

A Case History: Orthotic Management After Extensive Chest-Wall Resection

Jules G. Becher, M.D.
Arie J.H. Prevo, M.D., Ph.D.

INTRODUCTION

Partial chest-wall resection is unusual. The primary reason for performing such a resection is the presence of a malignancy or an infection with osteomyelitis of the ribs.

In most cases, surgical reconstruction of the chest-wall is possible. However, after an extensive resection, reconstruction is possible only with non-biological materials such as steel-wire or a Marlex mesh.^{1, 2, 3}

The advantage of reconstruction of the chest-wall is the restoration of solidity. This solidity gives protection to vital organs and is necessary to build up negative inspiratory pressure. Loss of solidity of the chest-wall results in a decrease of ventilation capacity.

Surgical reconstruction with non-biological materials is not always possible in the event of an extensive chest-wall resection caused by infection. In this case, reconstruction is not possible. An orthotic device is necessary for protection of the vital organs.

PATIENT BACKGROUND

The patient is a 30 year old male, who has a medical history that includes several thoracotomies with lunglobe resection for recurrent pneumothorax by chronic adhesive pleuritis *e causa ignota*. Finally, rethoracotomy was performed, with resection of the left lung and the third to the eleventh rib. There is a residual cavity in the left thorax, with a permanent drain in situ (Figures 1, 2, 3).

Secondarily, a left convex thoracolumbar kyphoscoliosis has developed during mobilization after surgery. The curvature starts at C5 and ends at L1. The lateral curvature is 20 degrees, using the Cobb-method of measurement.

Problems for the patient are the unprotected position of the heart and discomfort in sitting and lying.



Figure 1. Front view of patient.

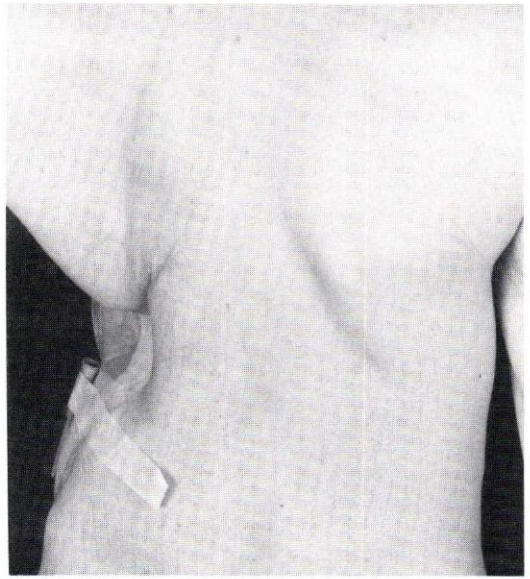


Figure 3. Back view of patient.

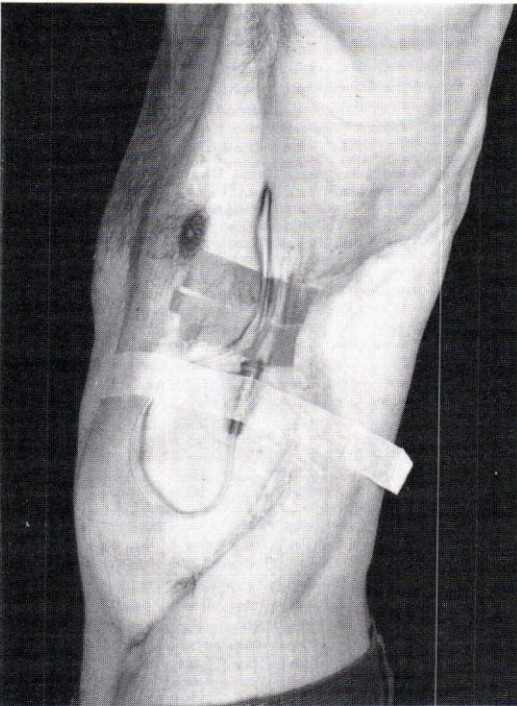


Figure 2. Left side of patient.

