

Wearing a brace for idiopathic scoliosis above 18 hours/day shows a dose-response effect on the outcomes improvement and end-of-treatment Cobb angle below 30 degrees

Negrini Stefano (1,2), Francesco Negrini (3,4), Tito Bassani (2), Francesca Febbo (5), Greta Jurenaite (5), Alessandra Negrini (5), Carmelo Pulici (5), Fabio Zaina (5)

1. Department of Biomedical, Surgical and Dental Sciences, University of Milan, Italy
2. IRCCS Istituto Ortopedico Galeazzi, Milan, Italy
3. Department of Biotechnology and Life Sciences, University of Insubria, Varese, Italy
4. Istituti Clinici Scientifici Maugeri IRCCS, Institute of Tradate, Tradate, Varese, Italy
5. ISICO (Italian Scientific Spine Institute), Milan, Italy

Purpose

The Brace Adolescent Idiopathic Scoliosis Trial (BrAIST) reported a bracing dose-response curve in AIS for brace-wearing time (BWT) up to 18 hours/day (h/d) on the outcome end-of-treatment $<50^\circ$. We aimed to check the dose-response curve for this and other relevant outcomes in case of BWT >18 h/d.

Methods

Design: retrospective secondary analysis of consecutively collected data. Participants: braced AIS patients with curves $<45^\circ$ and a subgroup with BrAIST inclusion criteria. Treatment: different braces, prescribed 18 to 24 h/d, according to curve topography, $^\circ$ Cobb and a shared decision-making approach. We divided patients into BWT quartiles and developed dose-response curves following the BrAIST methodology for the outcomes end-of-treatment $<50^\circ$, end-of-treatment $<30^\circ$, avoiding progression and improvement.

Results

We included 884 patients (85% females), age 13.0 ± 1.3 , $28 \pm 7^\circ$ Cobb. In the higher BWT quartiles, we found larger scoliosis curves but also better final $^\circ$ Cobb results. The dose-response curves showed statistically significant improvements for the outcomes end-of-treatment $<30^\circ$ and improvement (outcomes improvements ranging 45-60% and 25-35%, respectively). The outcomes end-of-treatment $<50^\circ$ and avoiding progression showed a ceiling effect due to a very high success rate (range 97-98% and 85-87%, respectively).

Conclusion

A BWT higher than 18 h/d almost guarantees to avoid surgery (END <50), greatly reduces the progressed cases, and allows positive results (increasing with BWT) in the outcomes improvement and finishing treatment below 30° Cobb – which is particularly relevant because it reduces the risk of problems in adulthood. Decisions on daily BWT should be based on the desired outcomes and an honest conversation with the patients and parents.