Tailored Inguinal Hernia surgery?
Open or Endoscopic? - Mesh or No-Mesh?
Financial Disclosures

- Johnson&Johnson Global/ EMEA
- C.R.Bard Europe
- Covidien Germany

Ralph Lorenz MD - Praxis 3CHIRURGEN Berlin - www.3chirurgen.de
...If we artificially produce tissue of the density and toughness of fascia and tendon the secret of the radical cure of hernia would be discovered!

*Theodor Billroth to his pupil Czerny
Success in Hernia Surgery - Today
1967

Is this patient suffering from some unrecognized connective tissue disorder?

Risc factors for *Herniosis*

- genetic
- smoking
- COPD, Asthma
- Diabetes
- obesity
- cancer

- Kollagen disorders
  - AAA
  - Prolaps, Diverticulitis
  - Varicosis
  - Cutis laxa
  - Hip dislocation
  - Marfan Syndrom
Genetic Aspects?


- 11 studies evaluating 37,166 persons

More recurrences and earlier recurrences!
Hernia formation - Recurrence

In all studies we find a linear increase of recurrence, not an initial peak as would be expected because of technical mistakes.

Recurrent inguinal Hernias - Years after primary repair

*Herniamed – German Database 10/2014  n = 14,334 Recurrent Inguinal Hernias
... even following mesh implantation an insufficient integration with a **lowered collagen Type I/III ratio** is detectable leading to **recurrence formation** at the boarders of the mesh material...


... collagen type I/III ratio in **skin** was representative for that in abdominal wall fascia ...

Scar of recurrent inguinal hernias

- **Lowered ratio**
  - Collagen I/III Biological Recurrence 70%

- **Normal ratio**
  - Technical Recurrence 30%

*Klinge U, Klosterhalfen 2013: Retrieval study at 623 human mesh explants made of polypropylene – impact of mesh class and indication for mesh removal on tissue reaction. Journal of Biomedical Materials Research Article ID: JBMB32958 in press*
Type of Hernia and Existence of Herniosis?


Direct groin hernias are linked to incisional hernias!
Classification of inguinal hernias

M,C,L,F = medial, combined, lateral, femoral

R* 0-x = Recurrence

I  = up to 1,5 cm diameter
II = 1,5 to 3 cm diameter
III = over 3 cm diameter

* Aachen Classification = SCHUMPELICK Classification = EHS

*European Hernia Society Hernia August 09
New understanding

... as long as we cannot influence the biology of Hernia formation ... we do no cure ... but palliation!
2. Material

≈250 meshes
Bad and Good Meshes?

Heavy
Small pores

Light
Large pores
Mesh or No-Mesh?

*Amato B, Moja L, Panico S, Persico G, Rispoli C, Rocco N, Moschetti I.

Shouldice technique versus other open techniques for inguinal hernia repair.
Cochrane Database Syst Rev. 2012 Apr 18;4

Sixteen RCT, with 2566 patients.

Shouldice herniorrhaphy is the best non-mesh technique in terms of recurrence.

Use of mesh is associated with a lower rate of recurrence but the quality of included studies is very low.
Are Recurrences the only problem of Inguinal Hernia Surgery today?
Fixation
female 52 years - right inguinal pain
Nerve – mesh - contact
male 25 years - right inguinal pain
3. Tailoring Surgeons
“…there is no standard patient and no standard of hernia that's why no standard technique to reach a standard result…”

*Prof. Dr. U. Klinge 2nd Berlin Herniadays 2008*
Tailoring ... but how?
...and all have Complications?

*O’reilly EA, Burke JP, O’connell PR.

A meta-analysis of surgical morbidity and recurrence after laparoscopic and open repair of primary unilateral inguinal hernia.


27 RCTs describing 7161 patients

For primary unilateral inguinal hernia:

**TEP** → increased risk of recurrence

**TAPP** → increased risk of perioperative complications

**LICHTENSTEIN** → increased risk of chronic pain/numbness
EHS-Guidelines for treatment of inguinal hernia in adults - Update 2012/2014

AHS/ EHS Kongress 28.-31.03.2012 New York
Update 2010 because of new evidence!

