

# CAN LUMBOSACRAL ORTHOSES CAUSE TRUNK MUSCLE WEAKNESS? A SYSTEMATIC REVIEW OF LITERATURE.

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The Spine Journal, received 8 July 2016; revised 14 November 2016; accepted 9 December 2016

**BACKGROUND:** Wearing lumbosacral orthosis (LSO) is one of the most common treatments prescribed for conservative management of low back pain. Although the results of randomized controlled trials suggest effectiveness of LSO in reducing pain and disability in these patients, there is a concern that prolonged use of LSO may lead to trunk muscle weakness and atrophy. **PURPOSE:** The present review aimed to evaluate available evidence in literature to determine whether LSO results in trunk muscle weakness or atrophy. **STUDY DESIGN:** This is a systematic review. **METHODS:** A systematic search of electronic databases including PubMed, Scopus, ScienceDirect, and Medline (via Ovid) followed by hand search of journals was performed. Prospective studies published in peer-reviewed journals, with full text available in English, investigating the effect of lumbar orthosis on trunk muscle activity, muscle thickness, strength or endurance, spinal force, and intra-abdominal pressure in healthy subjects or in patients with low back pain, were included. Methodological quality of selected studies was assessed by using the modified version of Downs and Black checklist. This research had no funding source, and the authors declare no conflicts of interest-associated biases. **RESULTS:** Thirty-five studies fulfilled the eligibility criteria. The mean and standard deviation of the quality score was  $64 \pm 9.7\%$ . Most studies investigating the effect of lumbar orthosis on electromyographic activity (EMG) of trunk muscles demonstrated a decrease or no change in the EMG parameters. A few studies reported increased muscle activity. Lumbosacral orthosis was found to have no effect on muscle strength in some studies, whereas other studies demonstrated increased muscle strength. Only one study, which included ultrasound assessment of trunk muscle stabilizers, suggested reduced thickness of the abdominal muscles and reduced cross-sectional area of the multifidus muscles. Out of eight studies that investigated spinal compression load, the load was reduced in four studies and unchanged in three studies. One study showed that only elastic belts reduced compression force compared to leather and fabric belts and ascribed this reduction to the elastic property of the lumbar support. **CONCLUSION:** The present review showed that the changes in outcome measures associated with muscle work demands were inconsistent in their relation to the use of lumbar supports. This review did not find conclusive scientific evidence to suggest that orthosis results in trunk muscle weakness.

## SELECTED QUOTATIONS

### Introduction

“While the randomized controlled trials suggest effectiveness of LSO in reducing symptoms of pain and disability in patients with LBP [17, 18], there is a concern that prolonged use of LSO may result in trunk muscle weakness and atrophy. The present review aimed to...determine whether LSO results in trunk muscle weakness and/or atrophy.” (Pg. 5)

### Results

“Literature search was conducted, corresponding to the period from January 1990 to July 2015.” (Pg. 5)

“A total of 35 studies were included in this systematic review.” (Pg. 8)

### Conclusion

“Upon analyzing the effect of LSO on the strength of the back and abdominal muscles, some studies reported no change, while others reported an increase in the strength of flexor or extensor muscles.” (Pg. 20)

“This review did not find conclusive scientific evidence to suggest that orthosis result in trunk muscle weakness.” (Pg. 22)