

CORR Insights®: Does Curve Regression Occur During Underarm Bracing in Patients with Adolescent Idiopathic Scoliosis?

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Where Are We Now?

Underarm bracing can prevent 25° to 40° curves in patients with adolescent idiopathic scoliosis (AIS) from progressing to the point where surgery may be indicated [2, 7]. While the main goal of bracing for AIS is to prevent the need for surgery, the study by Cheung and colleagues [1] provides the best evidence so far that curve regression can sometimes occur. The authors found that some scoliosis curves may be partially

reversed with bracing, and that, in some patients, reversal of vertebral wedging may occur at the apical vertebrae of major curves, which implies that the vertebrae were sufficiently relieved of axial load to allow recovery of their native growth potential. This is an important and rather exciting finding because it definitively demonstrates that bracing may potentially reverse one of the primary elements of the spine deformity which constitutes scoliosis [6].

In the current study, patients wore a brace for mean 3.8 years and SRS 22r scores were better for those who experienced correction. Notably, the authors' practice setting is a dedicated scoliosis clinic including an orthotist who fits their patients with customized braces, a physical therapist who assists with exercise training and a psychologist [1]. A multidisciplinary team such as theirs could potentially influence patient perceptions and behavior. While many have an orthotist immediately available, few, if any scoliosis practices have immediate access to a psychologist and a therapist.

Cheung and colleagues [1] also found that the benefits of bracing were not dependent on sex. This is an important and new finding because no previous studies have unequivocally demonstrated brace efficacy in males.

Where Do We Need To Go?

Several questions arise as a result of the present study. How does information such as potential "cure" influence patient adherence and success? Is there evidence to support the idea that scoliosis clinics should include either a physical therapist or a psychologist? In terms of compliance, are custom-made scoliosis braces superior to commercial braces? Might the results of the study be different if compliance were accurately measured? Would three-dimensional (3-D) imaging provide more accurate information about the observed vertebral deformity? What sort of pressures are applied with their brace?

How Do We Get There?

Patients often have difficulty with the notion that merely preventing scoliosis progression constitutes success for a condition that mainly affects appearance. The idea that scoliosis might be reversed (or "cured") is appealing, especially as a potential motivation for brace compliance. Commercial devices that record how long a patient wears a brace by sensing body heat are available for general use [1, 2, 7] and have been shown to be effective in improving compliance [1]. Using such devices could determine the reproducibility of the findings in the current study. Perhaps

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heat sensors, along with validated questionnaires, could potentially allow us to know which information imparted to the patient and family has the greatest influence. A comparative study between centers such as the authors' who have a multidisciplinary clinic, and others that do not, might help us to learn whether or not the addition of either a psychologist and/or physical therapy are truly beneficial to treatment adherence.

Custom bracing is often cost-prohibitive, especially for those who do not have commercial insurance. However, as technologies such as 3-D printing evolve, perhaps customized braces based on 3-D understanding of scoliosis will become less costly to produce and more widely available. Efficacy of bracing is difficult and designing a study that indicates the superiority of one design over another would be a monumental undertaking. However, superiority in terms of compliance would be easier to study.

Future studies should use 3-D stereo radiographic imaging, which is now available at most scoliosis centers [5]. Studies that use this imaging technique will improve our understanding of vertebral deformity and the effects of bracing on it.

Other devices that measure the pressure applied by scoliosis braces have also been used in previous studies [3, 4] and perhaps might be used to measure the effect of load applied to the spine, curve correction and improvement of vertebral body wedging.

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