SOME ASPECTS OF THE TONSILLECTOMY
ACCORDING TO SLUDER

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During the 3rd Meeting of the DUTCH EAR-NOSE-THROAT ACADEMY * in Utrecht held in the Clinic for Ear-Nose-Throat diseases, on 8 March 1931 a lecture was given detailing a technique of tonsil removal devised by the American ENT surgeon GREENFIELD SLUDER and performed for the first time in 1911.

* Genootschap van Nederlandsche Keel-, Neus- en Oorartsen

The Belgian ENT doctor Dr. VAN DER SCHUEREN from Grammont (Belgium) gave the presentation, in French (!) and clearly described the benefits of the method: total, rapid tonsil removal; less frequent post-operative bleeding and fewer complications. After the lecture an extensive discussion followed focusing on the Sluder technique and other methods preferred by the participants. Chairman QUIX recommended his own instruments for removing the tonsils. The report of the meeting includes no fewer than six pages documenting other techniques, instruments, elevators, brackets, tongs and other useful aids for the tonsillectomy (p.4004-4010). The presentation by VAN DER SCHUEREN included illustrations and occupied seven pages in the NTvG * of Saturday, July 25, 1931 (75 III 30 p.3996-4004)

* Dutch Medical Magazine - Nederlands Tijdschrift voor Geneeskunde (NTvG)

"... the entire set of instruments including the suction motor, bottle, etc. is connected to a small instrument table, on which the elevator connected to the hose can be attached to a boiling container. The instruments have been made and are supplied by H. STÖPLER in Utrecht."

Below one can see the three original illustrations from 1931 by Dr. VAN DER SCHUEREN with the accompanying photos of the various stages. As instructional material, the drawings are clearer than the photographs. The illustrator conveniently keeps the patient’s tongue out of the operating field.

The left tonsil of the patient is scooped up with the (blunt) ring knife in the left hand of the operator...
Fig. 2 Second stage

... the index finger of the right hand pushes the tonsil entirety through the ring, the instrument is then closed powerfully and completely...

Fig. 3 Third stage

... with the help of the instrument, the tonsil is pulled out of its fossa to the center of the oropharynx. Finally, the tonsil is removed by tearing the posterior pillar mucosa between the edge of the instrument and surgeon’s right index finger. No knife or cutting instrument is needed.

The instrument is then taken in the other hand and the same procedure follows on the other side. The total operating time for removing both tonsils with this method, takes only 10-15 seconds.

Fig. 4 The blunt instrument cannot 'cut'
If one reads the arguments of QUIX from 1931, it is amazing how many technical problems doctors had that time when removing the tonsils.

I. anesthetic agents at that time * (with their side effects):

- 1800  Discovery of the analgesic effect of nitrous oxide N\(_2\)O (respiratory depression, drop in blood pressure, oxygen deficiency).
- 1846  First ether anesthesia by the dentist WILLIAM T.G. MORTON (USA), (very flammable and explosive).
- 1847  First chloroform (trichloromethane) anesthetic, proved to be very dangerous (arrhythmias, liver and kidney damage).
- 1884  First application of cocaine as a local anesthetic. (rise of heart rate and blood pressure)
- 1894  Chloroethyl as an inhalant anesthetic (flammable, arrhythmias).
- 1899  Use of procaine combined with adrenaline as a topical anesthetic (sensitization).
- 1905  Procaine = Novocaine®, short-acting local anesthetic (sensitization).
- 1930  Tetracaine, long-acting, strong, local surface anesthetic.
- 1935  Cyclopropane as an inhaled anesthetic (very explosive, respiratory depression, drop in blood pressure, ventricular fibrillation, arrhythmias).

* dates may vary in the literature

General anesthesia was life-threatening in the early 1900's, and so was a throat infection -- a very difficult dilemma. Most tonsillectomies therefore were performed under local anesthesia or without any anesthesia at all. Under these conditions, patients often could not cooperate. Grasping and removing the tonsils was not easy in a bleeding, gagging, coughing and struggling patient. The operator, dressed in a sort of oil coat and rubber gloves, had to 'pluck away' as much tonsil tissue as possible in the shortest possible time during the operative struggle. Despite the use of leather straps to restrain the patient's arms and legs and a retractor to hold the mouth wide open, it remained a challenge to hold the patient's head still enough to operate. Figs. 13 & 14.

The method as proposed by SLUDER can therefore safely be called revolutionary. It was comparable in speed to the of pulling teeth by barbers, yet had the benefits of total removal and less post-operative bleeding than other methods. Surgical procedures lasting more than a few moments were a torture for the awake patient thus the saying: 'A good surgeon is a fast surgeon'.

