

## ORTHOTICS FOR SPINAL DEFORMITY: 1980 VIEW

Thirty-three years ago the Milwaukee brace made its first appearance, originally designed as a postoperative immobilizing and corrective device. Soon thereafter, it began to be used as a non-operative treatment method for both scoliosis and kyphosis. Between 1950 and 1970, the brace was gradually improved and the system of non-operative treatment became more refined, with more knowledge of the indications and contraindications.

In Europe in the 1960's and in North America in the 1970's, a wave of new braces appeared, all attempting to control spinal curvatures without surgery. The corset Lyonnaise, the Riviera brace, the Pasadena brace, and finally the Boston brace and the Wilmington jacket were all basically "underarm" orthoses, although most could be extended up to a neck ring for special circumstances.

The "underarm" orthoses were, of course, more esthetically pleasing to the child, but there was considerable controversy as to whether they could achieve the same quality of curve control as was achieved by the Milwaukee brace.

About this time, i.e. 1975, relatively long-term studies of the Milwaukee brace experience began to appear, not just what the curve was at the time of brace stoppage, but what was happening to those curves five and ten years later. It became increasingly apparent that there was a wide spectrum of brace results, even when ideal circumstances of brace manufacture, curve selection, and patient cooperation existed. The *average* result was a curve the same at the end as at the beginning.

Why then use an orthosis if there is to be no correction? The answer is obvious: to prevent progression. We have learned through experience that orthoses are *not* designed to make large curves permanently into small curves. Orthoses *are* designed to keep small curves small.

Should all small curves, therefore, be braced? The answer is "no," since many small curves are non-progressive and do not need treatment of any kind. An 18° thoracic idiopathic scoliosis in a pre-menstrual 13 year-old girl has a 63 percent chance of being non-progressive without treatment and a 4 percent chance of spontaneously improving without treatment. There is only a 33 percent chance of her curve progressing, and therefore she needs treatment only if progression is well-documented.

What kind of a brace is best? It depends on multiple factors as to which brace is best for which patient. All too often, proponents of a particular design will claim that their design is best and will solve all problems. As

in all phases of medicine, there is a spectrum of diseases and a spectrum of solutions. The pendulum of enthusiasm swings first one way (the Milwaukee brace only), and then the other (underarm orthoses only), and finally settles in the middle.

The current "middle ground" of orthotic management is best expressed by that sophisticated program in which the orthotist and orthopaedic surgeon work together to design an orthosis for the specific child's curvature problem. For a lumbar or thoracolumbar curve, they will use an orthosis that exerts correctional and stabilizing forces on the curve, but does not extend up to the neck, i.e., some type of underarm orthosis. If there is a decompensation problem, a trochanteric extension will be employed.

If the curvature is in the thoracic spine, i.e., the apex is at T7, an orthosis is needed which will give a maximal effect at that area. The best orthosis is still the Milwaukee brace, regardless of whether the curve problem is a kyphosis or a scoliosis.

Why is a Milwaukee brace best for such thoracic curves? It is best because it is designed to apply its forces in that area without negative effects on other areas. Those who suggest that an underarm orthosis can achieve the same result are looking only at the roentgenogram, not at the patient. It is of no benefit to create a "good looking" roentgenogram, if at the same time the patient has decreased lung function, permanent alteration of rib cage dimensions, skin sores, digestion problems, or any of the other secondary effects which improper bracing can create.

In summary, we have reached a point of professional advancement in which children with progressive curvatures are being detected early enough to permit non-operative control (not "correction") by orthoses. We are sophisticated enough not to overtreat small curves, nor to attempt to orthotically treat curves needing surgery. We now have a wide selection of orthotic devices from which to choose for the individual patient and her or his specific curve problem. We must stop looking just at an anteroposterior roentgenogram and begin to look at the patient as a three dimensional individual. Finally, we must recognize defeat — sometimes the orthosis just doesn't work and the patient needs surgery.

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