

Techniques of local anaesthesia

The work is supported by the **EFOP-3.4.3-16-2016-00021** „A Debreceni Egyetem fejlesztése a felsőfokú oktatás minőségének és hozzáférhetőségének együttes javítása érdekében” project. The project is co-financed by the European Union and the European Social Fund.



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„The ancient desire of human people is to eliminate the pain,,

DIVINUM OPUS EST SANARE
DOLOREM



Forms of anaesthesia

- Local : extractions, small surgical interventions (soft tissue excision, intraoral incisio, biopsy, sculptio, dentoalveolar and periodontal surgeries)
- General: ITN – bigger dentoalveolar and maxillofacial surgical interventions



Local anaesthesia

- Types of local anaesthesia can be classified according to the way in which doctors try to reach the nerve elements which need to be anaesthetized.
- We distinguish:
 - Terminal (infiltration) anaesthesia
 - Block anaesthesia



Terminal anaesthesia

- We reach the nerve elements by the axon terminals, directly by the innervation of teeth or periodontal ligaments.

Types:

- mucous membrane anaesthesia
- submucosal infiltration
- intramucosal infiltration
(subperiosteal)
- intraligamental anaesthesia
- intraosseal anaesthesia



Mucous membrane anaesthesia

- Anaesthetics with good diffusing ability can reach surface anaesthesia by penetrating the mucous membrane.
- Usage:
 - by insertion point of the injection
 - smaller mucosal lesions
 - removal of mobile primary teeth



Submucosal infiltration

- Most commonly used method; we infiltrate the anaesthetic to the field of the mucous membrane with submucosa, directly to the apex. The solution from the so formed pit diffuses to the desired location through the bone and periosteum.
- Implementation: we are directing the needle near by the periosteum, parallel the bone surface, while continually emptying the needle („pressing during injection”)



Intramucosal infiltration

- We give the anaesthetic to the gingiva propria with a thin needle. In this type, no pit is formed, we use small amount of anaesthetic and the elimination is quicker.
- Fields of application:
 - inflamed tissues
 - abscess around the root

Intraligamental anaesthesia

- In this type, we use extremely thin needle and high-pressure syringe to infiltrate the anaesthetic into the area of the circular ligaments.



Intraosseal anaesthesia

- In this type we give the compound through the cortical bone into the spongiosa with a special drill
- Types: transcortical
osteocentral
intraseptal



Block anaesthesia

- We block the function of the peripheral nerve trunk by forming a pit around the trunk, so the anaesthetic can diffuse to the nerve fibers through the peri- and endoneurium.
- Pressing during injection, pit forming by directing the needle slowly(!)



Block anaesthesia

- Types: can be sorted by the insertion point or the nerve to be anaesthetized

Maxilla

- Infraorbital (n. alveolaris sup.ant. + n. infraorbitalis)
- Tuberal (nn. alveolares sup. post)
- Matas (n. maxillaris)
- Foramen palatinum majus (n. palatinalis ant.)
- Foramen incisivum (n. incisivus)



Block anaesthesia

- Types: can be sorted by the insertion point or the nerve to be anaesthetized

Mandible

- Szokolóczy (n. alveolaris inf. + n. lingualis)
- foramen mentale: (n. mentalis)
- n. lingualis
- n. buccalis
- Gow Gates
- Akinosi



Block anaesthesia

Maxilla

- **Infraorbital:** the aim is the most optimal approach of the infraorbital foramen, because the anaesthetic infiltrated here diffuses to the infraorbital canal, so it can anaesthetize the superior anterior nerves and the infraorbital nerve

Anaesthesia: upper incisors, canines, maybe premolars;
soft tissues of the face in the infraorbital area

Implementation: stand in front of the patient, grab the upper lip between the thumb and index finger. Link the pupil and the second premolar, than move the index finger on this imaginary line under the infraorbital margin, so it reaches the infraorbital foramen. Pull the upper lip with the thumb, the insertion point: in the axle of the canine, up high in the vestibule. Inject with long needle!

Block anaesthesia

Maxilla

- **Tuberal:**

insertion point: in the axle of the DB root of the second upper molar, up high in the vestibule.

direction of insertion: parallel with the nasal bone and the median plane. After 1 cm, direct the needle a little towards medial, following the curvature of the maxillary tuberosity.

depth of insertion: around 18-20mm (short needle , better with long needle)



Block anaesthesia

Maxilla

- **Matas:**

Anaesthesia of the maxillary nerve in the pterygopalatine fossa. Used in bigger surgical interventions or in case of neuralgia.