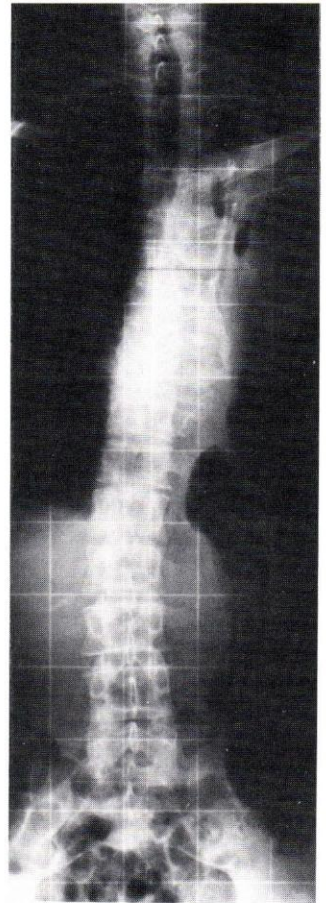


Figure 4. A.P. roentgenogram of the thoracolumbar spine.

ORTHOTIC MANAGEMENT

At first we prescribed a thoracolumbar orthosis for protection of the vital organs and "correction" of the scoliosis. The left side, from axilla to the iliac crest, was made of polypropylene, the right side, fixing the orthosis, of elastic cotton.

This orthosis was efficient in protecting the vital organs, but produced too much discomfort in sitting and lying.

Finally, we ordered a plastic protective shield, molded on a plaster of Paris positive model of the left residual chest-wall. The shield is fitted in a pocket, attached to a Tubigripp® shirt (Figures 5, 6, 7). The shield is made of unpadded polyethylene, with a thickness of four millimeters (0.16 inch) (Figures 11, 12). The size is 25 × 30 cm (10 × 12 inch). The pocket is closed with a groove, the shield is exchangeable, and the shirt is washable.



Figure 5. Front view of patient in orthosis.

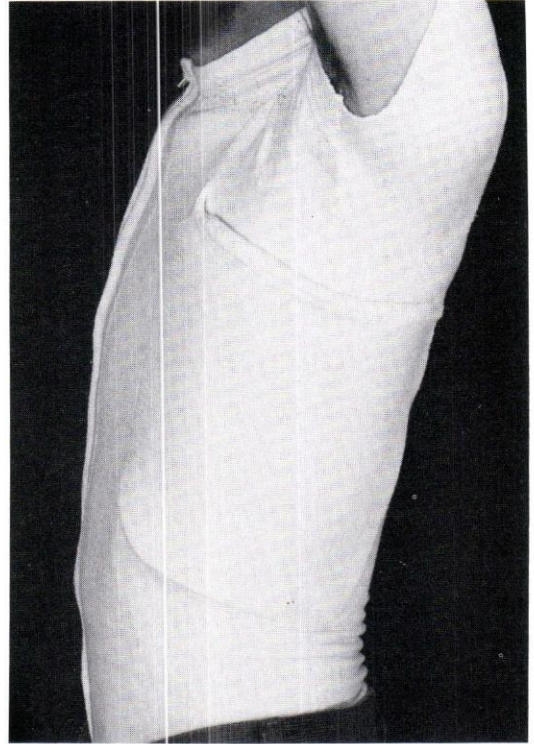


Figure 6. Left side of patient wearing orthosis.

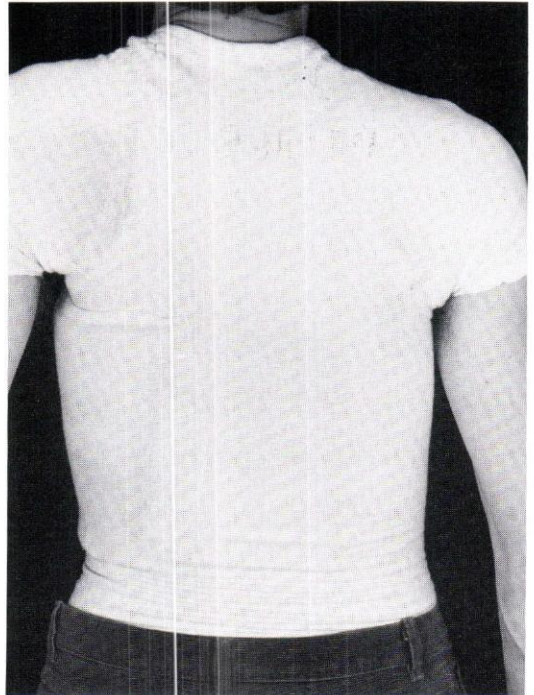


Figure 7. Rear view of patient in orthosis.

Figure 8. Protective shield, outside.

