

Efficacy of Orthotic Intervention for Patients with Hypermobile Ehlers-Danlos Syndrome
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Clinical Question: In patients with hypermobile Ehlers-Danlos syndrome (hEDS) or related joint hypermobility disorders, how does orthotic intervention compared with therapeutic exercise, no orthosis, or usual rehabilitation affect pain, joint stability, and functional performance?

Background: Joint hypermobility disorders, including hEDS, classical EDS (cEDS), joint hypermobility syndrome (JHS), generalized hypermobility (GH), hypermobility spectrum disorders (HSD), and symptomatic flexible flatfoot, can present with excessive joint motion, pain, fatigue, and functional limitations.¹⁻⁵ Reviewed orthoses included positional finger orthoses, a shoulder orthosis, customized arch-support insoles, and dynamic elastomeric fabric orthoses (DEFOs). These devices improve joint positioning or stability while preserving functional movement. Therapeutic exercises and motor-function training for people with GH and hEDS were also supported, indicating that orthotic intervention can be considered as one component of multidisciplinary rehabilitation rather than as a replacement for exercise or functional training. The purpose of this CAT is to evaluate whether orthotic intervention improves pain, joint stability, cognitive effort, and functional performance in people with hypermobility-related conditions.

Search Strategy

Databases searched: Google Scholar, PubMed, oandp.org, and Sage Journals. Search terms: ("hypermobility" OR "hypermobility" OR "hypermobility EDS" OR "Ehlers-Danlos Syndrome" OR "HEDS") AND ("orthotics" OR "orthosis" OR "orthoses"). Inclusion criteria: English-language publications from 2013 to present. Five articles were selected for the evidence table.

Synthesis of Results: Across the reviewed studies, orthotic interventions generally provided support, improved alignment or stability, or limited excessive motion while allowing functional activity.³⁻⁵ Jensen et al. found that positional finger orthoses significantly reduced the time required for functional hand tests, although the expected reduction in prefrontal cortical activity was observed only during the dominant-hand coin task.³ Kotler et al. reported improved bed mobility and transfers, less pain, and fewer dislocations in a patient receiving multidisciplinary rehabilitation that included a shoulder orthosis.⁴ Hsieh et al. found significant improvements in pain/comfort, physical health, stair-ascent time, physical and upper-extremity function, and transfers after 12 weeks of customized arch-support insoles in children with symptomatic flexible flatfoot.² Snowden and Dadla identified immediate relief, improved proprioception, and enhanced joint stability as recurring themes in expert experiences with DEFOs.⁵ Brittain et al. concluded that therapeutic exercise and motor-function training are effective approaches for GH and hEDS, with weaker evidence for adaptive equipment, patient instruction, manual therapy, and functional training.¹

The evidence is limited by small or heterogeneous samples, lack of control groups in some studies, short or absent long-term follow-up, variable treatment compliance, and reliance on expert or retrospective evidence in some articles. These limitations make it difficult to determine which orthotic designs, wear schedules, or patient characteristics produce the greatest benefit. The findings support controlling painful or excessive motion while maintaining function, but they do not establish orthoses as a stand-alone treatment.

Clinical Message: Orthotic intervention may improve pain, joint stability, alignment, and functional performance in selected patients with hEDS and related hypermobility disorders. The strongest directly relevant findings include faster functional hand performance with finger orthoses and improved pain, transfers, and dislocation frequency in a shoulder-orthosis case report; additional evidence from hypermobility-related populations support customized foot and fabric orthoses. Orthoses should be individualized to control painful or excessive motion without unnecessarily immobilizing the joint and should be combined with therapeutic exercise, motor-function training, and other multidisciplinary rehabilitation. Because the evidence base is heterogeneous and limited, clinicians should monitor functional outcomes, pain, skin tolerance, and adherence and avoid assuming that one orthotic strategy is appropriate for all patients.

