SNORING & OSAHS
SURGERY

International Workshop

Minimally Invasive Surgery
M.I.S.
< 15 min
SURGICAL PROCEDURES UNDER LOCAL ANAESTHESIA

1. SLEEP DISORDERED BREATHING (SDB) SEVERITY

2. AIM OF TREATMENT

3. ANATOMICAL AREAS and TISSUE CHARACTERISTICS

4. PATIENT COMPLIANCE and ANATOMICAL FACTORS

5. TREATMENT SELECTION

6. TECHNOLOGICAL INSTRUMENTS AVAILABLE
1. SLEEP DISORDERED BREATHING (SDB) SEVERITY

**Simple Snoring**

**Obstructive Sleep Apnea Syndrome**

- **MILD:** AHI 10-20
- **MODERATE:** AHI 20 - 30
- **SEVERE:** AHI > 30

**SURGICAL PROCEDURES UNDER LOCAL ANAESTHESIA**

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## 2. AIM OF TREATMENT

<table>
<thead>
<tr>
<th>CURE SDB</th>
<th>SIMPLE SNORING</th>
<th>MILD-MODERATE OSAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURE FAILURE post-SS SURGERY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CURE FAILURE (on snoring) post-OSAS SURGERY</td>
<td></td>
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</tr>
</tbody>
</table>

- **IMPROVE** CPAP ADAPTATION
- **SIGNIFICANT REDUCTION OF FUNCTIONAL RISKS** in professional voice patients (eg.: singers, actor, lawyer …)
- **MINIMAL FUNCTIONAL SWALLOWING EFFECTS** in tongue base surgery (eg.: Down's Sy)

## SURGICAL PROCEDURES UNDER LOCAL ANAESTHESIA

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3.a. ANATOMICAL AREAS

- GENIOGLOSSUS MUSCLE
- TONGUE BASE
- TURBINATES
- TONSILS
- SOFT PALATE
- ADENOIDS

3.b. TISSUE CHARACTERISTICS

- Lymphatic
- Muscular
- Vascular

- TURBINATES
- SOFT PALATE
- TONGUE BASE
- ADENOIDS
- TONSILS
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pay attention to

4.a PATIENT COMPLIANCE
Psychiatric disease
Expected collaboration
Pharyngeal reflex
Drug intolerances

4.b ANATOMICAL FACTORS

good exposure?
4.b ANATOMICAL FACTORS

Different problems for different site/s of treatment/s

1. Septal deviations
2. Chronic sinusitis
3. Polips
4.b ANATOMICAL FACTORS

1. Mouth opening

2. Mallampati/Friedman score
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### 5. TREATMENT SELECTION

<table>
<thead>
<tr>
<th>Sites</th>
<th>Procedures</th>
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<tbody>
<tr>
<td><strong>Resection</strong></td>
<td>adenoidectomy</td>
</tr>
<tr>
<td>Adenoids</td>
<td>tonsillectomy</td>
</tr>
<tr>
<td>Tonsils</td>
<td>Uvulectomy</td>
</tr>
<tr>
<td><strong>Plastic reshaping</strong></td>
<td>UPPP, UPF, LAUP</td>
</tr>
<tr>
<td>Soft Palate</td>
<td></td>
</tr>
<tr>
<td><strong>Tissue stiffening</strong></td>
<td>Pillar implant</td>
</tr>
<tr>
<td>Soft Palate</td>
<td></td>
</tr>
<tr>
<td><strong>Tissue volume reduction</strong></td>
<td>RFVR</td>
</tr>
<tr>
<td>+ Turbinates</td>
<td></td>
</tr>
<tr>
<td>+ Adenoids</td>
<td></td>
</tr>
<tr>
<td>+ Soft Palate</td>
<td></td>
</tr>
<tr>
<td>+ Tonsils</td>
<td></td>
</tr>
<tr>
<td>+ Tongue-base</td>
<td></td>
</tr>
<tr>
<td>+ Genio-glossus muscles</td>
<td></td>
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6. TECNOLOGICAL INSTRUMENTS

- CO2 LASER
- RADIOFREQUENCY
- PILLAR Kit
Thermic effect:

- **Conventional Bovie:**
  - *high* temperatures (300-400 °C)
  - limited margin of thermal effect (0.5 mm. ca.)

- **RF technology:**
  - *low* temperatures (max. 85 °C)
  - relatively *big volumes* (till about 15x10 mm.)