Implementation: first anaesthetize the area of the major palatine foramen with a 45°-curved needle (0,1-0,2 ml solution), then direct the needle into the pterygopalatine canal to 3 cm depth. Infiltrate about 1 ml anaesthetic.

If the anaesthesia is successful, we can also reach the numbness of the infraorbital nerve.



Block anaesthesia

Maxilla

- Matas:

1. n. infraorbitalis
2. nn. supp. post. alv.
3. ggl. pterygopalatina
- 4 n. palatinum major
5. n. palatinus minor
6. n. nasopalatinus
7. n. pharyngei

Block anaesthesia

Maxilla

- Major palatine foramen

The nerve, exiting this foramen (anterior palatine nerve) innerves the mucous membrane of the palate to the area of the canines. Used for anaesthesia of upper molars and premolars.

Insertion point: link the distal surface of the two upper second molars. The insertion point is on this imaginary line 1 cm from the gingival margin. Hold the needle sharply onto the bone, 0,2-0,3 ml anaesthetic is sufficient.



Block anaesthesia

Maxilla

- Incisive foramen

Anaesthesia is done by the incisive papilla, where the incisive nerve exits.

Insertion point: on the edge of the incisive papilla, insert from lateral side. If the anaemic zone appears, try to get 1-2 mm deeper into the incisive canal, so the anaesthesia will be even more effective.

Insertion depth: 3-4 mm. If deeper, the anaesthetic gets into the nasal cavity.



Block anaesthesia

Mandible

-Szokolóczy's method

If we infiltrate the anaesthetic to the area of the lingula mandibulae, we can reach the anaesthesia of the the inferior alveolar nerve and the lingual nerve at the same time. The method helps to determine the position of the lingula.



Block anaesthesia

Mandible

-Szokolóczy's method

Implementation: while standing in front of the patient, by closed mouth we put either the left index finger on the right side, or the left ring finger on the left side to the condyle of the mandible. The condyle is just in front of the tragus, so if we ask the patient to open mouth, it can be easily located. After this we put either the ring finger on the right side, or the index finger on the left side to the angle of the mandible. This is how to determine the height of the ramus.



Block anaesthesia

Mandible

-Szokolóczy's method

Implementation (continued):

After this, we put our middle finger to the midpoint of the determined height, onto the posterior margin of the ramus of the mandible. If it's done, we can easily palpate the anterior margin of the ramus by open mouth intraorally. Later on we palpate the retomolar fossa with our thumb and put it onto the margin of the crista temporalis. So the pterygomandibular space is medially from our thumb, bordered only by mucous membrane.

Block anaesthesia

- Mandible
 - Szokolóczy's method

Implementation (continued): The entrance of the pterygomandibular space is bordered by the crista temporalis from the lateral side, and by the anterior margin of the medial pterygoid muscle from the medial side. The position of the muscle is indicated by the pterygomandibular plica (mucosal protrusion).

Insertion point: along the longitudinal bisector of the thumb, between the plica and the edge of the thumb.

Direction of insertion: determined by the deflection of the ramus from the body of the mandible. Usually we direct the needle from the opposite premolars, parallel with the occlusal plane. We first hit the bone with the needle. Then turn the syringe parallel with the ramus and guide the needle for about 2 cm. Then turn back again to the opposite side premolars and go until you feel the bone again. Stop here and aspirate the syringe. If there is no blood in the syringe, insert 1,8 ml.

Depth of insertion: determined by the width of the ramus, usually 20-25 mm. Always insert the needle until reaching the bone!

Block anaesthesia

- Mandible
 - **Szokolóczy's method**

If the anaesthesia was done correctly, numbness first develops on the lower lip, then on the tongue from back to the tip. The complete anaesthesia is indicated by the numbness of the lower lip, chin and the front 2/3 of the tongue till the midline. This takes about 5-10 minutes.

Failures:

- the needle doesn't go deep enough: only the tongue is numb
- the needle goes too deep: the tongue is not or just partially numb, numbness occurs on the lip and around the ear



Block anaesthesia

Mandible

- Lingual nerve:

Implementation: by the second and third molars, lingually by the floor of the mouth

Indication: soft-tissue surgeries done on the tongue or on the floor of the mouth



Block anaesthesia

Mandibula

- Mental nerve:

Implementation: anaesthesia is done by the anaesthetic infiltrated to the mental foramen, which is located between the apices of the first and second premolar.

On the right side, stand behind the patient and insert the needle from distal to the foramen.