References

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Evidence Table

	Jensen et al., 2021	Kotler et al., 2014	Brittain et al., 2023	Hsieh et al., 2019	Snowdon, 2023
Population	Female adults, 19–65, diagnosed with JHS, hEDS, or cEDS.	One 22-year-old female with hEDS.	28 articles involving 630 participants; mostly female, mean age 26.2.	52 children with symptomatic flexible flatfoot; exclusions included foot injury/surgery, foot abnormalities, and developmental delay.	Six experts in fabric orthoses and HSD.
Study Design	Prospective superiority trial; repeated-measures comparison of functional testing with and without finger orthoses.	Prospective case report.	Scoping review of studies identified through a systematic search of PubMed, CINAHL, and Embase (January 2000–April 2023).	Prospective randomized controlled clinical trial.	Qualitative thematic analysis using semi-structured expert interviews; themes were member-checked by three original participants.
Intervention	Custom finger orthoses at the MTP and 1st metacarpal joints.	Multidisciplinary inpatient rehabilitation including PT, OT, psychology, orthotics, and a left shoulder orthosis designed to limit humeral separation from the glenoid.	Studies of PT interventions including therapeutic exercise and motor-function training; the review also identified evidence for adaptive equipment, instruction, manual therapy, and functional training.	Customized arch-support insoles worn for 12 weeks.	Dynamic Elastomeric Fabric Orthoses (DEFOs).
Comparison	Same participants tested with and without finger orthoses.	No separate control; case received a multidisciplinary program throughout.	Intervention categories were compared/synthesized across the included literature; no single orthotic comparator.	No insoles.	No separate comparison group.
Methodology	Time to complete Box and Blocks, writing, and coin pickup tasks; prefrontal cortex activity also measured with fNIRS.	Shoulder orthosis used to limit humeral separation; outcomes included pain, function, bed mobility, transfers, dislocations, and complications/psychosocial implications.	Systematic search, appraisal, and classification of included studies by PT intervention type.	Treatment group wore customized insoles for 12 weeks; control group did not. Outcomes were collected at baseline and 12 weeks.	Semi-structured interviews were analyzed for recurring themes regarding DEFO use in people with hypermobility.

	Jensen et al., 2021	Kotler et al., 2014	Brittain et al., 2023	Hsieh et al., 2019	Snowdon, 2023
Outcomes	Box and Blocks, writing, and coin-pickup performance; prefrontal cortical activity.	Pain, function, bed mobility, transfers, dislocations, and psychosocial/immobility-related outcomes.	Reported outcomes varied across included studies; the review synthesized evidence for function and quality of life.	10-m distance, normal/fast walking, stair ascent/descent, chair rising, and Pediatric Quality of Life Inventory.	Expert-reported themes including immediate relief, proprioception, and joint stability.
Key Findings	Finger orthoses significantly reduced time for functional hand tests. Reduced prefrontal cortical activity was observed only for dominant-hand coin pickup.	Bed mobility and transfers required less time and were less painful, with fewer dislocations; patient transitioned to outpatient therapy after 2 weeks.	Therapeutic exercise and motor-function training were supported for GH/hEDS. Evidence for adaptive equipment, instruction, manual therapy, and functional training was weaker.	After 12 weeks, customized insoles significantly improved pain/comfort, physical health, stair-ascent time, upper-extremity/physical function, and transfer ability.	DEFOs were associated in expert reports with customized support/alignment, improved proprioception, and enhanced joint stability while allowing more mobility than traditional orthoses.
Study Limitations	Small and heterogeneous sample; attentional demands may have influenced pain; one-day testing may have contributed to fatigue and later pain.	Single-patient case report, no long-term follow-up, and no independent control group because multidisciplinary care was provided throughout.	Small/variable evidence base and heterogeneous studies; included evidence does not establish a standardized orthotic treatment plan.	Small sample and no long-term follow-up.	Perspectives were expert/second-hand experiences rather than direct patient outcome data.