Non Surgical Management of Pectus Pathologies

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DON'T GET SURGERY!
Non surgical strategies

- For mild defects
- No data on long term results
- Patients want to avoid operation
- Patients are reluctant to undergo surgery because of the pain associated with the operation
- Risk of "imperfect" results
- Risks/complications of the operation
Conservative Therapy of PE

- No therapy (?)
- Physiotherapy & sports
- Magnetic mini mover (Harrison M et al., J Pediatr Surg 2010)
- Vacuum bell
- Silicon implant
- Lipofilling
Psychological Support and Counselling

• Being affected by Pectus Excavatum may affect the patient’s social relationships and and having this attention and support will be vital for them to have a life with fully-formed social and personal relationships

• Many studies justify use of psychological support

• Particularly important with adolescents or paediatric age children


Physiotherapy and Posture Improvement

• Target and strengthen muscles in the chest, back and shoulders in order to alter the alignment and appearance of the chest and sternum
• Stretching Exercises
• Strengthening Exercise
• Yoga
Magnetic Mini-mover procedure (3MP)

- Multicenter clinical trial open to patients who are between 8–14 years of age in USA
- Deformed costal cartilages are gradually reformed by a controlled gradual outward "pull" on the depressed breastbone
- Participation in the main part of the study will take 18 to 24 months, depending on how long it takes to correct the defect
- Two titanium-encased magnets are used together to create a magnetic force field which applies a controlled sustained pull
  - one magnet implanted inside the chest and attached to the sternum (small surgical outpatients procedure)
  - second one outside the chest wall and attached to an external brace
Silicon implants - Custom made implants

- Creation of plaster-cast model directly on the skin of the patient’s thorax and used in the design of the implants
- Customised 3D implants designed directly from the ribcage
  - very precise
  - easier to place sub-pectorally
  - perfectly adapted to the shape of each patient
- The implants are made of medical silicon rubber which is age-resistant and unbreakable (different to the silicon gel used in breast implants)
- They will last for life (apart from the rare case of an adverse reaction) and are not usually immediately visible externally.
Silicon implants - Postoperative course

- The recovery after the surgery is not very painful and only requires mild pain relief
- Post-operative care is minimal: a dressing is required for eight days and compression vest for a month following the procedure
- The patient can resume normal activities relatively quickly – he can return to work after 15 days and participate in any sporting activities after three months


**Pectus excavatum reconstruction with silicone implants: long-term results and a review of the english-language literature.**

*Snel BJ, Spronk CA, Werker PM, van der Lei B*

*Author information*
Lipofilling

• Process of relocating autologous fat to change the shape, volume, consistency and profile of tissues, with the aim of reconstructing body features

• Success depends on careful harvesting, refining and grafting of the fat

• Fat should be harvested with minimal trauma to tissues and the least possible exposure to the air before grafting

• More frequently used for reconstruction after breast surgery
Lipofilling - Complications

Recipient site complications:
• Bruising and swelling, haematoma formation
• Altered sensation
• Infection
• Fat necrosis, oil cyst formation, calcifications
• Hypertrophic scarring
• Contour irregularities
• Under-correction or over-correction of deformity
• Damage to underlying structures e.g. breast implants, pneumothorax
• Intravascular injection with fat embolism

Donor site complications: Standard complications of liposuction
Lipofilling - Applications for pectus patients

• Lipotransfer applied in the sternal region, thin subcutaneous layer with low vascularization

• Strong adhesions of the skin to the sternum impedes the injection of fat and its survival (pressure inhibits ingrowth of transplanted fat)

• Lipofilling predominantly applied at lateral thoracic wall depressions on in combination with vacuum bell application in advance

• Poor results

Conservative Therapy

« deforming of cartilage »

Rhinoplastik anno 1890
Die „goldene Nase“
Conservative Therapy
dental braces
Therapy of PE

effect of the vacuum bell

- Elevation of the sternum
- Elevation of the sternocostal joint

Therapy of PE

the vacuum bell

16cm
19cm
26cm
Therapy of PE

the vacuum bell

Model for adolescent girls/women
Therapy of PE

the vacuum bell

• Price of the device: ~620€

• Manufacturer: E. Klobe (Germany)

• FDA approved since 05/2012
Therapy of PE

the vacuum bell

- Instruction for application by a physician
- Daily application by the patient oneself
- Application two times per day (≈30 min.)
- Duration of daily application?
Therapy of PE

application of the vacuum bell
Application of the vacuum bell

**Indications**

- conservative treatment of PE
- preoperative before the Nuss procedure ("pre-treatment")
- intraoperative during the Nuss procedure
  - during advancement of the introducer
  - during flipping of the bar
- postoperative after surgical procedure
Therapy of PE

the vacuum bell - contraindications

- Skeletal disorders (e.g. Osteogenesis imperfecta, Glisson’s disease, etc.)
- Vasculopathies (e.g. Marfan’s syndrome, abdominal aneurysm)
- Cardiac disorders
- Coagulopathies
Therapy of PE

the vacuum bell – side effects

- Hematoma
- Petechial bleeding
- Back pain
- Paraesthesia of the upper extremities
- Rib fractures
  (never seen in our patients group)
Side effect of the vacuum bell
Therapy of PE

the vacuum bell - patients perception

- Pain around the sternum when starting the application (≈1.-5. applications)
- „strange“ sensations („tension“)
- Moderate subcutaneous hematoma
- Transient paraesthesia of the UE (2 pts.)
- Recurrent dorsalgia (1 pt.)

- No routine analgetic medication
6-year-old boy

before vacuum bell therapy (depth of PE: 3.3 cm)

after 6 months (depth of PE: 1.1 cm)
16-year-old boy

before therapy (depth of PE: 4.5 cm)  after 10 months (depth of PE: 2.0 cm)
15-year-old boy
9-year-old boy

before vacuum bell therapy (depth of PE: 2.8 cm)

after 10 months (depth of PE: 1.6 cm)

after 16 months (depth of PE: 0.4 cm)

24 months after therapy

36 months after therapy
15-year-old boy

before vacuum bell therapy (depth of PE: 4.1 cm)

after 8 months (depth of PE: 2.1 cm)

after 24 months (depth of PE: 1.6 cm)

after 35 months (depth of PE: 1.0 cm)
Therapy of PE

the vacuum bell – problems

- Definition of success?
- Age specific differences of success?
- Patients with asymmetric PE?
- Costs of treatment?
- Objective assessment of depth of PE?
The Vacuum Bell - Conclusion

- easy application
- Good acceptance by both pediatric and adult patients
- no relevant side effects
- additional therapeutic tool before, during and after the Nuss procedure
- Improvement of body control
- Long-term results missing
- Costs of treatment?
THANK YOU FOR YOUR ATTENTION! ANY QUESTIONS?