3D evaluation of postoperative swelling following orthognathic surgery using hilotherapy

- A randomised observer blind prospective Pilot trial -

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Aim of the study

Compare cool laps vs. Hilotherm

- 3D measurement of swelling in ml
- Neurological complain
- Pain-Score
- Patients satisfaction
Hilotherm cooling mask
patients and methods

patients

- 42 healthy patients, 27 f and 15 m
- bimaxillary osteotomy
- 1 surgeon, standardised pain medication and antibiotic
- group 1: cool laps vs. group 2: hilotherapy
- direkt post OP, cooling: 4 days á 16 h
## patients and methods

### methods

<table>
<thead>
<tr>
<th>TEST/rating</th>
<th>Pre OP</th>
<th>2nd day post OP</th>
<th>3rd day post OP</th>
<th>4th day post OP</th>
<th>6th month post OP</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D Scan</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>NRS/MCP</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Painscore</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>neurological disturbance score</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Trismus</td>
<td>+</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>questionnaire</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>
3D-SHAPE Facescan®
3D-Measuring solution from ear to ear by using a mirror construction and digital texture.
Alligned shell deviation

Create panel for cut off
Volumetric measurement

Reference mask 6 month

T4 vs. T1
153, 27 ml

T4 vs. T2
123, 58 ml

T4 vs. T3
111, 69 ml
Profil digital texture with volumetric measurement (ml) by using cool laps
Profil digital texture with volumetric measurement (ml) by using hilo therapy
Results
mean swelling rate

<table>
<thead>
<tr>
<th>Day</th>
<th>Cool laps</th>
<th>Cool laps</th>
<th>Hilotherapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd</td>
<td>120,19</td>
<td>92,91</td>
<td>*</td>
</tr>
<tr>
<td>3rd</td>
<td>124,13</td>
<td>87,05</td>
<td>*</td>
</tr>
<tr>
<td>4th</td>
<td>106,58</td>
<td>72,47</td>
<td>*</td>
</tr>
<tr>
<td>6th month</td>
<td>5,33</td>
<td>7,68</td>
<td></td>
</tr>
</tbody>
</table>
Results
mean swelling rate

- Cool laps
- Hilotherapy

Volume of swelling in m³:
- 2nd day: 120.19
- 3rd day: 124.13
- 4th day: 106.58
- 6 month: 5.33 (7.68)

*Significant difference between groups.
Results

pain rating scale

![Bar chart showing pain rating scale over 3 days for Cool laps and Hiloterapy groups.]

- 2nd day:
  - Cool laps: 6.56
  - Hiloterapy: 4.24
- 3rd day:
  - Cool laps: 5.95
  - Hiloterapy: 3.95
- 4th day:
  - Cool laps: 4.33
  - Hiloterapy: 2.86

* indicates statistical significance.
Results
neurological disturbance

![Bar chart showing comparison of neurological complain score between Cool laps and Hilotherapy at 4th day and 6 month.](chart.png)

- **4th day**
  - Cool laps: 2.87
  - Hilotherapy: 2.48

- **6 month**
  - Cool laps: 1.95
  - Hilotherapy: 1.76
Results

satisfaction score

1: good
4: bad

Satisfaction score

Cool laps: 2.85
Hilotherapy: 1.76
Conclusion

- confirmed shown a new method to measure facial swelling
- less swelling in ml
- less pain
- no significant difference by neurological complains
- more satisfied patients
- Improvement of technology and individual mask