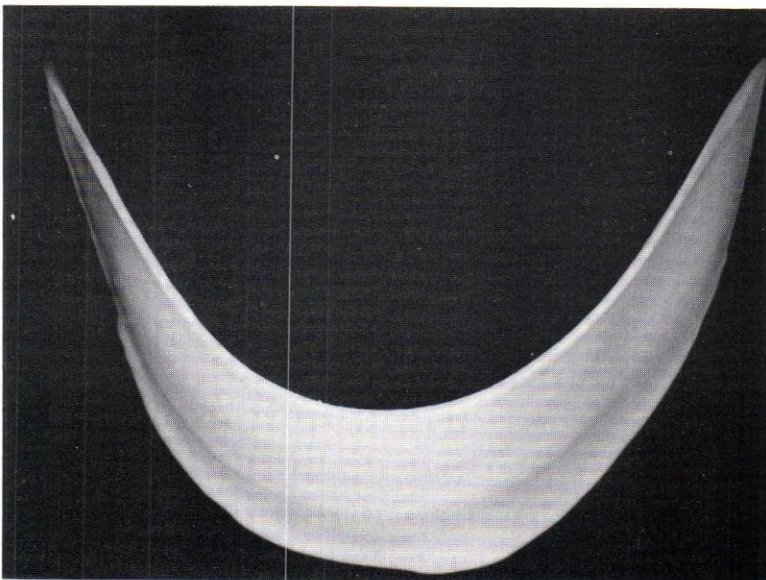
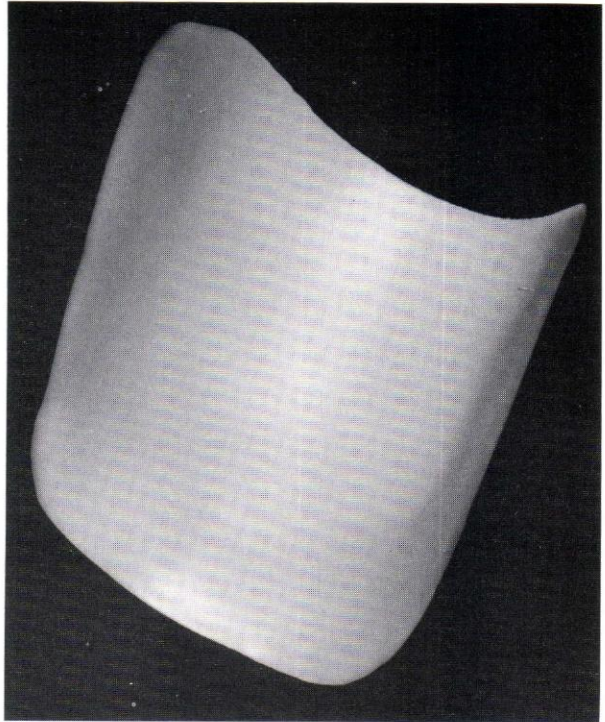


Figure 9. Protective shield, upper side.

With this device, the patient feels safe for social outdoor life, without discomfort in his daily activities. Regular x-ray control of the spine shows no progression of the scoliosis during a three year follow-up.

SUMMARY

Orthotic management is described for a patient after an extensive left chest-wall resection. An orthosis to protect the vital organs was fabricated, which allows the patient to feel safe in social, outdoor activities without any discomfort. No progression of the initial scoliosis is noted in a three year follow-up.

AUTHORS

The authors are affiliated with the Department of Rehabilitation Medicine of the Academic Hospital of the Free University, Amsterdam, The Netherlands. Address reprint requests to: Dr. A.J.H. Prevo, Department of Rehabilitation Medicine, Academic Hospital Free University, De Boelelaan 1117, 1007 MB Amsterdam, The Netherlands.

REFERENCES

- ¹Graham, J., Usher, D.C., et. al., "Marlex mesh as a prosthesis in the repair of thoracic wall defects," *Ann. Surg.*, 1960, 469-79.
- ²Hubbard, S.C., Todd, E.P. et. al., "Repair of chest wall defects with prosthetic material," *Ann. Thorac. Surg.*, 1979, 440-4.
- ³Larson, D.L., McMurtrey, M.J. et. al., "Major chest wall reconstruction after chest wall irradiation," *Cancer*, 1982, 49: 1286-93.

ACKNOWLEDGMENT

Grateful acknowledgment is made to Hetty Tonneijck, O.T., for delivering the idea of the final orthosis.