Fig. 5 LEWIS HINE: Tonsillectomy 1920-1930 (Courtesy George Eastman House)
2. Adjustment of the instruments

As early as the year 10 AD, the Roman physician AULUS CELSUS described scraping out a tonsil with his long fingernail. In the ensuing millennium, others recommended grabbing the tonsil with a hook and cutting it off, or binding a rope or steel string around it and pinching it slowly. This last process sometimes took more than a day while the patient drooled over a container, (SAMUEL SHARP 1700-1778). All this to prevent the much-feared operative bleeding. BENJAMIN BELL (1749-1806) devised a guillotine knife for uvulectomy (cutting off the entire uvula). In those days the edematous uvula was seen as the cause of angina or tonsillitis. PHILIP PHYSICK (1768-1837) use the Bell uvulotome in 1828 for the tonsillotomy (partially cutting the tonsil). Unfortunately, the sharp cutting of the tonsil usually degenerated into a bloodbath.

Fig. 6 Physick’s tonsillotome (1828) is a sharp-cutting instrument

3. Improvement of the method

As most surgeons are right-handed, early textbooks advised that the surgeon approach the patient’s left tonsil front to side, from the left corner of the patient’s mouth, with the guillotine knife in the operator’s left hand with the handle to the left. The goal was to catch the slippery tonsil in the ring knife, then push the instrument over the tonsil as far as possible and then cut it off. This was not easy in mouth full of saliva, past a resistant tongue in a gagging, struggling and writhing patient. The second tonsil was even more difficult to remove in a bleeding field with an increasingly uncooperative patient. It is to SLUDER’s credit is that he published this well-thought-out method and remained it forceful advocate.

Fig. 7 H.C. Ballenger (1925)  
Fig. 8 L.R. Boies (1954)
**Greenfield Sluder** (1865-1928) was Clinical Professor and Director of the Department of Rhinology, Laryngology and Otology, Washington University School of Medicine, St. Louis, Missouri. He presented his blunt, complete removal of the tonsils (‘ectomy) from their niche on June 9, 1910, at a meeting of the AMERICAN MEDICAL ASSOCIATION in St. Louis USA. He published a detailed description in the J.A.M.A. volume LV, No. 12, 867-871, March 25, 1911.

![Sluder’s picture: Courtesy of the National Library of Medicine USA.](image)

The basic principles of his method are as follows:

- An adapted guillotine knife from Physick. The instrument was made stronger so that it could not bend and prevent wobbling of the knife.
- The blade part was made shorter and the handle longer, to increase the leverage effect.
- The instrument was closed with the thumb, or the thumb was placed in a ring so that the knife could be opened again. This system was later improved by William Lincoln Ballenger (1862-1916) from Chicago, who first demonstrated his pinch and spring-back handle in Europe-Austria in 1914 in Vienna.
- The oval-shaped opening with the largest diameter perpendicular to the shaft and the top slightly curved for better visibility.
- And most importantly: the instrument was made blunt.

![Fig. 9 Greenfield Sluder](image)

Fig. 10 Tonsillectome according to Sluder-Ballenger

The technique (the left tonsil of the patient):

- The patient under adequate anesthesia: ’sleeps’, feels no pain, breathes spontaneously, reflexes still present, anesthesia mask removed, the patient breathes room air.
- To open the mouth, a spring-loaded mouthpiece that snaps behind the front teeth is inserted fig.11.
- The patient is in a sitting position, slightly bent over so that blood and possibly the tonsils fall out of the mouth and not into the back of the throat.
- The instrument is held in the left hand of the operator.
- The patient’s mouth is entered from the right corner.
- The tonsil is scooped from the inferior pole upward and from lateral to medial.
- The ring knife rests against the last mandibular molar -the eminentia alveolaris mandibulae- (fig. 12). This allows the instrument to be pressed firmly against the tonsil.
The index finger of the right hand now pushes the tonsil, from front to back, in its entirety through the ring knife. The ring knife is then closed firmly. As a result, the mucous membrane partially slips off the tonsil and the tonsil protrudes from the niche, towards the center.

With the instrument firmly and completely closed, the tonsil is gently pulled out of the niche towards the center.

The index finger of the right hand then tears the tonsil stump out of the niche.

Total operating time per tonsil: 4-7 seconds! Including the subsequent scraping of the adenoids, the entire procedure takes less than 30 seconds.

**YouTube Video: Sluder tonsillectomy**

Immediately afterwards, the patient is placed with his head down in a stable side position and is given oxygen. At the same time, the operator pulls the lower jaw forward to keep the airway clear. The mouth and nose are lightly suctioned as bleeding stops spontaneously. The patient wakes up slowly, feeling no pain at first.

