Effectiveness of Lumbosacral Orthoses for Nonspecific Low Back Pain

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Clinical Question: In adults with subacute or chronic nonspecific low back pain, does wearing a lumbosacral orthosis, compared with usual care, reduce pain and disability and improve physical function or trunk-muscle performance?

Background: With a lifetime prevalence near 40%, low back pain is the leading global contributor to years lived with disability.[1,2] Contemporary guidelines emphasize education, exercise, and self-management.[3] While lumbosacral orthoses (LSOs) are theorized to limit painful motion and unload the spine, early systematic reviews found brace trials to be small and methodologically weak.[4,5] Modern randomized controlled trials (RCTs) evaluating specific wear schedules now permit a more focused critical appraisal.[6-10]

Search Strategy:
Databases Searched: PubMed, CINAHL, and Google Scholar
Search Terms: ((lumbar OR lumbosacral) AND (brace* OR orthos* OR support*)) AND "low back pain"
Inclusion Criteria: English-language original studies (2010–2025) of adults ≥ 18 y with subacute or chronic nonspecific low back pain, reporting pain, disability, or functional outcomes.
Exclusion Criteria: Post-operative bracing, fracture, scoliosis, case reports, and systematic reviews.

Synthesis of Results: Five recent RCTs evaluated bracing for subacute or chronic low back pain, but the magnitude and direction of effect varied according to brace design, wear schedule, and compression level.[6-10] A soft, high-tension LSO worn four hours per day reduced pain by about 1 cm on a 10-cm Visual Analogue Scale (VAS) and improved disability compared with medication, without compromising trunk-muscle strength or endurance.[6] When a full-time non-extensible LSO was added to physiotherapy, it produced a clinically important 10-point gain on the Oswestry Disability Index, although pain relief was modest.[9] A sacroiliac belt delivered pain and disability outcomes equivalent to a standard lumbar brace while subjects rated it as more comfortable,[7] whereas an intermittent semi-rigid corset actually worsened functional scores in one high-quality trial.[10] Across all studies, ultrasound and electromyography revealed no trunk-muscle atrophy or strength loss, postural stability remained unchanged, and no serious adverse events were reported.[6,8-10] Benefits generally emerged within the first 4–12 weeks and stabilized thereafter,[6,9] suggesting that bracing is best used as a short-term adjunct to active rehabilitation. Nevertheless, the trials were small and their brace protocols heterogeneous, so the overall certainty of evidence remains moderate.

Clinical Message: For patients whose subacute or chronic nonspecific low back pain persists despite guideline-based education and exercise, prescribing a well-fitted non-extensible or high-tension soft LSO can provide a small but clinically worthwhile reduction in pain and disability for roughly 4–12 weeks.[6,9] Sacroiliac belts offer equivalent symptom relief with higher user satisfaction, suggesting they may be preferable when comfort and adherence are priorities.[7] In contrast, semi-rigid braces worn only “as needed” have failed to relieve pain and have actually worsened disability and quality-of-life metrics in at least one high-quality trial, so their routine use should be approached cautiously.[10] Importantly, none of the included studies identified muscle atrophy or other serious harms, even with prolonged wear.[6,8] Clinicians should position bracing as a complement rather than a substitute for active rehabilitation, set clear goals for tapering wear time as function improves, and tailor brace choice, compression level, and daily schedule to individual patient needs while monitoring disability and quality-of-life outcomes.[3] Further long-term investigations are necessary to refine device selection, optimal compression, and patient subgroups most likely to benefit.[1,3-5,10]

