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New Underarm Three-Point Holding Orthosis for Management of Low Scoliotic Curves

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The use of underarm-level orthoses for the management of thoraco-lumbar and lumbar scoliotic curves (2, 3) is a recent idea stemming directly from the "Milwaukee Brace", with the main goal being to relieve the patient from the cervical superstructure.

Hereby described is an orthosis developed in the Zamenhoff Orthotic Laboratory in colaboration with the Scoliosis Unit of the Department of Orthopedics and Traumatology of the Beilinson Medical Center. The aim of this design was to produce an efficient, three-point holding force system acting on the convex side of the scoliotic curve and thus to achieve a maximal correction.

The orthosis (Fig. 1) consists of the following parts:

a. the pelvic cage
b. two upright bars (anterior and posterior)
c. a horizontal underarm bar
d. a lumbar holding pad.

The pelvic cage is constructed of a thermoplastic material. It rests on both iliac crests, leaving the waist area open. Special care is taken to eliminate lumbar lordosis. For this purpose the cage is brought low in the region of the buttocks but is cut sufficiently high in the front to permit comfortable sitting. The abdomen must

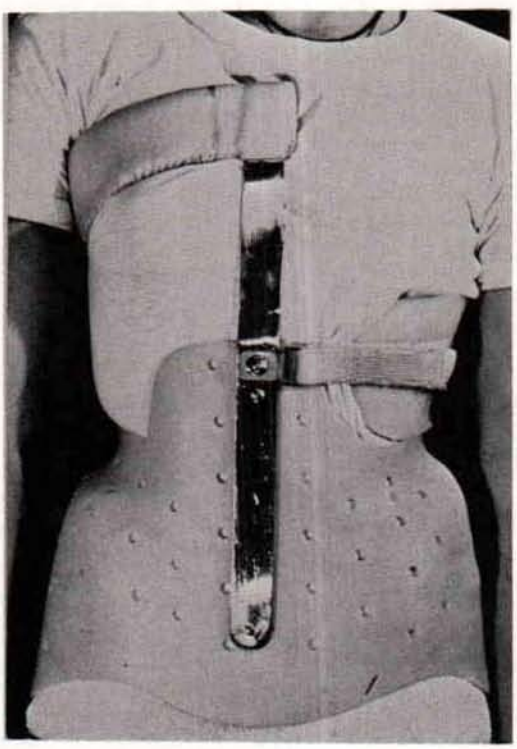

Fig. 1. Front view of the orthosis. Note the anterior upright, pelvic cage with abdominal support, anterior part of under-arm bar and canvas strip to lateral holding pad.

Fig. 2. Posterior view of the orthosis, showing bayonet shaped upright connected with the horizontal underarm bar. Note downward deflexion of the arm-pit bar and position of the lateral holding pad.

be kept firmly supported in order to prevent lumbar lordosis and to ensure an effective correction when the lateral force is applied by a holding pad. Two metallic upright bars, anterior and posterior, rise from the pelvic girdle to the level of the arm pits. Whereas the anterior bar is straight (Fig. 1), the posterior bar is bent and bayonet-shaped (Fig. 2). The lower end of the posterior upright is fixed to the pelvic cage 7 to 8 cm lateral to the midline on the concave side, bringing the upper part of the "bayonet" above the spinous process of the thoracic vertebrae. Both uprights reach equal height. Their upper ends are connected by means of a horizontal bar which passes under the arm pit on the concave side and is a half-ring shape to fit the individual form of the chest and breast. A slight downward deflexion of this bar is necessary to avoid shoulder elevation (Figs. 1 and 2). The holding pad, which is made of thermoplastic material, exactly fits the convex side of the patient's waist. This pad is attached to the posterior bar with a joint and by means of a canvas Velcro-strip to the anterior upright bar. It must be positioned exactly against the top of the scoliotic curve so that tightening of the canvas strip exerts a direct corrective force on the curve.

DISCUSSION

The three-point holding system, a principle utilized in the "Milwaukee Brace", has proved to be an effective aid in the correction of scoliotic curves and prevention of deformities (1). The design described above utilizes the same principle and acts similarly to the Milwaukee Brace, with the corrective force exerted by a holding pad placed against the top of the curve. This force is opposed by the pelvic cage and the half-ring under-arm bar. Lowering of the upper "opposing" point limits the effectiveness of the orthosis to the lumbar and thoraco-lumbar regions alone, but in these regions it has proved to be useful in correcting scoliotic curves, particulary those between 20 to 40 deg. (Figs. 3 and 4).

