INPLASY

INPLASY202410103

doi: 10.37766/inplasy2024.1.0103

Received: 25 January 2024

Published: 25 January 2024

Lumbar Segmental Stabilization Exercises in Managing Disability and Pain Intensity for Lumbar Spondylolysis and Spondylolisthesis: a Study Protocol of a Systematic Review and Meta-analysis

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ADMINISTRATIVE INFORMATION

Support - TSUM.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202410103

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 25 January 2024 and was last updated on 25 January 2024.

INTRODUCTION

Review question / Objective To investigate the treatment effect of lumbar segmental stabilization exercises on disability and pain intensity in lumbar spondylolysis and spondylolisthesis.

Rationale Spondylolysis and spondylolisthesis are spinal disorders affecting approximately 6% and 3.1% of the population, respectively. Both conditions are linked to lumbar segmental instability. Local muscles, such as the lumbar multifidus, transversus abdominis, pelvic floor, and diaphragm, play a crucial role in stabilizing lumbar segments. Studies, like Kumar's, highlight the effectiveness of local muscle stabilization exercises in addressing lumbar segmental instability. While recent randomized controlled trials show promising results for lumbar segmental stabilization exercises (LSSE) in spondylolysis and spondylolisthesis, there is a lack of a systematic review and meta-analysis on their impact.

Condition being studied Lumbar spondylolysis or spondylolisthesis.

METHODS

Search strategy Two authors made independent electronic searches in the PubMed, Cochrane library, and ClinicalTrials.gov with keyword of ("lumbar segmental stabilization exercise" OR "local muscle training" OR "spinal stabilization exercise" OR "lumbopelvic control training") AND ("spondylolysis" OR "spondylolisthesis").

Participant or population Lumbar spondylolysis or spondylolisthesis.

Intervention Lumbar segmental stabilization exercise.

Comparator Control.

Study designs to be included Randomized controlled trials (RCTs).

Eligibility criteria (1) RCTs investigating disability/pain intensity before and after LSSE; (2) enrolling adults diagnosed with spondylolysis or spondylolisthesis based on medical imaging; (3) the intervention groups receiving either LSSE alone or combination with other interventions and (4) one reference group undergoing treatments that did not include LSSE.

Information sources Two authors made independent electronic searches in the PubMed, Cochrane library, Pedro and ClinicalTrials.gov with keyword of ("lumbar segmental stabilization exercise" OR "local muscle training" OR "spinal stabilization exercise" OR "lumbopelvic control training") AND ("spondylolysis" OR "spondylolisthesis").

Main outcome(s) The primary outcomes were the changes in the disability scores following LSSE or control regimens. Secondary outcome: The secondary outcomes were the changes in the pain intensity following LSSE or control regimens.

Data management Two independent authors extracted data from the recruited studies, encompassing demographic data, study design, details of LSSE and control regimens, and values of the outcomes. The evaluators paid special attention to the effect direction of the scale used in each trial to avoid mis-interpretation.

Quality assessment / Risk of bias analysis To assess the methodological quality of the included studies, we employed the Cochrane risk of bias tool for randomized trials (version 2, RoB 2, London, United Kingdom). This tool comprises six key items to evaluate study quality, namely the randomization process, intervention adherence, missing outcome data, outcome measurement, selective reporting, and overall risk of bias. In the assessment of intervention adherence within the RoB 2.

Strategy of data synthesis Because of heterogeneity of the treatment protocols of the enrolled studies, the effect sizes were pooled by using a random-effects model. A two-tailed p value of less than 0.05 was considered statistically significant. I^2 and Cochran's Q statistics were also employed to evaluate the degree of heterogeneity across studies. AI^2 value of 25, 50, and 75% were deemed low, moderate, and high grades of heterogeneity, respectively.

Subgroup analysis Subgroup analyses based on the LSSE regimens, diagnosis and reference group were performed.

Sensitivity analysis To validate the reliability of the meta-analysis, sensitivity analyses were conducted using the one-study removal method.

Language restriction No limitation of languages.

Country(ies) involved Taiwan.

Keywords spondylolysis, spondylolisthesis, low back pain, physical therapy.

Contributions of each author

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