Stabilization of the Sternum

www.posthorax.com
Postoperative wound complications after cardiac surgery are still one of the major causes of morbidity and mortality. Infections acquired during health care, such as sternal infections, lead to prolonged hospital stay and revision surgery. Greater consumption of antibiotics and resources culminate in unpredictably high treatment costs.

Restrictions on the reimbursement of medical expenses, especially in recent years, have magnified the importance of preventing post-surgical complications. Postoperative care must be focused on the patients’ well-being and prudent use of resources.

**Posthorax® Support Vest – The Sternum Stabilizer**

The Posthorax vest is a simple addition to the classic method of sternum closure and significantly reduces associated risk.

- Distributes pressure away from wires
- Prevents wire breakage, tear through and dehiscence
- Increases closure strength and stability
- Prevents DSWI and mediastinitis (rand. clin.trial results up to – 63%)
- Savings due to reduction of hospitalization, revision surgery, readmissions
- Pain reduction
Characteristics and Design of the Posthorax® Support Vest

The non-flexible front section keeps the sternum level and stable, thereby preventing friction of the two sternum halves.

Due to the specially designed breathing and stop mechanism, the patient is not impaired in regular breathing. Only the Posthorax Sternum Support Vest with its patented design shows significant results in multicenter prospective randomized trials.

www.posthorax.com
High level design provides a low cost solution

Deep sternal wound infections and mediastinitis are costly. Clinical trials report average cost between 35,000 to 55,000 EUR (1-4). For patients with dramatic development and resulting long term hospitalization up to 300,000 EUR are reported. (3) The United States Medicare program reports an increase in cost by 227%. (5)

Reimbursement covers some but not all of that cost. A recent study shows that an average of 9.145 EUR per patient is not covered by the german DRG. (4)

Patient safety is increasingly moving into focus. High readmission rates and hospital-acquired infections are not only costly but result in hardship and possible death.

Readmission rates in the multicenter prospective randomized study: “Of all patients with sternal wound complications, 34% developed wound infections within 90 days after being discharged from the hospital. The average duration of the hospital stay was extended to 49 days when a patient required repeat surgery due to infection. In cases of readmission during the follow-up period, the mean hospital stay was 42 days (6).”

“The routine use of the device reduces the relative risk of deep sternal wound complications by 54%.” (6)
(2) Hollenbeak et al: The Clinical and Economic Impact of Deep Chest Surgical Site Infections Following Coronary Artery Bypass Craft Surgery CHEST: 2000; 118; 397-400
The Function and Efficiency of the Posthorax® Sternum Support Vest

1. Biomechanical Study (1)

Using pressure sensors placed between the two devices and around the thorax to measure how well each absorbs the forces produced by deep breathing, movement and coughing.

Counter - Pressure of up to 2 NM/cm² by the Flexible Bandage

Counter - Pressure of up to 8 NM/cm² by the Posthorax® Vest

"Sternal instability seems to be the single most important factor for deep sternal wound healing complications and mediastinitis post cardiac surgery." (2)

The Posthorax® Sternum Support Vest produced significant reductions in deep sternal wound infections and mediastinitis. Savings in infection related prolonged hospitalization reduces cost and leads to increased patient admissions.

2. Multicenter prospective randomized trial – an ITT analysis (2)

<table>
<thead>
<tr>
<th>1. Prospective randomized multicenter study: (2600 patients)</th>
<th>Non vest group</th>
<th>Vest group</th>
<th>Improvement</th>
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<tbody>
<tr>
<td>Total wound healing complications</td>
<td>3,36 %</td>
<td>2,59 %</td>
<td>-22,91 %</td>
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<tr>
<td>Deep sternal wound infections &amp; mediastinitis</td>
<td>2,27 %</td>
<td>1,04 %</td>
<td>-54,18 %</td>
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<tr>
<td>Infection related prolonged hospitalization</td>
<td>1490 days</td>
<td>874 days</td>
<td>-586 days</td>
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</tbody>
</table>

(2) Final results of the world largest prospective randomized multicenter trial regarding reduction of sternal wound complications after open heart surgery Gorlitzer et al. 124 (10021): A13882 - Circulation, abstract AHA Orlando, 2011

3. Cohort Study University Heart Centre Hamburg - Eppendorf – an ITT analysis (3)

<table>
<thead>
<tr>
<th>2. Single cohort study in an all patients setting (2200 patients)</th>
<th>Non vest group</th>
<th>Vest group</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total wound healing complications</td>
<td>3,53 %</td>
<td>2,74 %</td>
<td>-22,37 %</td>
</tr>
<tr>
<td>Deep sternal wound infections &amp; mediastinitis</td>
<td>2,39 %</td>
<td>0,88 %</td>
<td>-63,17 %</td>
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<tr>
<td>Infection related prolonged hospitalization</td>
<td>1676 days</td>
<td>1350 days</td>
<td>-326 days</td>
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</table>

(3) Wagner FM et al, Significant reduction of deep sternal wound infections post cardiac surgery by the Posthorax® vest. A single center observational cohort study in 2200 patients 29th Cardiovascular Surgical Symposium, Zürs-Austria March 4 2011

Publications:
**POSTHORAX® PRO STERNUM SUPPORT VEST**

*Used in the ward after patient mobilization and in rehabilitation. The vest is worn until the fracture has completely healed (6-8 weeks)*

To determine your size: With a flexible measuring tape, you start measuring from the back, then under the armpits to the top of the chest. The front of the vest with its cushions is placed directly over the sternum (chest bone), so a measure below that, for example over the stomach or over the breast for ladies, will give an incorrect size.

