

INPLASY PROTOCOL

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Corresponding author:
Qian Wang

wangqianwind@163.com

Author Affiliation:
Center of Rehabilitation
Medicine, West China Hospital,
Sichuan University West China
Hospital.

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None declared.

Application of 3D gait assessment in scoliosis correction and rehabilitation

Zhang, J¹; Ye, SQ²; Li, S³; Wang, Q⁴.

Review question / Objective: The purpose of this review article was to summarize the application of 3D gait assessment in scoliosis correction and rehabilitation providing temporal spatial, kinematics, kinetics, surface electromyography, and energy consumption parameters.

Condition being studied: Scoliosis is a three-dimensional spinal deformity that causes pain, limited mobility, and altered gait patterns, causing serious family and social burdens.

Information sources: The following databases were searched: Pubmed, Embase, Science Direct and ISI web of knowledge using the words "OR," "AND," and "NOT." Keywords related to the population included scoliosis, scoliotic, and idiopathic scoliosis; keywords related to the intervention included surgery/fusion/orthosis/brace/spinal brace(s)/spinal orthosis(es)/thoracolumbosacral orthosis/TLSO/Milwaukee brace/ Boston brace/Cheneaubrace/spineCor/Wilmington/Lyonnais/rehabilitation/exercise/training/treatment, and keywords related to the outcome measures included gait, walking, walking speed, walking velocity, kinetics, kinematics, cadence, step length, stride length, step width, stride width, spatiotemporal, temporospatial, energy expenditure, energy cost, electromyography, and EMG.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 18 January 2023 and was last updated on 18 January 2023 (registration number INPLASY202310056).

INTRODUCTION

Review question / Objective: The purpose of this review article was to summarize the application of 3D gait assessment in scoliosis correction and rehabilitation

providing temporal spatial, kinematics, kinetics, surface electromyography, and energy consumption parameters.

Condition being studied: Scoliosis is a three-dimensional spinal deformity that

causes pain, limited mobility, and altered gait patterns, causing serious family and social burdens.

METHODS

Participant or population: (1) participants with scoliosis; (2) spinal orthosis, spinal surgery and other rehabilitation intervention were used as one of the treatment; (3) At least one of the temporal spatial parameters, kinematics, and kinetics, muscle activation and energy expenditure were included in the study.

Intervention: Spinal orthosis, spinal surgery or other spinal treatment.

Comparator: No comparator.

Study designs to be included: Trials, prospective study, case control study.

Eligibility criteria: The search strategy was based on the various intervention for scoliosis using gait analysis as relevant outcome measurement and included all relevant articles published between 2000 and 2023.

Information sources: The following databases were searched: Pubmed, Embase, Science Direct and ISI web of knowledge using the words “OR,” “AND,” and “NOT.” Keywords related to the population included scoliosis, scoliotic, and idiopathic scoliosis; keywords related to the intervention included surgery/fusion/orthosis/brace/spinal brace(s)/spinal orthosis(es)/thoracolumbosacral orthosis/TLSO/Milwaukee brace/ Boston brace/ Cheneaubrace/spineCor/Wilmington/Lyonnaise/rehabilitation/exercise/training/treatment, and keywords related to the outcome measures included gait, walking, walking speed, walking velocity, kinetics, kinematics, cadence, step length, stride length, step width, stride width, spatiotemporal, temporaspatial, energy expenditure, energy cost, electromyography, and EMG.

Main outcome(s): The main outcomes include results from 3D gait analysis, EMG and energy consumption results. 3D gait analysis results will provide information about gait changes after various intervention, including temporal spatial parameters (walking velocity, cadence, step length, stride length, step width, stride width), kinematics (mainly focus on pelvis and lower limbs) and kinetics (joint moments, joint power and ground reaction force). EMG will provide information about muscle activation pattern, timing and effect. Energy consumption provide information about changes in energy cost with different treatment strategies.

Quality assessment / Risk of bias analysis: The quality assessment of the included study will use NHLBI quality assessment tool.

Strategy of data synthesis: All the data will be pulled together and classified into 5 categories: temporal-spatial parameters, kinematics, kinetics, EMG data and energy consumption.

Subgroup analysis: There is no subgroup analysis.

Sensitivity analysis: This study is a literature review, there will be no sensitivity analysis in this study.

Country(ies) involved: Mainland China.

Keywords: scoliosis; 3D gait analysis; EMG; Energy consumption; Orthoses; surgery.

Contributions of each author:

Author 1 - Jing Zhang - Author 1 drafted the manuscript.

Email: lovekathy2007@sina.com

Author 2 - Saiqing Ye - Author 2 confirmed search strategy and search the databases.

Email: 1184720305@qq.com

Author 3 - Sha Li - Author 3 search the databases and confirm the inclusion and exclusion criteria.

Email: 919402754@qq.com

Author 4 - Qian Wang - Author 4 is the corresponding author. Author 4 provide feedback and approved the final manucript. Email: wangqianwind@163.com