A bedside test to determine motion stereopsis using the Pulfrich phenomenon

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OBJECTIVE: Many diseases induce asymmetric delays in the visual pathway, resulting in a spontaneous Pulfrich phenomenon (PP). The PP is a visual stereoillusion that may cause difficulties in persons when traveling in cars, crossing the road, or playing ball games. The authors developed and tested a simple new bedside procedure to detect PP.

DESIGN: A case series.

PARTICIPANTS: Disease simulation in 2 normal subjects and 18 patients with optic neuritis (ON) was examined. Ninety normal subjects were studied to determine normal range of PP.

INTERVENTION: The new test, called swinging pen test (SPT), is performed by oscillating a pen by hand. The SPT was compared to a gold standard, a mechanical pendulum (MP).

MAIN OUTCOME MEASURES: The authors measured simulated PP in two normal subjects and PP in 18 patients with ON and 90 normal control subjects. The Pearson product-moment correlation (r) and the Spearman rank correlation (rs) between SPT and MP were calculated.

RESULTS: The magnitudes of simulated PP determined with the SPT and the MP correlated well (r = 0.92, P < 0.005, and r = 0.96, P < 0.001). Correlation also was good in patients with ON (rs = 0.90, P < 0.05). The positive predictive value of the SPT was 100%, and the negative predictive value was 92%. The PP was absent in all control subjects testing with either pendulum. The normal range for PP varied from -1.40 to 1.52 msec. For the SPT, the intraobserver variability coefficient was 8.2%, and the interobserver variability coefficient was 10.5%.

CONCLUSIONS: The authors believe that SPT will be of value to clinicians on bedside evaluation of motion stereopsis dysfunctions. The normal range of PP was approximately +/- 1.5 msec (approximately +/- 1.5 cm), corresponding to a 0.3-log unit neutral density filter.

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