Assessment of Gait Disturbance by Foot Pressure Measurement in Patients with Myelopathy

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Introduction

Gait disturbance by myelopathy is mainly assessed with subjective complains of patients, whereas myelopathy hand is objectively assessed with the frequency of finger grip and release in ten minutes and grading of finger escape sign. Foot pressure measurement is one of the methods for gait analysis and some measuring instruments are commercialized as simplified mobile systems. Unstable on tandem gait and Romberg sign reflect motor and/or sensory ataxia in patients with myelopathy. The purpose of this study is to verify the quantitative assessments of tandem gait tests and Romberg tests with foot pressure measurements for patients with gait disturbance by myelopathy.

Methods

We measured the foot pressure distribution in 31 patients with myelopathy, who underwent spinal surgery. The tests consisted of normal walking in 20 meters, tandem gait in 5 meters (Figure 1), standing with eyes opened closed in 15 seconds (Figure 2). We scored the center line of foot pressure for each test on 4-points scale. Motor function of the lower extremity was assessed with the modified JOA Score. They were evaluated before and after surgery.

Results

Preoperative and postoperative scores of motor function were 1.9±0.73 and 3.1±0.98. Scores of tandem gait test were 1.6±0.98 and 2.3±1.2, respectively. Scores of Romberg test were 2.0±0.71 and 2.7±0.91, respectively. We evaluated tandem gait test and Romberg test about six months after surgery in 25 patients. Scores tandem gait additionally recovered from 2.4±1.1 to 3.1±0.83. Scores of Romberg test was also recovered from 2.8±0.93 to 3.2±0.72.

Conclusions

Foot pressure measurements graphically showed that tandem gait tests and Romberg tests reflect the postoperative recovery of gait disturbance in patients with myelopathy. They could be useful not only in postoperative evaluation, but also in determining surgical patients with benign spinal tumor or degenerative cervical stenosis.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of a tandem gait test and Romberg tests on assessment of myelopathy, 2) Discuss, in small groups, how useful to determine a surgical indication by these test, 3) Identify that these tests reflect the postoperative recovery of gait function.

References

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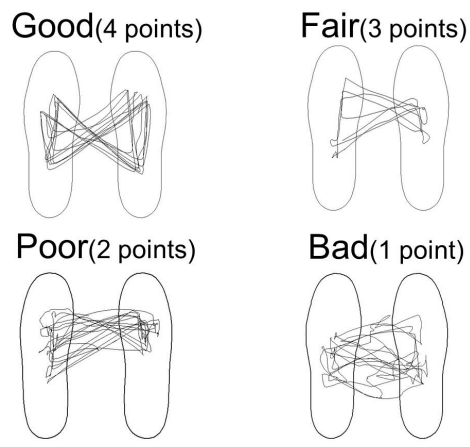
2) Edwards CC 2nd, Riew KD, Anderson PA, Hilibrand AS, Vaccaro AF: Cervical myelopathy. current diagnostic and treatment strategies. Spine J. 2003; 3 :68-81.

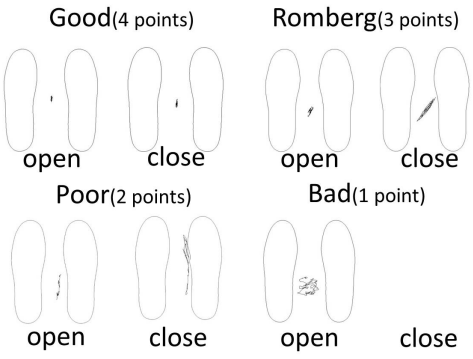
3) Harrop JS, Ganju A, Groff M, Bilsky M: Primary intramedullary tumors of the spinal cord. Spine (Phila Pa 1976). 2009; 34:S69-77

Figure 1



Scoring in a tandem gait test.

Figure 2



Scoring in a standing test with eye opened and closed (Romberg test).