

Experience With the Stuttle Spinal Brace

Paul Campbell, M.D.¹

The problem of lumbosacral disease is universal after the age of twenty, and a fairly high percentage of those involved at one time or another require orthopedic management. Most of these patients can be controlled without bracing, but a significant percentage have enough instability or degenerative changes in the "low back" to require the use of external support.

The history of back bracing goes back many centuries but became somewhat scientific approximately only about a hundred years ago with the development of the Taylor "Spinal Assistant" (Fig. 1 & 2). The Taylor brace is effective and is still used commonly. Various modifications have been made including the Knight and Goldthwait braces. A shorter version that extends only to the lower thoracic region is the most

commonly used modification, called either a chair-back brace or cage brace. Another commonly used brace that produces hyperextension is the Jewett brace. All of these devices are rigid in construction and attempt to immobilize the lumbosacral region by grasping the pelvis below and a portion or all of the thoracic regions above by encirclement of the chest. All of these braces are ineffective to some degree because the pelvis cannot be grasped adequately to prevent motion in the sagittal plane of the two lower joints in the lumbosacral spine in movements like sitting and bending forward from a standing position.

A definitive study of these types of braces was made by Norton and Brown in the early fifties (1). A few of their comments are worth repeating because they elucidate this problem. They stated that the effective-

¹ Portland Orthopedic Clinic, Portland, Oregon.

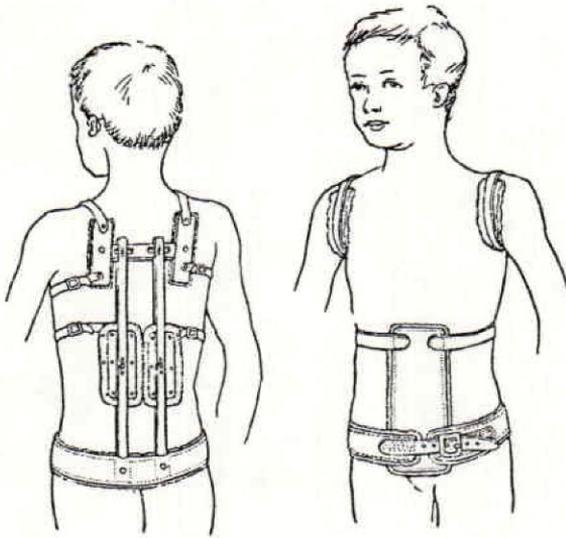


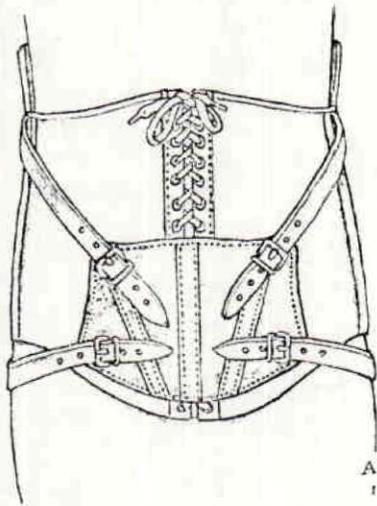
Figure 1
The Taylor "Spinal Assistant" (from 2).

ness of a brace is related to the patient's comfort in using a brace. In other words, a brace that is uncomfortable in use will not be effective because it will not be worn snugly enough to be effective. They further commented that "if the object of treatment is to immobilize the lumbosacral spine, either sitting must be avoided or the apparatus must be effective in the sitting position." Since our culture involves sitting in most of our daily activities including eating, transportation, working and recreation, it is obvious that an effective brace must function in the sitting position. It is in this position that the rigid braces mentioned before are ineffective because they are unable to adjust to the change in relationship between the pelvis and spine when the position of sitting is changed to standing. The third comment that is pertinent is, "It seems highly unlikely that any device ap-

plied to the exterior of the body can effectively splint the lumbosacral region." This is the significant problem facing those prescribing or making "low back" braces.

In an attempt to solve this problem Williams developed a functional brace incorporating a hinged bar as the fixation device across the lower thoracic spine region and a fixed bar beneath the buttocks with the third point of fixation being a broad apron across the abdominal region. (Fig. 1 & 2). The hinge in this brace allowed it to accommodate to the changes in posture from the standing to the sitting position, maintaining the lumbosacral and the L4-5 joints in a flexed position throughout. The Williams brace incorporates lateral uprights to prevent rotation and lateral bending, thus affording the maximum degree of rigidity while still allowing essential function.

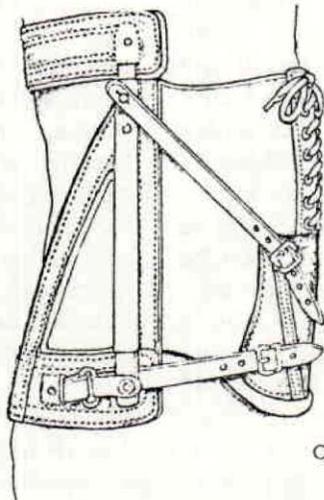
Experience with the Williams



A
1



B
1



C

Figure 2
The Williams Brace (from 2).

brace was disappointing in that the patients complained of pressure in the lower thoracic spine region and tended to either wear the brace too loosely or to discontinue its use against advice. Occasionally a patient would return with the brace applied in an upside down position stating that despite the fact the brace did not fit too well in such a position, it was more comfortable and could be tolerated better in an upside down position. Our practice was to admonish the patient to wear the brace properly and to follow the instructions of the surgeon and orthotist.

