



Stabilization of the Sternum

POSTHORAX® 



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® PRO Sternum 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® PRO Sternum Support Vest

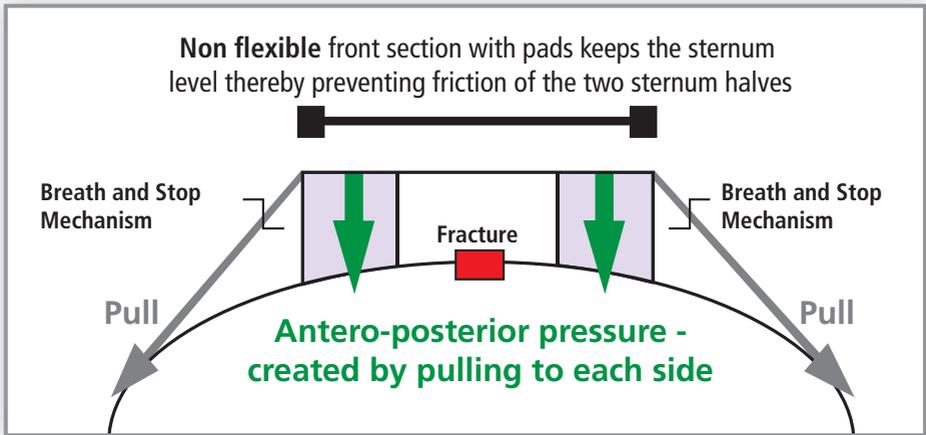
The non-flexible front section keeps the sternum level and stable, thereby preventing friction of the two sternum halves.



Flexible side bands allow normal breathing, the stop mechanism prevents over-extension of the thorax



Two cushions placed to the left and right of the sternum provide antero-posterior fixation



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.



High level design provides a low cost solution

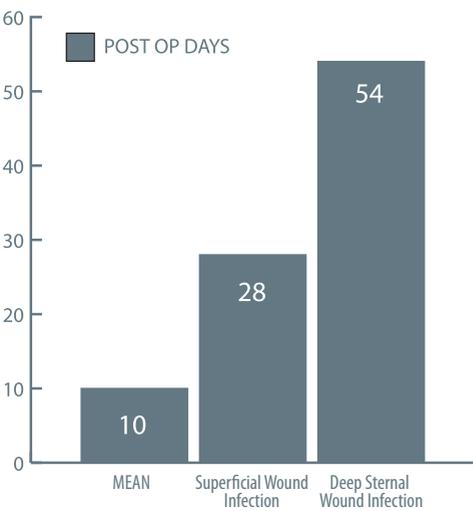
Deep sternal wound infections and mediastinitis are costly. Clinical trials report average cost between 35.000 to 55.000 EUR (1-4). For patients with dramatic development and resulting long term hospitalization up to 300.000 EUR are reported. (3) The United States Medicare program reports an increase 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).

“Routine use of the device reduces the relative risk of deep sternal wound complications by 54%.” (6)



The Posthorax® sternum support vest proves highly advantageous to patients.

Prolonged hospitalization, wound management and reduced operating capacity are factors to be considered by financial management.





- (1) Speir et al: Additive Costs of Postoperative Complications for Isolated Coronary Artery Bypass Grafting Patients in Virginia The Annals of Thoracic Surgery:2009; 88:40-46
- (2) Hollenbeak et al: The Clinical and Economic Impact of Deep Chest Surgical Site Infections Following Coronary Artery Bypass Graft Surgery CHEST: 2000; 118; 397-400
- (3) Loop et al: Sternal wound complications after isolated coronary artery bypass grafting: Early and late mortality, morbidity and cost of care The Annals of Thoracic Surgery: 1990:49:179-187
- (4) Graf et al: Economic aspects of deep sternal wound infections European Journal of Cardio-Thoracic Surgery: 2010; 37: 893-896
- (5) Brown, P., Kugelmass, A., Cohen, D., Reynolds, M., Culler, S., Dee, A. & Simon, A. The frequency and cost of complications associated with coronary artery bypass grafting surgery: results from the United States Medicare program. Ann Thorac. Surg. 2008, 85 (6): 1980-1986
- (6) Gortlitz et al: Prevention of sternal wounds after sternotomy: results of a large prospective randomized multicenter trial. Presented at 26th Annual meeting of the European Association of Cardiothoracic Society. 10/2012



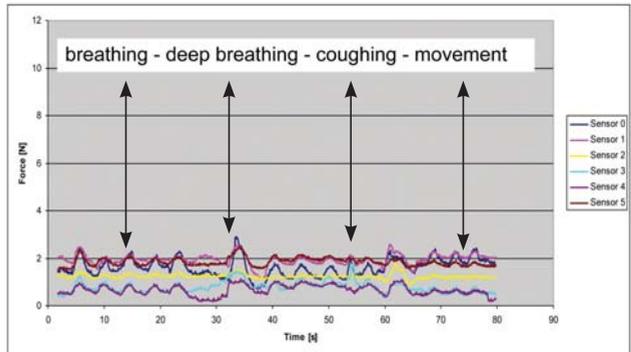
The Function and Efficiency of the Postthorax® PRO Sternum Support Vest

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.