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Evidence Table

	Azadinia 2017[9]	**Samani 2019[6]**	**Azadinia 2019[8]**	**Annaswamy 2021[10]**	**Lee 2022[7]**
Population	41 adults (20 LSO, 21 CTL) with nonspecific CLBP, 20–55 y, ≥ 12 mo history, ODI > 6; mean ≈ 27 y	42 adults (13 high-P, 14 norm-P, 15 CTL) with chronic nonspecific LBP, 25–55 y, ≥ 3 mo, VAS ≥ 4/10, ODI ≥ 20/100	44 adults (22 LSO, 22 CTL) with nonspecific CLBP, 20–55 y, ≥ 1 y history or recent episode, ODI ≥ 6; mean ≈ 27 y	59 adults (34 CTL, 25 brace) with uncomplicated CLBP > 12 wk with degenerative spondylosis, 18–85 y; mean 48.9 y; 18.7% female	30 adults (16 experimental, 14 CTL) with subacute or chronic nonspecific LBP > 1 mo, 18–65 y; mean 57.0 y (22–88); 23 female
Study Design	RCT, single-blind (data analyst); 4 wk	RCT, single-blind (statistician); 4 wk	Parallel-group RCT, single-blind (assessor); 4 wk	Prospective unblinded RCT; halted early (61 of 120 planned)	Prospective randomized crossover, single-blind; 2 wk
Intervention	Non-extensible LSO (QuikDraw) + routine PT; worn all day except sleep	High-pressure soft LSO (50% above normal) + NSAID, 4 h/day	Non-extensible LSO (QuikDraw) + routine PT; worn all day (mean 7.21 h/day)	Semi-rigid brace (Horizon 627) + Back-School education and exercise; brace ≤ 4 h/day	Week 1 sacroiliac belt then Week 2 LSO (experimental sequence)
Comparison	Routine PT only	NSAID only (CTL) and normal-pressure LSO + NSAID	Routine PT only	Back-School education and exercise only	Crossover sequence reversed
Methodology	8 PT sessions (twice/wk × 4 wk); VAS, ODI, TSK, COP	All groups received NSAID for 4 wk; FSR pressure monitoring; pre/post strength, endurance, proprioception, EMG (RA/EO/IO/TA/LES), VAS, modified ODI	8 PT sessions; ultrasound imaging of TrA, IO, LM pre/post	Assessments at 0, 6, 12 wk, and 6 mo: NRS, PDQ, PROMIS, EQ-5D; self-reported adherence	Each brace worn 1 wk; daily NRS, analgesic use, wear hours; ODI on days 0, 7, 14; QUEST 2.0 on days 7, 14
Outcomes	Pain, disability, kinesiophobia, postural sway	Motor function, pain, disability, proprioception	Thickness of deep trunk muscles	Pain, disability, function, quality of life	User satisfaction, pain, disability, analgesic use

	Azadinia 2017[9]	Samani 2019[6]	Azadinia 2019[8]	Annaswamy 2021[10]	Lee 2022[7]
Key Findings	LSO + PT reduced pain and disability compared with PT alone; no additional benefit for postural stability; no change in TSK	No adverse motor effects; pain decreased in all groups; disability and proprioception improved in LSO groups; high-pressure group showed greater improvement than normal pressure	No change in TrA, IO, or LM thickness; muscle thickness varied by position; findings do not support LSO-induced atrophy	Brace provided no extra pain relief; brace group worsened on PDQ, PROMIS, and EQ-5D, leading to early termination	Sacroiliac belt produced higher satisfaction ($p = 0.0375$); pain and disability similar between devices; satisfaction inversely related to pain and disability
Study Limitations	Participants and assessor unblinded; no no-treatment arm; uncertain brace compliance; young sample	Four-week duration; assessors unblinded; small sample; NSAID confounding; younger cohort	Four-week duration; adherence unclear; no no-treatment arm; right-side imaging only; daily-activity performance not assessed	Unblinded design; early stop; self-reported adherence; specific inclusion criteria; wide age range	Short study; no washout period; small sample; female-skewed population

Abbreviations: CLBP: chronic low back pain; LBP: low back pain; LSO: lumbosacral orthosis; SI: sacroiliac; PT: physical therapy; RCT: randomized controlled trial; CTL: control group; VAS/NRS: Visual/Numerical Rating Scale; ODI: Oswestry Disability Index; TSK: Tampa Scale for Kinesiophobia; COP: center-of-pressure; QUEST: Quebec User Evaluation of Satisfaction with Assistive Technology; NSAID: non-steroidal anti-inflammatory drug; FSR: force-sensing resistor; RA/EO/IO/TA/LES: rectus abdominis / external oblique / internal oblique / transversus abdominis / lumbar erector spinae; TrA/IO/LM: transversus abdominis / obliquus internus / lumbar multifidus; PDQ: Pain Disability Questionnaire; PROMIS: Patient-Reported Outcomes Measurement Information System; EQ-5D: EuroQol 5-Dimension.