

Gait Analysis in Cervical Spondylotic Myelopathy

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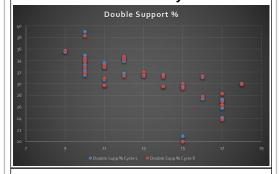
Introduction

Cervical Spondylotic Myelopathy (CSM) is the leading cause of spinal cord dysfunction in the elderly worldwide. Commonly used functional scaled scores include the Nurick and modified Japanese Orthopedic Association (mJOA), which fail to quantitatively and objectively characterize the extent of gait dysfunction in cervical myelopathy patients. Our objectives were 1) characterize and quantify gait abnormalities in CSM patients using temporal spatial gait parameters; and 2) investigate the relationship between these parameters and widely used CSM functional scaled scores.

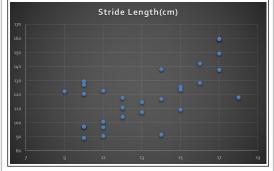
Methods

CSM patients from a single institution without a history of cervical surgery and without competing diagnoses impacting gait were prospectively enrolled. Functional scaled scores (Nurick and mJOA) were collected via patient interview. Subjects completed a 15m walk test; time and number of steps were recorded. Quantitative gait evaluation was performed using the computerized GaitRite program. Temporal spatial gait parameters included velocity (cm/s), cadence (steps/min), cycle time (s), stride length (cm), step time (s), step time (s), stance/swing percentage, and and single/double support percentage. Individual parameters were assessed by bivariate statistics to evaluate the relationship between gait parameters and qualitative functional scaled scores.

Double Stance % by mJOA



Stride Length by mJOA



Results

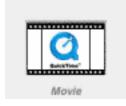
27 patients were enrolled. Strong statistical significance was achieved in correlation of stride length and double support percentage with all established scoring systems. Moderate statistical significance was achieved in the correlation of step length and stance percentage with all scoring systems.

Conclusions

Temporal spatial gait parameters, specifically stride length, double support percentage, step length, and stance percentage were highly correlative with DCM-specific functional analyses. The use of gait parameters allows for quantifiable reporting of gait dysfunction with more severe myelopathy. Higher enrollment is necessary to establish a threshold for indication of surgical intervention, and longitudinal followup has implications in determining postoperative improvements as an objective outcome measurement as well as natural history and progression of disease.

Learning Objectives

- 1) Describe the gait cycle, including its individual components and the parameters that are most affected in myelopathic gait.
- 2) Understand the potential importance of gait analysis on the stratification of severity of disease.



References

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