SUMMARY

Idiopathic scoliosis remains a challenge to the orthopedic surgeon and orthotist. In recent years the use of orthoses has been found to be a useful method of preventing an increase in the developing curve and the "Milwaukee Three-Point Brace" has proved to be the most effective in this respect. The need to wear a brace with a superstructure which cannot be concealed by ordinary clothing is a source of considerable inconvenience

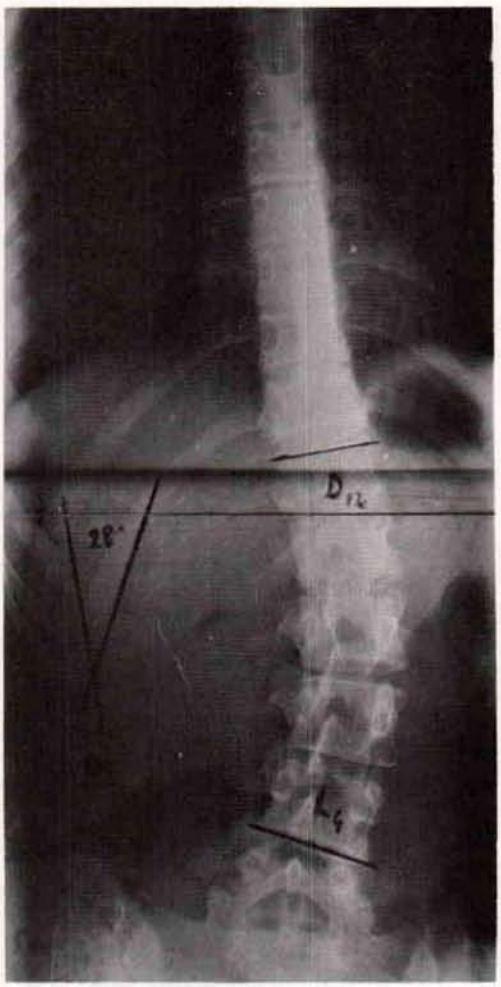

Fig. 3. X-ray of the spine in a 13-year-old girl with right dorsolumbar scoliotic curve of 28 degrees.

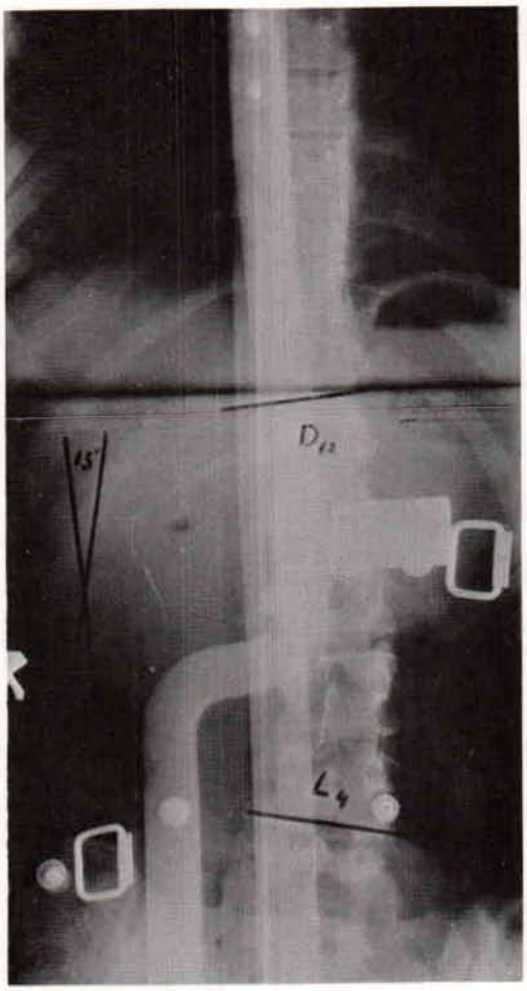

Fig. 4. X-ray of the patient shown in Figure 3 wearing the brace. Correction of the curve to 13 deg. was achieved immediately.

and embarressment to the patient. For this reason an effort is being made to construct an orthosis which eliminates the neck piece but is still based on the three-point holding principle.

Our experience has shown that this type of orthosis satisfactorily provides an adequate correction of the scoliotic curves in the lumbar and dorso-lumbar regions.

Footnotes

[1]The Zamenhoff Orthotic Laboratory and the Department of Orthopedics and Traumatology, Beilinson Medical Center, Petah Tiqva, Israel.

References

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