

**Title**

Innovations in the design of hard rigid braces for adolescent idiopathic scoliosis treatment

**Authors**

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**Abstract**

Bracing has been accused of “no evidence” for years, slowing the progressive of research. For these reasons, the international Society On Scoliosis Orthopedic and Rehabilitation Treatments (SOSORT) has produced a series of Consensuses and Guidelines to drive clinics and research. A well designed RCT published in 2014 was stopped for ethical reasons because the high efficacy of bracing did not allow more recruiting to the “no-treatment” control group. As a result, research is growing again. Among the innovations in this century are hard rigid braces, developed to avoid casting. Currently they include two devices: the Sforzesco (Italy) and the ART (France) braces. They differ mainly in the quantity of symmetry and, consequently, in biomechanical action. Published results show their efficacy also in curves above the surgical threshold. Proper timing in prescription, correct design and building provide a possibility to avoid surgery and improve trunk aesthetics. Biomechanics principles applied to braces cannot ignore a design tailored to the patient and a controlled fabrication process. One of the most significant problems in braces management is the conflict between the rigid part of the brace and the pelvis in the three space planes. The lateral parts of the iliac bones stop the frontal corrections. The sagittal compression also changes the biomechanics of the pelvis. An innovative idea aims to reduce those problems by introducing a soft material pelvis containments and a gradual back closure system. It enables us to obtain an increasing progression of the correction forces without the strains, which usually spoil our work.

**Statement of the objective/learning objectives**

The instructional course aims to give attendees information about the last guidelines, braces' classification, state of the art of hard rigid braces and biomechanical concepts, technical innovations in design and fabrication.