Dr. Fred Stuttle of Peoria, Illinois, evidently had similar experience with patients, but was wise enough to listen to the patients and to respond to the strong hint that perhaps improvements in the design of this brace were possible. It was a very simple modification to

change the arrangement of the posterior bars so that the hinged bar was placed across the well-padded gluteal region and the fixed bar across the less protected lower thoracic spine area. No other significant modifications were made to the Williams brace by Stuttle who presented his version (Fig. 3) in a scientific exhibit at the 1962 Annual Meeting of the American Academy of Orthopaedic Surgeons. Because of the obvious advantage in function of the Stuttle brace compared to the Williams design, we adopted this brace for use in our clinic.

For the last ten years we have used more than 700 Stuttle braces and are continuing to use approximately three each week for treatment of low back disease. Minor modifications in design have been made by our chief orthotist, Mr. Dale Butler, but the essential functional ele-

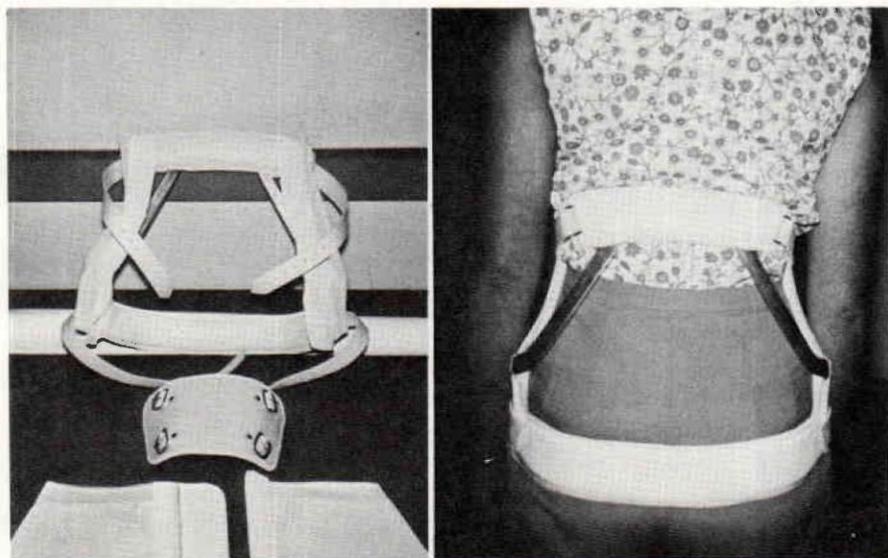


Figure 3
The Stuttle Brace.

ments as first devised by Dr. Williams and modified by Dr. Stuttle have not been changed. Patients almost uniformly tolerate this brace well and continue to use it as long as prescribed. In fact, occasional patients have continued to use the brace even after they were advised to discontinue it because they felt more secure with the brace and could see no reason to discontinue it. There have been no serious complications in using the brace and only occasionally have patients been bothered with irritation of the lower lumbar spine requiring a more rigid type of fixation. This brace is not effective in treating the upper lumbar spine area; it is only effective for the lower two joints of the lumbosacral spine. These two joints are normally hyperextended owing to the pelvic tilt, and thus are best protected by bracing in flexion, because straightening the lordotic curve lessens the sheer component of the forces applied.

We do not consider this brace as corrective of postural abnormalities even though it has been recommended for such use. This brace functions by immobilizing the spine in a flexed position, but does not carry a spine into a greater range of flexion than was possible prior to the application of the brace. The immobilization in a flexed position has the added advantage of tending to open the intervertebral foramina when used for immobilization to achieve spinal fusion, thus affording maximum room for the nerve roots to pass from the spine. The fact that this brace acts to maintain flexion of the lumbosacral spine in all body positions helps it achieve maximum

immobilization as the patient's posture changes from standing to sitting and vice versa. It is obvious that the less sitting a patient does while wearing the brace, the less motion will occur at the involved joints and so our instructions to patients in whom we hope to achieve spinal fusion is "avoid sitting as much as possible during the immediate post-operative period."

CONCLUSION

We have such confidence in the efficacy of this type of low back brace that we use it for many types of diseases of the lumbosacral spine region where immobilization in a functional position is indicated. Where less stringent support is required we still use a canvas type of low-back support, usually incorporating a pad to fit into the lumbar lordosis. Occasionally for compression fractures in this region we use a hyperextension brace or a Jewett type of back brace. For all other conditions requiring external immobilization, the Stuttle brace is our choice. Specifically we use this brace after spinal fusions, after lumbosacral laminectomies, or for those patients treated conservatively who require more rigid support than the reinforced canvas support can afford.

It can be concluded that a brace to immobilize the lumbosacral spine will be effective only if it is firmly applied, only if it is used continuously, and only if it is tolerated long enough to be effective. We believe that the Stuttle modification of the Williams flexion brace makes it possible for these requirements to be fulfilled.

REFERENCES

1. Norton, Paul L., and Thornton Brown, The immobilizing efficiency of back braces, *J. Bone and Joint Surg.*, 39A:1:111-138, Jan. 1957.
2. Thomas, Atha, Appliances for the Spine and Trunk, pp. 179-250, *Orthopaedic Appliances Atlas*, Vol. 1, J. W. Edwards, Ann Arbor, Mich. 1952.
3. Williams, P.C., Lesions of the lumbosacral spine, part II, *J. Bone and Joint Surg.*, 19:690, 1937.