<table>
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<th>Article Nr.</th>
<th>Item</th>
<th>Chest size</th>
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<tr>
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<td>POSTHORAX® PRO Ladies M (Medium)</td>
<td>27-35 inches</td>
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<td>POSTHORAX® PRO Ladies XXL (XXLarge) special model</td>
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**SPECIFICATION**

Shell 100 % Cotton  
Cushion 100 % PU foam  
No wipe disinfection  

Personal „single patient“ product  
Do not use with multiple patients (Infection risk!)  
Wash at home, approx 3 wash cycles < 140 °F
Before the operation –
The ideal patient admission

• Introduce the POSTHORAX® Support Vest during the admission interview.
• Explain the protection for the sternum, patient safety and advantage in wearing the stabilization vest.
• Present the brochure: "POSTHORAX® Patient Information"
• Fitting the support vest – select ladies or gentlemen model
  IMPORTANT: choose the correct size (measure the chest size under the armpits as shown in user manual)
• After fitting the stabilization vest, it is now pre-sized and ready to wear after the operation.
• To get used to the vest, the patient should sleep with it the night before the operation.
• This procedure provides patients with security and understanding in the use and reason for the stabilization of the sternum and use of the Posthorax® vest!

After the operation –
When the vest is fitted and length of wearing it

• The vest should be fitted during mobilization of the patient, no later then the first day in the ward. Exception: At doctors request even earlier.
• Wear the vest 6 - 8 weeks until the sternum fracture is healed completely, also during the night ! (Instruction should be given to outpatient clinics)
• We recommend the private purchase of a second vest for hygiene.
  Visit www.posthorax.com for contact information.
• For help fitting the Posthorax® sternum support vest please refer to our user manual and also watch the instruction videos at www.posthorax.com.
1st PLACE INNOVATION AWARD 2009 - CITY OF VIENNA, AUSTRIA

“Successful treatments in patient care“
“1st Heart Surgical Department Hietzing, Vienna
Project: Prevention of sternum instability after heart surgery using a newly developed Thorax Support System

“The staff in the 1st Surgical Department of the heart center Hietzing, Vienna and our patients experience daily the extraordinary effects of this new product. Since we treat all patients with Posthorax sternum vest it is a win for all – we highly recommend Posthorax to every heart center.

Prim. Univ. Doz. Dr. M. Grabenwöger, Dr. Michael Gorlitzer
Heartcenter Vienna, Austria

„Correct application and stringent use of the Posthorax® vest as a single patient product provides highly significant results preventing dWHC whereas sWHC showed no significant improvement Hence post operative anterior posterior stabilization in the dorsal ventral axis as demonstrated by the Posthorax® vest seems to be the single most important factor preventing deep sternal wound infections and mediastinitis. DGTHG 2011

Phd. Dr. Florian Wagner
University Hospital Hamburg, Germany

“We have used the vest for more then 6 months in more than 500 patients. We are very pleased with the result. In these 500 patients we have 2 cases of mediastinitis. “
“After 3 months we evaluated the vest, we called around 200 patients 4 weeks after surgery. More than 80% were satisfied and felt secure and comfortable with the vest. “
“What we have been seeing is that they mobilized better and earlier according to the physiotherapist. “

M.D. Ph.D Hans Jonsson
Department of Cardiothoracic Surgery
Karolinska University Hospital Stockholm

Hi,
Yesterday I received the PRO vest. It’s great, much better than the one they had in hospital. My father can breath normally, and he doesn’t feel such big pain. Thank you very much also for the fastest delivery I’ve ever seen, regards from Poland,

Agnieszka Figlewicz

Ladies and gentlemen,
Grateful thanks for providing the chest bone support vest. It has helped me very much after the operation and was an indispensable healing device. Now two months after the operation I feel very well and thank you very much.

With cordial greetings
Klaus Dieter Rassenbruch, Leipzig
POSTHORAX® is SIMPLE and EFFECTIVE

- Reducing readmission rates and long hospitalization
- Preventing wires breaking bone and general instability after CABG
- Significantly reducing deep sternal wound infections
- Chest pain after sternotomy in up to 30% of patients*
- Savings due to reduction of hospitalization, revision surgery, readmission
- Increased patient safety and quality of outcome

To schedule a presentation or for more product information please call or send an email to dinoepple@posthorax.com.

Thank you

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