Intraobserver Reliability of Grip and Release Test (10-Second Test) in Healthy Volunteers and Cervical Myelopathy Patients

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INTRODUCTION: Clumsiness of the hands is one of the common symptoms in cervical spondylotic myelopathy (CSM). Crandall (1966) described these clumsy hands as "slow stiff opening and closing of the fists". Ono (1987) also mentioned that CSM patients could not grip and release rapidly with the fingers (grip and release test). At the XXth annual meeting of CSRS, we presented that the grip-and-release test (10-second test) had improved significantly after laminoplasty in CSM patients. At the XXXIInd annual meeting, we also presented that the threshold of 10-second test between cervical myelopathy patients and healthy volunteers was 21 or 22 cycles and 10-second test was significantly related with the JOA scoring system. According to these results, we concluded that, compared with other scales, 10 seconds test is simple, quantitative and universal test for the assessment of severity of cervical myelopathy. In the next step, we have to clarify the reliability of 10-second test. The purpose of this study is to clarify the intraobserver reliability of 10-second test in cervical myelopathy patients and healthy volunteers.

METHOD: Three hundred and sixty patients with myelopathy secondary to cervical disc herniation (CDH), cervical spondylotic myelopathy or ossification of posterior longitudinal ligament (OPLL) were in the subjects of this study. Each patient was evaluated with the JOA scoring system. They were also asked to grip and release with fingers as rapidly as possible. The release means full extension of the digits and the grip means full flexion of the digits. The number of complete cycles of the movement within 10 seconds was counted (10-second test). When there is a discrepancy between right hand and left, the data of severely involved hand was adopted. Eighty-three volunteers (healthy individuals without myelopathy or other disability) were also examined. The same surgeon interviewed the same patient or the volunteer at intervals of 4 weeks. However, 144 of 360 myelopathy patients and 13 of 83 volunteers were excluded because of the following reasons; 1. Apparent changes in upper and/or lower extremities function between the first and second interviews resulting from either the cervical disease or musculoskeletal complications, 2. Symptoms that may be associated with labor welfare problem or traffic accident. Finally, 216 paired data in cervical myelopathy patients and 70 in healthy volunteers.
were included into this study. The intraobserver reliability was evaluated using Spearman’s correlation coefficient between the first and the second interviews.

RESULTS: 1. Values of 10-Second test; The mean values of the cervical myelopathy patients was 19.6±6.7 at the first interview and 19.9±6.8 ath the second interview, respectively. Correlation coefficient between the first and the second interview was 0.91 in the cervical myelopathy patients (Fig. 1). The mean value of the healthy volunteers was 26.5±6.7 cycles at the first interview and 27.0±5.7 at the second interview, respectively. Correlation coefficient between the first and the second interview was 0.78 in the healthy volunteers (Fig. 2). 10 Second test was significantly slower in the cervical myelopathy group at the either interview, compared with the volunteer group (p< .0001). 2. Values of JOA score; The mean values of the cervical myelopathy patients were 12.5±2.9 at the first interview and 12.6±0.2 at the second interview, respectively. Correlation coefficient between the first and the second interview was 0.95 in the cervical myelopathy patients. The mean value of the healthy volunteers was 16.9±0.5 at the first interview and 16.8±0.6 at the second interview, respectively. Correlation coefficient between the first and the second interview was 0.73 in the healthy volunteers. 3. Correlation coefficients of 10 Second tests and JOA score; In the cervical myelopathy patients, correlation coefficient was 0.91 for 10 Seconds test and 0.95 for JOA score, respectively. In the healthy volunteers, correlation coefficient was 0.78 for 10 Seconds test and 0.73 for JOA score, respectively.

CONCLUSION: In this study, correlation coefficients of 10 Second tests and JOA score revealed similar values either in cervical myelopathy patients (0.91 versus 0.95) or healthy volunteers (0.78 versus 0.73). The 10 seconds test was found to have similar reliability, compared with JOA score, for evaluation of cervical myelopathy. We had revealed that the threshold of 10-second test between cervical myelopathy patients and healthy volunteers was 21 or 22 cycles and 10-second test was significantly related with JOA scoring system. Therefore, by 10-second test, we can evaluate the severity as well as the change of cervical myelopathy objectively. As 10 seconds test is simple, quantitative and universal test, this test enables the practice of evidence-based medicine in cervical myelopathy.

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