



204

Physical Education Is Feasible While Wearing a Thoraco-Lumbo-Sacral Orthosis: Functional and Psychosocial Aspects in Adolescents with Idiopathic Scoliosis

Francesco Negrini^{1,2,3}, Irene Ferrario³, Valentina Boetto⁴, Christian Barone¹, Alessandra Negrini³, Stefano Negrini^{5,6,3}
¹Università degli studi dell'Insubria, Varese, Italy. ²Istituti Scientifici Maugeri, Milan, Italy. ³SICO (Italian Scientific Spine Institute), Milan, Italy. ⁴AOU Città della Salute e della Scienza, Turin, Italy. ⁵Università degli studi di Milano, Milan, Italy. ⁶IRCCS Galeazzi-Sant'Ambrogio Hospital, Milan, Italy

Background

Current guidelines for the rehabilitative treatment of adolescent idiopathic scoliosis (AIS) recommend continued participation in physical education (PE) during bracing, citing benefits for pulmonary function, psychological well-being, and treatment success. However, no study has objectively quantified the functional difficulty perceived by adolescents when performing standard PE motor tasks while wearing a thoraco-lumbo-sacral orthosis (TLSO), limiting the ability to design targeted adaptations and provide adequate psychosocial support.

Study Design

Observational Cross Sectional Study

Objective (s)

(1) quantify perceived functional limitations during PE while wearing a TLSO, and (2) examine the association between perceived functional difficulty and selected health-related quality of life (HRQoL) domains, with a focus on social exclusion.

Methods

A multidisciplinary team including a physiatrist, a psychologist, a physical therapist, and an exercise science specialist, each with at least 10 years of experience managing AIS, developed a questionnaire to assess perceived difficulty in motor tasks typically performed during school-based PE. The questionnaire included 82 exercises or games and was structured in two steps: participants first indicated whether each activity had ever been proposed during PE lessons, and, if so, rated their ability to perform it as without difficulty (WOD), with difficulty (WD), or not achievable (NA). Three additional items explored enjoyment, perceived social exclusion, and self-consciousness. Adolescents aged 10–18 years with AIS who routinely wore a rigid or very rigid TLSO during PE were eligible. Associations between perceived functional difficulty and psychosocial variables were analysed using chi-square (χ^2) tests.

Results

Thirty adolescents with AIS (24 females, 6 males), all undergoing full-time bracing, completed the questionnaire. Overall accessibility to PE activities was high, with more than half of the assessed tasks being performed by the majority of participants. Sport activities were proposed to approximately 45% of students and were largely feasible, with 92.9% reporting successful performance (WOD 81.2%, WD 11.7%) and only 7.1% reporting inability. In contrast, activities requiring greater trunk mobility, strength, or postural control were perceived as more challenging. Rolling and climbing, muscle strengthening, stretching, and jumping showed lower rates of successful performance (WOD+WD 58.9–69.7%) and higher proportions of reported inability, reaching 30.3–41.1%. Higher perceived difficulty was significantly associated with increased feelings of social exclusion and reduced enjoyment during PE (χ^2 , $p < 0.05$ for both).