

Q&A WITH J. MARTIN CARLSON, CPO, FAAOP

By Miki Fairley
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In a question-and-answer interview with Miki Fairley, J. Martin Carlson, CPO, FAAOP, provides his viewpoint on some of the issues involved in orthotic management of adolescent idiopathic scoliosis (AIS).

Carlson is president of Tamarack Habilitation Technologies Inc., St. Paul, Minnesota, and was director of Habilitation Technologies at Gillette Children's Specialty Healthcare in St. Paul for 16 years. He was one of the participants in a panel discussion on "*Trends in Adolescent Idiopathic Scoliosis Concerning Cobb Angle vs. Overall Balance and the Application of Forces*" during the 2006 Annual Meeting of the American Academy of Orthotists and Prosthetists (the Academy).



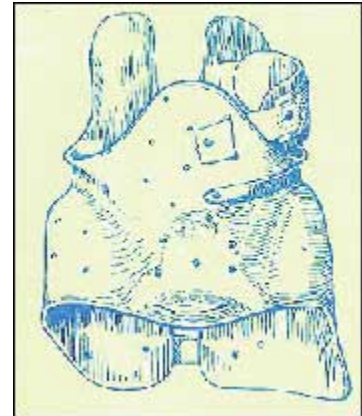
Q: *How do you define successful orthotic management outcomes? What should be the goals of treatment?*

A: There are two fundamental goals of orthotic treatment for children with juvenile or adolescent idiopathic scoliosis, and they are of equal importance:

1. Resist progression of the spine deformity to avoid the necessity for fusion.

2. Maintain or improve curve compensation/balance and alignment for cosmetic reasons.

However, accomplishing those two goals does *not* necessarily constitute an acceptable, successful orthotic management. There are always two sides to the "successful outcome" coin. Virtually any medical intervention has side effects and complications. We should design, craft, and fit with the following intentions:



- minimize physical constraint;
- encourage physical activity/sport;
- minimize cosmetic and psychological challenges;
- avoid or minimize excessive pressure on internal organs;
- avoid exacerbation of thoracic hypokyphosis; and
- avoid unnatural reshaping of the thorax.

I think of the side effects as being what we require the child to "pay" for the treatment. We, as orthotists, provide the highest value when we manage to get a good outcome for the child at a low "cost" to the child.

Q: *Curve balance has been considered to improve the cosmetic appearance of the spine, thus being a factor in whether or not surgery is undertaken. How important do you feel this factor is, compared to Cobb angle, in orthotic management?*

A: It is fundamentally difficult to compare the value of Cobb angles with the value of overall balance-alignment. Cobb angles relate to individual curves, and concepts such as balance, compensation, and alignment relate to the family of spine curves (primary, compensatory, and even fractional) as a whole. As such, these concepts relate more directly to the *patient's* condition rather than to the straightness/crookedness of any one, two, or three small parts of the patient's spine. The challenge is to devise and prove out a quick, objective measurement that validly relates to the curve "family."

Q: *Is it more important to achieve overall balance or maximum reduction of the Cobb angle?*

A: My answer is unequivocal. It is more appropriate to treat the scoliotic spine as a whole rather than to attack each curve as individual deformities to be individually minimized.

Q: *To achieve curve balance, should compensatory curves be allowed or induced?*

A: This is a judgment call depending on the relative sizes of the curves, the flexibility/correctability of the primary curve, and overall alignment. You may not know the answer until you see one or two in-orthosis radiographs. The A-P radiograph should ideally show roughly equal rightward and leftward deviation (from CSL) of the apices of the primary and compensatory curves. In addition, we would like to see that this correction did *not* produce a high thoracic curve, did *not* cause a shoulder asymmetry, and we would like to see head and neck quite well centered. *If* treatment of the primary and compensatory curves has caused poor right-left balance or any of the undesirable effects in the upper spine, we would be obligated to back off on our efforts to reduce the Cobb angles of one or both of the two lower curves. In some cases, we may even need to encourage better compensation.

Q: *What are the implications of increasing a secondary curve?*

A: When a secondary/compensatory curve is increased for the right reasons (better balance/alignment) the implications are a more cosmetic outcome for the patient and probably less pleasing Cobb angle numbers.

Q: *What areas of research and evidenced-based practice studies are most needed at this point, and why?*

A: We need a number of studies around the country (probably both retrospective and prospective) that can begin to indicate the

strengths/weaknesses of using an objective measurement such as the Overall Balance Summation (OBS) in addition to the Cobb angle.

Q: *It has been noted that better orthosis designs are needed and that current designs frequently tend to cause flattening of the spine in the sagittal plane. Also it has been said that there is a need for designs that will be better tolerated by patients, thus increasing compliance. What is your thinking on this?*

A: Flattening of the thoracic spine in the sagittal plane (thoracic hypokyphosis), is frequently a component of juvenile and adolescent idiopathic scoliosis. Ways to address this in orthosis design have been proposed as early as 1977 (*Clinical Orthopedics and Related Research* , No 126, July/August, p.77) and as recently as 2003 (*Journal of Prosthetics and Orthotics* , Vol. 15, No. 4, p.S23).

I feel that the present shortcomings I see in spinal orthoses are, in large part, due to the shortcomings of the Cobb angle as the single, dominant objective measurement in scoliosis. If we can improve the way we measure and report treatment progress and outcomes so they more validly reflect outcome quality for the child, improvements in orthosis designs will automatically follow.

It may take seven to ten days for a child to become accustomed to her/his spinal orthosis. Beyond that, the child should not experience distracting discomfort. Acceptance and compliance, we should remember, is mostly a reflection of the level of confidence and respect present in the parent-child-physician-orthotist relationship.