LICHTENSTEIN
= Plug- Technique
= 3D-Meshes
TEP (TAPP) if expertise present

<table>
<thead>
<tr>
<th></th>
<th>Endoscopic</th>
<th>LICHTENSTEIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrences</td>
<td>4%</td>
<td>2,6%</td>
</tr>
<tr>
<td>Severe chronic pain</td>
<td>1%</td>
<td>1,9%</td>
</tr>
</tbody>
</table>

Edward Earle SHOULDICE  *1890   †1965

> 300,000 Operations since 1945
> 7000 procedures /year
Daily > 30 procedures

Complications rate  < 0.5 %
Infect rate  < 0.5 %
Recurrence rate  < 1.5 %
Standard meaning?

TED – voting for **SHOULDICE** repair

- continuous 4-lines steel
- continuous 3-4 lines non resorbable
- continuous 3-4 lines resorbable
- continuous 2 line non resorbable
- continuous 2 line resorbable
- single stitches

*Berlin Herniadays – January 2010, TED voting among 300 herniologists*
Tension Free Pure Tissue Repair

Own results 2012-2014

>300 cases

- No recurrences after 1 year yet
- No chronic pain VAS>3
- No intraoperative complications
- 2 postoperative complications (Bleeding)
Pure Tissue (SHOULDICE)

**PRO**

- No foreign body
- Simple - safe
- Cost effective
- Lowest chronic pain rate
- If recurrence mostly easy procedure

**CONTRA**

- Learning curve
- Tension?
- Not recommended in every case (weak area, large hernias, high risk profile)
Pure Tissue (DESARDA)

**PRO**
- No foreign body
- Simple - safe
- Cost effective
- Lowest chronic pain rate
- If recurrence mostly easy procedure
- Tension free
- Low learning curve

**CONTRA**
- Not recommended in every case (if external oblique can’t hold the sutures and in high risk patients)
Irving Lester
LICHTENSTEIN
* 1920 Philadelphia
† 2000 Marina del Rey

50 - 70 %
# Chronic pain rate LICHTENSTEIN

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study</th>
<th>Follow up years</th>
<th>Chronic pain rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eklund</td>
<td>2010</td>
<td>RCT</td>
<td>5</td>
<td>18.8%</td>
</tr>
<tr>
<td>Aasvang</td>
<td>2010</td>
<td>prospective</td>
<td></td>
<td>16.0%</td>
</tr>
<tr>
<td>Kai-Fuchs</td>
<td>2012</td>
<td>RCT</td>
<td>1, 5</td>
<td>10.2%, 12.2%</td>
</tr>
</tbody>
</table>
LICHTENSTEIN

**PRO**

- Tension-free
- Simple – safe - fast
- Short learning curve
- local anaesthesia

**CONTRA**

- Problems with big hernias
- Wrong mesh position
- MPO not completely covered
- Mesh contacts nerves → chronic pain
- Recurrences mostly mediocaudal because of not enough overlap
Endoscopics techniques

**TAPP *1991**
*Arregui*  
*Fitzgibbons*

**TEP *1992**
*Duluq und Begin*  
*Ferzli, Mc Kernan, Philips, Hourlay*
TAPP/ TEP

PRO

• MPO completely covered
• Fast recovery
• Less acute and chronic pain
• Cosmetic

CONTRA

• Longer learning curve
• Longer OR--duration
• High costs
• Higher rate of Major- complications
• Missed Lipomas
• Port site hernias up to 5 %

- 241 patients with laparoscopic cholecystektomy, follow-up period of 46.8 month
- 57 patients (25.9%) were diagnosed with umbilical TSIH by physical exam or ultrasound.
- incision enlargement, wound infection, diabetes mellitus and obesity contributed to the risk for developing a TSIH.

Port-Site Hernias are much more common than expected
Which Technique is your personal Favourite for Inguinal Hernia repair?