**High-tech tonsillectomy**

It is striking how rarely one finds the name of SLUDER with regard to his tonsillectomy-method in the current English-language medical literature or on the Internet. He seems forgotten as the discoverer of a revolutionary, fast and safe method. Especially in American literature, people nowadays read more about tonsillectomies with the help of:

* Shaver - XPS Powered T&A Blade Set® (10 minutes)
* Ultrasonic Scalpel - Harmonic® (9 min.)
* Diathermic Knife - Radio Frequency Thermal Ablation, RFTA (5 min.)
* Laser - APC Argon Plasma Coagulation® (12 min.)
* Coblation Probe - T&A Plasma Wand® (5 min.)

These devices use: laser light, shaving, high-frequency electricity, high-frequency electromagnetic waves (microwaves), high-frequency cutting movements, HF-sound etc. etc. and usually aim at cutting and coagulating (burning) at the same time. Some of these methods overlap in terms of the technology used. Moreover, it has never been shown that these methods are better, safer or less painful. They are a lot more expensive and require more surgery- and thus anesthesia-time. These methods also reinforce the idea that nowadays surgery must increasingly be performed with high-tech instruments and that operating with the knife ‘cold-steel’ is hopelessly old-fashioned and outdated.

**The numbers ‘... nowadays they don't decide it so easy’**

The frequency of tonsillectomy and the indications for surgery have changed over the last century. It must be borne in mind that prevalence of infectious diseases and the tools to treat them are much different now than in 1900. New virulent microorganisms (AIDS, SARS and Ebola) have emerged in recent decades and other disease-causing agents have almost disappeared. In the antibiotic era, even recurrent throat infection and peritonsillar abscess are less common indications for tonsillectomy.

An overview of the indications for tonsillectomy around 1900 and 2000

<table>
<thead>
<tr>
<th></th>
<th>1900</th>
<th>2000</th>
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<tbody>
<tr>
<td>1 Angina = sore throat or illness with a painful feeling of suffocation</td>
<td>+</td>
<td>-</td>
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<tr>
<td>2 Peritonsillar abscess</td>
<td>+</td>
<td>+</td>
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<tr>
<td>3 Scarlet fever</td>
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<td>-</td>
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<tr>
<td>4 Acute rheumatism</td>
<td>+</td>
<td>-</td>
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<td>5 Glomerulonephritis</td>
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<td>-</td>
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<td>6 Polyarthritis rheumatica acuta</td>
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<td>-</td>
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<tr>
<td>7 Chronic / recurrent tonsillitis</td>
<td>+</td>
<td>+/-</td>
</tr>
<tr>
<td>8 Diphtheria carriers</td>
<td>+</td>
<td>-</td>
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<tr>
<td>9 Recurrent otitis</td>
<td>+</td>
<td>+/-</td>
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<tr>
<td>10 Recurrent laryngitis</td>
<td>+</td>
<td>-</td>
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<tr>
<td>11 Recurrent Sinusitis</td>
<td>+</td>
<td>+/-</td>
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<td>12 Cervical gland tuberculosis</td>
<td>+</td>
<td>-</td>
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<tr>
<td>13 Focal infections</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>14 (Extreme) hypertrophy – OSAS</td>
<td>+</td>
<td>+/</td>
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<tr>
<td>15 White spots with foul breath and taste *</td>
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* depends on the aspect of the tonsils
indications (+) and relative (+/-) indications

At the same time, OSAS (Obstructive Sleep Apnea Syndrome/Snoring) from tonsillar hypertrophy has become a dominant indication for surgery.

**Obstructive tonsils**

While sleeping, large tonsils tend to fall backwards because of muscular relaxation and may obstruct the airway and cause snoring. These “stuffy” children shiver, have nightmares, sweat, wake up, cry and pee in bed. If this has been going on for some time, they will get up extremely tired in the morning. Headache, eating problems, fatigue, poor attention in school, falling asleep in the afternoon, crying without a cause – all may be related to sleep disordered breathing. These symptoms were recognized 100 years ago and are still present. (Fig. 15) At the same time, tonsillectomy is not the answer to all problems. With isolated adenoidal hypertrophy, the tonsils may appear normal and apnea may be absent. On the other hand, it makes no sense to remove the adenoids alone if there are two enormous tonsils. OSAS will likely persist and tonsils may continue to be a nidus of infection. Enuresis has many causes and should not lead to tonsil surgery in the absence of symptoms of disrupted sleep.
Cut or peel?

Cutting the tonsil (tonsillotomy) remained the preferred approach into the early 1900s, for lack of a better method. The tonsils were hooked with tongs and then partially cut off. Sometimes the "white dots" (hyperkeratosis) and crypts (holes) were excised as well. The term "cut" is heard by older children with the greatest possible distrust: when they open their mouth, they are wary that the doctor does not unexpectedly pick up scissors and cut off the uvula. It may be better to avoid this term in the presence of children.