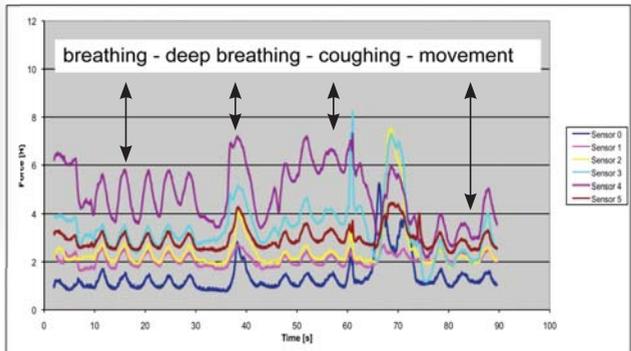
flexible bandage - shows insufficient stabilization



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



Postthorax® PRO sternum support vest - absorbs all intra-toracic pressure towards the sternum



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

(1) Comparison of thorax support systems after median sternotomy: Evaluation of force distribution in a biomechanical analysis 40th Annual Meeting of the German Society for Thoracic- and Cardiovascular Surgery, Feb. 14, 2011



“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)

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

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

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

2. Single cohort study in an all patients setting (2200 patients)	Non vest group	Vest group	Improvement
Total wound healing complications	3,53 %	2,74 %	-22,37 %
Deep sternal wound infections & mediastinitis	2,39 %	0,88 %	-63,17 %
Infection realted prolonged hospitalization	1676 days	1350 days	-326 days

(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:

1. A prospective randomized multicenter trial shows improvement of sternum related complications in cardiac surgery with the Posthorax® support vest. Gortlitz et al; Interact CardioVasc Thorac Surg 2010;10:714-718. doi:10.1510/icvts.2009.223305
2. A newly designed thorax support vest prevents sternum instability after median sternotomy. Gortlitz et al; Eur J Cardiothorac Surg (2009) 36(2): 335-339. doi: 10.1016/j.ejcts.2009.01.038



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).



POSTHORAX® PRO Sternum Support Vest



POSTHORAX® PRO Sternum Support Vest with BRA

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.

Article Nr.	Specification / Size	Chest circumference in cm
15.1202	Universal sternum support vest S (small)	60-70
10.1202	Ladies sternum support vest M (medium)	70-90
10.1203	Ladies sternum support vest L (large)	90-120
10.1204	Ladies sternum support vest XL (X large)	120-150
10.1205	Ladies sternum support vest XXL (XX large)	150-210
10.0208	Bra ladies cup B attached to sternum support vest	flexible (80+)
10.0209	Bra ladies cup C attached to sternum support vest	flexible (90+)
10.0210	Bra ladies cup D attached to sternum support vest	flexible (100+)
10.0211	Bra ladies cup E attached to sternum support vest	flexible (110+)
11.1202	Gentleman sternum support vest M (medium)	70-90
11.1203	Gentleman sternum support vest L (large)	90-120
11.1204	Gentleman sternum support vest XL (X large)	120-150
11.1205	Gentleman sternum support vest XXL (XX large)	150-210

SPECIFICATION

Shell 100 % Cotton

Cushion 100 % PU foam

No wipe disinfection

BRA 90 % cotton, 10 % elasthan

Personal „single patient“ product. NO HOSPITAL WASH

Do not use with multiple patients (Infection risk!)

Wash at home, approx 3 wash cycles <60°C (140°F)

Machine wash at 40°C (104°F) or less. NO HOSPITAL WASH



Before the operation – The ideal patient admission

- Introduce the POSTHORAX® PRO Sternum 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 than 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 Foglewicz

*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



*Meyerson J et al: *The Incidence of Chronic Post-Sternotomy Pain After Cardiac Surgery: a prospective study.* Acta Anaesthesiol Scand. 2001 Sep;45(8):940-4

*Van Leersum NJ et al: *Pain Symptoms Accompanying Chronic Post-Sternotomy Pain: a pilot study.* Pain Med. 2010 Nov;11(11):1628-34. doi: 10.1111/j.1526-4637.2010.00975.x

*Kalso E. et al: *Chronic Post-Sternotomy Pain Acta Anaesthesiol Scand.* 2001 Sep;45(8):935-9



WE ♥ CARE



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

Thank you

POSTHORAX LIMITED, 2 Pevenil Court, 6-8 London Road, Crawley,
West Sussex, RH10 8JE, United Kingdom

POSTHORAX GmbH, Rudolf-Waisenhorn-Gasse 39, 1230 Vienna, Austria
Phone +43.720.505345, Fax +43.720.505345.9

POSTHORAX s.r.o., Laurinska 9, 811 01 Bratislava, Slovakia
Phone +421.2.32121028, Fax +421.2.32144038

www.posthorax.com

info@posthorax.com