<table>
<thead>
<tr>
<th>Technique</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHOULDICE und Nahttechniken</td>
<td>4.3 %</td>
</tr>
<tr>
<td>LICHTENSTEIN</td>
<td>24.8 %</td>
</tr>
<tr>
<td>Plug</td>
<td>8.1 %</td>
</tr>
<tr>
<td>TIPP und 3-D</td>
<td>8.6 %</td>
</tr>
<tr>
<td>TAPP</td>
<td>33.3 %</td>
</tr>
<tr>
<td>TEP</td>
<td>21.0 %</td>
</tr>
</tbody>
</table>

*Berlin Herniadays – January 2013, TED voting among 400 herniologists*
If you would have an Inguinal Hernia what repair do you wish for yourself?

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHOULDICE und Nahttechniken</td>
<td>22.8 %</td>
</tr>
<tr>
<td>LICHTENSTEIN</td>
<td>14.3 %</td>
</tr>
<tr>
<td>Plug</td>
<td>5.3 %</td>
</tr>
<tr>
<td>TIPP und 3-D</td>
<td>6.9 %</td>
</tr>
<tr>
<td>TAPP</td>
<td>27.5 %</td>
</tr>
<tr>
<td>TEP</td>
<td>23.3 %</td>
</tr>
</tbody>
</table>

*Berlin Herniadays – January 2013, TED voting among 400 herniologists*
## Own tailored concept

<table>
<thead>
<tr>
<th>EHS Classification</th>
<th>Risk profile</th>
<th>First option / Plan A</th>
<th>Plan B</th>
</tr>
</thead>
<tbody>
<tr>
<td>M I, L I, L II</td>
<td>Low</td>
<td>DESARDA / SHOULDICE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>DESARDA / SHOULDICE</td>
<td>RUTKOW / MILLIKAN</td>
</tr>
<tr>
<td>M II, L II</td>
<td>Low</td>
<td>DESARDA / SHOULDICE</td>
<td>LICHTENSTEIN / ONSTEP</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>TIPP/ 3D/ ONSTEP/ LICHTENSTEIN</td>
<td>TAPP / TEP</td>
</tr>
<tr>
<td>M III, C X</td>
<td>Low/ High</td>
<td>TIPP/ 3D</td>
<td>LICHTENSTEIN / TEP / TAPP</td>
</tr>
<tr>
<td>Scrotal</td>
<td></td>
<td>Open! 3D/ TIPP</td>
<td>LICHTENSTEIN</td>
</tr>
<tr>
<td>Females</td>
<td>High</td>
<td>3D/ TIPP/ TEP</td>
<td>SHOULDICE / DESARDA</td>
</tr>
<tr>
<td>Both site Hernias</td>
<td></td>
<td>TEP</td>
<td>TIPP/ 3D</td>
</tr>
<tr>
<td>Recurrences after open mesh repair</td>
<td>High</td>
<td>TAPP/TEP</td>
<td>RUTKOW/ MILLIKAN</td>
</tr>
<tr>
<td>Recurrence with mesh explantation</td>
<td>High</td>
<td>Open!</td>
<td></td>
</tr>
</tbody>
</table>
Tailored Hernia Surgery

Surgeon

Biology

Material
Tailored Hernia Surgery

- Technique
- Quality

- Size and Type of Hernia
- Risk Profile
- Age and Comorbidity
- Patients wish

- Tissue
- Mesh
- Fixation
Hernia Registries in Europe

<table>
<thead>
<tr>
<th></th>
<th>Sweden</th>
<th>Denmark</th>
<th>Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>~240.000</td>
<td>~190.000</td>
<td>~180.000</td>
</tr>
<tr>
<td>Follow up</td>
<td>-</td>
<td>-</td>
<td>1,5,10 years</td>
</tr>
</tbody>
</table>
Conclusion

• No one fits all mentalitiy
• Open and endoscopic techniques have mostly similar results and complement one another
• Pure Tissue Repairs are valuable additions
• Biology has bigger influence than expected
• Training and Standardisation of Techniques is important
• Quality Management to look for own results
Maintain the Variety!