Peeling (tonsillectomy) generally evokes the wrong image, too. This usually involves an egg or orange, the outer layer of ‘skin’ which is peeled off. But that is not the case with a tonsillectomy. It is more like removing the pit from a peach or plum by cutting the fruit in half, turning the two halves in opposite directions and peeling out the pit completely.
939. The consequences of the operation are, with correct indication, extremely beneficial. I do not know of another example of a surgical procedure that lasts two minutes and, as if by magic, to transform something like a deaf, snoring, drooling, drowsy, sad-tempered, struggling child into a mentally and physically perfectly healthy one (fig. 342).

Fig. 342. 7-year-old boy, 3 days before and 4 days after the adenoid-operation

412. Adenoid appearance (fig. 189) is a face type, that is created by regular mouth breathing in childhood. It is characterized by: persistent open mouth, weak facial muscles, elapsd naso-labial folds, smooth forehead and eyebrows, lower- and upper eyelids hanging down, faint eyes, stupid, slow, weak, sad tempered mood and facial expression.

Fig. 189. “Adenoid appearance” and its disappearance after the surgical removal of the adenoid.

Afb. 342. Jongen van 7 jaar, 3 dagen vóór en 4 dagen na adenoid-operatie.

Afb. 189. „Adenoid uiterlijk” en verdwijnen er van na de adenoidedoperatie (volgens Stumpf, Leerboek der Ziekenverpleging).

939. De gevolgen der operatie zijn, bij juiste indicatie-stelling, uitermate gunstig. Mij is geen ander voorbeeld bekend van een heelkundige ingreep, die twee minuten duurt en, als met tooverslag, zo iets bereikt als een doof, snurkend, kwijlend, suf, droefgeestig, sukkelend kind te veranderen in een, dat geestelijk en lichamelijk volkomen gezond is (afb. 342).

Afb. 342. Young man of 7, 3 days before and 4 days after adenoid operation.

Afb. 189. “Adenoid appearance” and its disappearance after the surgical removal of the adenoid.

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Fig. 189. “Adenoid appearance” and its disappearance after the surgical removal of the adenoid.

Fig.16 from H. BURGER, Textbook of diseases of the ears, nose, mouth, throat and esophagus, 1918
Fig. 17 The nasopharyngeal adenoid (above) and the two oropharyngeal tonsils (below, mm/cm)

Again cheerful and fresh

In 1881, Florentius Antonius Ingen-Housz obtained his PhD doctorate in Leiden on the thesis "The adenoid vegetation of the nasal throat". The booklet contains the photos of the 13-year-old son of the 'widow of D from The Hague'. The boy is pictured here before- and 9 months after the surgical procedure - an adenotomony. Fig. 18

"... February 27, patient with normal speech, normal physionomy and closed mouth will be discharged. The right ear now hears the watch at 71, the left ear at 89 cm. When he leaves, he is tidy and cheerful and gives us all a warm hand."
Two tonsillectomy anecdotes:

My mother-in-law (1928) still can remember how her tonsils in 1949 by Dr. C.A.H. WAAR in The Hague were removed under local anesthesia. The doctor spoke the following historical words during the procedure:

[The first tonsil is removed] "...it's a bloody cesspool... I don't see a Goddamn thing... she bleeds like hell... why are you bleeding like that?"

[Patient emits some sounds] "...Shut up... stop turning like a turd in a pot... put her on a stretcher and give her Sangostop... look at her [winding]... she looks like a python..."
[She survived, is 91 now].

Just after the war. A patient receives the bill from a professor for a tonsillectomy performed under local anesthesia. The bill provided with the additional 'professor's allowance'.

Patient : "What... that much money, for such a short intervention!"
Professor : "Next time I'll take it a little longer."

Illustrations:

VAN DER SCHUEREN, NTvG 1931; BURGER, textbook 1918;
VAN GANGELEN, textbook 1945; National Library of Medicine USA;
LEWIS HINE, George Eastman House USA; INGEN-HOUSZ, dissertation 1881.


ROELF M. BACKUS (1946)

Studied medicine at Leiden University from 1972-1979 and from 1979-1983 Ear, Nose and Throat Surgery at the ENT department at the Utrecht University, head prof.dr. E.H. HUIZING.
He was employed from 1984-2006 as an ENT-doctor at the hospital in Zeist-Utrecht in the Netherlands.

Nowadays he is retired and an active member of the Archive Committee of the Dutch ENT-Society *.

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Translated & Updated: 11 August 2020