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Nine-hole peg test for evaluation of hand function: The advantages and shortcomings

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The paper 'Evaluation of hand function in healthy individuals and patients undergoing uninstrumented central corpectomy for cervical spondylotic myelopathy using the nine-hole peg test' is very important due to several aspects.^[1]

It is important to document the normative data from healthy Asian subjects, especially in the Indian population. This helps to standardize the normal indices of physiological function in the country and pick up subtle and early signs of the commonly prevalent diseases encountered in the region. It is extremely important to distinguish hand-dysfunction arising due to the natural progression of spectrum of clinical manifestations of normal ageing from the clinical presentation of cervical spondylotic myelopathy, as the latter is often remediable resulting in a significant improvement in the quality of life of the subjects. Documenting normative data also helps to standardize the gradations of progressive disability and to eliminate errors arising due to assessment performed in different ages and gender. It also helps to systematise the objective reporting of outcome of diseases and helps in a better interpretation of the results of a therapeutic intervention, as it eliminates the possibility of a wide variability of results despite the existence of a similar neurological status, a discrepancy that may arise due to the different evaluating standards used by different observers.

This study also measured the functions of the right and left hand separately and undertakes five tests of the nine-hole peg test to record the higher worst score and the lower best score (instead of performing the test only one or twice). This helped in eliminating the variability arising due to the better functions in the dominant hand, and also of better results on repeated testing due to improvement in

hand functions by repeated practice. The hand function is a very significant determinant of the degree of disability that a patient suffering from cervical spondylotic myelopathy has. In the previous studies evaluating hand function in this disease, an averaging of the hand function on both the sides has been carried out, resulting in a result that was not representative of the actual hand function on either side. This often led to erroneous results.^[2,3] Cervical spondylotic myelopathy often manifests asymmetrically and by averaging the values of the two sides, this variability may often not be adequately recognised.

The other important aspect of the study were the comparisons of the nine-hole peg test with other scoring systems like the Nurick and the upper limb Japanese Orthopaedic Association Score grading. It is no wonder that the nine-hole peg test correlated poorly with the Nurick grade because the Nurick grade predominantly assesses disability based upon the lower limb function of the subject. The correlation between the nine-hole peg test and the upper limb Japanese Orthopaedic Association Score grading was good indicating that the former can serve as a good index for the evaluation of the upper limb functions.^[1,4] In fact, in addition to this favourable correlation between the two scales, the nine-hole peg test grading aided in detecting hand dysfunction in some patients who had been classified to be having "no hand dysfunction" as per the upper limb Japanese Orthopaedic Association Score, thus highlighting that in some aspects, the nine-hole peg test grading was more sensitive in assessing disability due to hand dysfunction than the upper limb Japanese Orthopaedic Association Score.

The nine-hole peg test grading, however, has a few drawbacks. It is not a good indicator of the degree of improvement in hand function in

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the early postoperative period but is a sensitive and valuable test in detecting recovery in hand dexterity when the others tests have reached their maximum scores, and after a longer follow up is available. Hand function has several subtle variations of movements; it is the sum-total of movements at several joints, muscle groups with neurological control at various levels. The amalgamation of all these physiological factors working in tandem is responsible for the accuracy and effectiveness of hand movement. However, the nine-hole peg test repeatedly grades the same type of movement. Hence, the subtle recovery of certain movements may often be missed simply because they have not been tested in the monotonous repetitive movement that the nine-hole peg test grading represents. Moreover, as is the problem with most other tests, any subtle improvement in the disability status of the hand function may translate into a huge improvement for the patient; however, it may not necessarily be picked up as it may not be of sufficient magnitude to bring about a change in the grade of the scale. This may be the reason why the nine-hole peg test grading does not work in the early postoperative period while being very sensitive in the later months in picking up subtle improvements in the hand function (due to the occurrence of a more significant recovery at a long-term follow up. Finally, the need of the hour is to have several modules of a disability grading system that separately test subtle variations of different parameters, namely the hand, the lower limb, the torso, and the intellectual function; the vision; the spasticity; attentiveness; intelligence; fatigability; and, the degree of depression present.^[5] All of these factors would independently affect the overall disability of a person suffering

from cervical spondylotic myelopathy, and in addition, would also have an interdependent effect in compounding the degree of disability. For the future, studies related to assessing the outcome of cervical spondylotic myelopathy will need to compare different options of treatments using the nine-hole peg test grading to detect which approach or technique provides better hand function.

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