Indication: soft-tissue surgeries done on the lower lip, on the chin or in the vestibule



Block anaesthesia

Mandibula

- Buccal nerve:

Implementation: we can reach the nerve in the retromolar fossa. Insert 1 cm from the distal surface of the lower wisdom tooth.

(the nerve can be anaesthetized terminally as well, which is often more effective)



Block anaesthesia

Mandibula

- Vazirani-Akinosi

Indication:

trismus

TMJ ankylosis



Anaesthesia of individual teeth

- Maxilla

Upper incisors and canines

- ***Anaesthesia:***

vestibular:

block: anaesthesia of the infraorbital nerve
(see above)

palatal:

block: anaesthesia of the incisive nerve
around the incisive papilla

terminal: -used by anaesthesia of canines
-0,5-1 cm from the palatine
gingival margin



Anaesthesia of individual teeth

- Maxilla

Upper premolars

- ***Innervation:***

vestibular: nn. alveolares sup . ant., medii et post.

palatal: n. palatinus anterior

- ***Anaesthesia:***

vestibular:

terminális: submucosal

insertion from the direction of the canine

block: n. infraorbitalis

palatal:

block: by the major palatine foramen (see above)



Anaesthesia of individual teeth

- Maxilla

Upper molars

- ***Innervation:***

vestibular: nn. alveolares post.

palatal: n. palatinus anterior

- ***Anaesthesia:***

vestibular:

terminal: submucosal

!!!Upper first molar: anaesthesia is done by 2
insertion points because of the crista
zygomaticoalveolaris:

0,6-0,7 ml solution ahead,

1,2-1,3 ml behind the crista



Anaesthesia of individual teeth

- Maxilla
Upper molars

- ***Anaesthesia:***

vestibular:

block: tuberal
Matas

palatal:

block: by the major palatine foramen (see above)



Anaesthesia of individual teeth

- Mandible

General aspects: thick cortical, which inhibits the anaesthetic diffusing to the apicis. That's why we usually use block anaesthesia for lower teeth (Szokolóczy's method).

Beside the block anaesthesia, sometimes terminal supplement is also needed:

- incisors and canines: because of the overlaps from the opposite side
- premolars and molars: because of the anaesthesia of the buccal mucous membrane



Extraoral anaesthesia

- The 2nd and 3rd trigeminal branch can be anaesthetized extraorally as well. Used for bigger maxillofacial surgeries, when ITN is contraindicated.

The preparation of the patient and the sterility is very important!
(isolation, skin desinfection)

Methods:

- Payr
- Lindemann
- Braun
- Berg
- Kantorowicz



Extraoral anaesthesia

Payr

The insertion point is at the meeting point of the zygomatic bone and the lateral margin of the orbit. The needle is directed from above and forward to back and behind. If we get about 5,5 cm deep, we reach pterygopalatine fossa.

Here, we infiltrate 2-3 ml anaesthetic, but before, aspirate the needle.

The needle should be at least 6 cm long.



Extraoral anaesthesia

Lindemann:

The point of insertion is above the zygomatic arch, and if we follow the *facies infratemporalis ossis temporalis*, we can reach the pterygoid process. After this, pull back the needle a little bit, and direct about 1 cm to dorsal to get nearby the foramen ovale.

With this method, we can also anaesthetize the maxillary nerve, if we direct the needle 1 cm to ventral, after reaching the pterygoid process.



Extraoral anaesthesia

Braun:

The point of insertion is under the zygomatic arch, with moderate open mouth. The needle is directed through the incisura semilunaris. Getting about 5,5 cm deep, we reach the pterygoid process, 1 cm dorsally there is the foramen ovale, 1 cm frontally there is the sphenopalatine fossa (anaesthesia of V/2 and V/3).



Extraoral anaesthesia

Berg:

Used for extraoral anaesthesia of the inferior alveolar nerve. The point of insertion is under the angle of the mandible, on the central point of the imaginary line binding the tragus and anterior margin of the masseter. Insert the needle until reaching the lingula of the mandible, till the depth of about 30-35 mm.



Extraoral anaesthesia

Kantorowicz:

Used for extraoral anaesthesia of the inferior alveolar nerve. Put your index finger onto the posterior edge of the ramus mandibulae and the distal phalanx of your thumb onto the angle of the mandible. Now the insertion point is just next to the nail of the thumb. After this, we direct the needle until the lingula of the mandible, insertion depth is about 30-35 mm.



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The work is supported by the **EFOP-3.4.3-16-2016-00021**
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