±14.32 | 85.86±22.27 |
| Study group* | 2.32±0.77 | 3.18±0.53 | 74.83±12.24 | 93.18±19.10 |

* $p<0.05$

So we estimated that quantitative change of anesthetic drug has an influence over the time to be anesthetized and effect. The quantitative change of anesthetic drug in each anesthesia method that was injected correctly to the pterygomandibular cavity has an influence over the time and effect of anesthesia.

### 3.4. Success rate of anesthesia

We estimated success rate according to sex, age and diseases(Table 5).

As shown in Table 5, success rate of the anterior method of IANB was high as 91.57%

Table 5. Success rate of anesthesia

| Division | Count of success | Success rate |
|---|---|---|
| Control group($n$=398) | 322 | 80.90 |
| Study group($n$=546) | 500 | 91.57* |

* $p<0.05$

than control group.($p$<0.05)

It shows this technique has high effect and can be applied to all the patients of oral and maxillofacial surgery without the relation of age and sex.

### 3.5. The incidence of complications

Some researchers said that the higher success rate gets, the higher incidence of complications gets for the anesthetic method of inferior alveolar nerve.

We examined complications compared with these data. As shown in table 6, in study group the injury of nerve, lock jaw, hematoma and bleeding were not identified, and infection was 0.05%.(not significant than the control group)

Table 6. Incidence of complications

| Division | Nerve injury | Lock jaw | Hematoma | Bleeding | Infection | All |
|---|---|---|---|---|---|---|
| Control group($n$=398) | 4.02(16) | 2.26(9) | 1.26(5) | 4.27(17) | 1.76(7) | 13.57 (54) |
| Study group($n$=546) | — | — | — | — | 0.05(3) | 0.05*(3) |

* $p$<0.05

The whole incidence of complication in the anterior method of IANB of study group was low than that of control group.($p$<0.05) In the case of anethesis by the anterior method of IANB, there was no nerve injury, hematoma and hemorrhage, because there was no risk that could injure nerves or vessels anatomically. Then thin and short needle pass only through oral mucosal membrane, whereas there is manually no risk that could injure temporal muscle tendo, so there was no lock jaw.

## Conclusion

In the anterior technique of the inferior alveolar nerve block, anesthetic effectiveness was 91.57% and incidence of complication was 0.05%.

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