**TURBINATE HANDPIECE**

**PALATAL HANDPIECE**
Anaesthesia

**Topic Anaesthetic:**
Spraying of Xylocaine 10% (2 - 4 puffs)

**Local Anaesthetic:**
Naropine 10%
(without adrenalin)

Palatal treatment

Our parameters ➔ 150 to 250 Joule each shot (median or lateral)
**Turbinate treatment**

*Our parameters*

- **Temperature:** 75°C
- **Joule:** 250–300 J
- **Time:** automatic

**Tonsillar treatment**

- **Temperature:** 85°C
- **Joule:** 200–300
- **Time:** automatic

4 SHOTS EACH TIME
GENIOGLOSSUS MUSCLE AND TONGUE BASE HANDPIECE

Temperature: 85°C
Joule: 150-250
Time: automatic

ENT & ORAL SURGERY - Forli
(Director: Claudio Vicini MD, Ph)
RADIO FREQUENCY SURGERY series
up to 25 February 2009

219 patients

<table>
<thead>
<tr>
<th>Condition</th>
<th>Patients</th>
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<tbody>
<tr>
<td>Inferior Turbinates</td>
<td>104</td>
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<tr>
<td>Adenoids</td>
<td>5</td>
</tr>
<tr>
<td>Soft Palate</td>
<td>111</td>
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<tr>
<td>Uvula</td>
<td>1</td>
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<tr>
<td>Tonsils</td>
<td>12</td>
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<tr>
<td>Tongue Base</td>
<td>30</td>
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<tr>
<td>Genioglossus M.</td>
<td>29</td>
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967 procedures

<table>
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<tr>
<th>Condition</th>
<th>Procedures</th>
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<tbody>
<tr>
<td>Inferior Turbinates</td>
<td>338</td>
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<tr>
<td>Adenoids</td>
<td>19</td>
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<tr>
<td>Soft Palate</td>
<td>390</td>
</tr>
<tr>
<td>Uvula</td>
<td>3</td>
</tr>
<tr>
<td>Tonsils</td>
<td>28</td>
</tr>
<tr>
<td>Tongue Base</td>
<td>104</td>
</tr>
<tr>
<td>Genioglossus M.</td>
<td>85</td>
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</table>
## OUTCOMES

<table>
<thead>
<tr>
<th></th>
<th>RFVR 1° proc.</th>
<th>RFVR 2° proc.</th>
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</thead>
<tbody>
<tr>
<td>N° paz</td>
<td>169</td>
<td>50</td>
</tr>
<tr>
<td>follow-up (months)</td>
<td>26.3</td>
<td>18.2</td>
</tr>
<tr>
<td>% of snoring reduction</td>
<td>76%</td>
<td>84%</td>
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</table>

## RFVR COMPLICATIONS

<table>
<thead>
<tr>
<th>AREA</th>
<th>COMPLICATION</th>
<th>N° APPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbinates</td>
<td>mild bleeding</td>
<td>2/338</td>
</tr>
<tr>
<td>Adenoids</td>
<td>-</td>
<td>0/19</td>
</tr>
<tr>
<td>Soft Palate</td>
<td>significant edema</td>
<td>1/390</td>
</tr>
<tr>
<td></td>
<td>“blistering”</td>
<td>2/390</td>
</tr>
<tr>
<td>Tonsils</td>
<td>-</td>
<td>0/28</td>
</tr>
<tr>
<td>Tongue base</td>
<td>ulceration</td>
<td>1/104</td>
</tr>
<tr>
<td>GGM</td>
<td>-</td>
<td>0/85</td>
</tr>
</tbody>
</table>
Pillar® Palatal Implants

**Procedure**
- Three Pillar implants inserted surgically into the muscle of the soft palate

**Effect**
- Stiffens the soft palate and reduces palate flutter and airway collapse

**Attributes**
- Minimally invasive and reversible
- Significantly less morbid and fewer complications than other palatal surgical procedures

**Site of Service**
- Physician office (stand-alone procedure)
- Hospital outpatient (combination procedure)

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**Pillar Implant Properties**

- **Braided polyethylene** construction
  - Same material used in surgical sutures and heart valve cuffs
  - Flexible enough to allow full soft palate function, but firm enough to provide stiffening of the soft palate
  - Porosity of the implant promotes tissue in-growth, which anchors the implant and prevents the relaxed palate from stretching during sleep
  - Surface texture of the implant allows the body’s natural fibrotic response to encapsulate and connect the three implants
Complications

Partial Extrusions

- Most common complication
- Reasons for partial extrusion
  - Placed too superficially – implants need to be placed in muscle layer of palate
  - Placed too far laterally – implants should be 2 millimeters apart

Suggested Implant Removal Technique

- If the tip of the implant has penetrated the mucosal layer, a forceps may be used to grasp and remove the implant
- Remove the implant from the palate tissue
- Local anesthesia may be needed, depending on the patient’s level of discomfort

Foreign body sensation

self limited or precedes partial extrusion
Pillar® Palatal Implants

ADVANTAGES

- Just one step procedure
- Only mechanical
  - no Control Unit requested
- Physician office procedure

DISADVANTAGES

- Cost (3 implants 1200 €.)