Objective:
To determine the association of the bedside test of head-shaking nystagmus (BedHSN) with patients’ self-perceived dizziness and functional handicap, as well as to determine this test’s diagnostic usefulness as a screening test in unilateral vestibular hypofunction.

Study Design and Setting:

Methods:
Fifty-three adult patients with unilateral peripheral hypofunction and ten healthy controls. Unilateral vestibular hypofunction was defined by the caloric test of the videonystagmography (VNG). Patients and controls underwent BedHSN testing. Patients completed the New Version Dizziness Handicap Inventory (DHI) (Appendix 1) and the Functional Level (FL) (Appendix 2) questionnaires. The sensitivity and specificity of BedHSN in diagnosing unilateral vestibular hypofunction defined by VNG caloric testing, and by abnormal gain and symmetry of the VOR by rotary chair testing was calculated. Score of self-perceived handicap were compared between subjects with and without a BedHSN by Wilcoxon rank test (significance level = 0.05).

Bedside HSN and VNG:
The bedside head-shaking test was performed by having the patient wear Frenzel lenses in darkness. The clinician rotated the patient’s head in the plane of the horizontal semicircular canal 30 times at 1-2 Hz. A positive BedHSN is the presence of at least 5 beats of nystagmus. Only patients with horizontal biphasic nystagmus were included in this study. The VNG (VNG, Balanceback, Boca Raton, FL, USA) test battery included oculomotor testing, high frequency headshaking, positioning and positional testing, and bithermal water calorics at temperatures of 44°C and 30°C. The maximum slow phase velocity of nystagmus was calculated for each irrigation. Using Jonkees’ formula, a unilateral weakness of > 25% was considered abnormal. The patient’s head was rotated in the horizontal plane for 20 s and eye movements were recorded for 20 s post stimulus. Rotational chair testing (Portal NOTC, Neuro Kinetics Inc., Pittsburgh, PA, USA) was also employed to assess VOR. Sinusoidal harmonic acceleration testing was performed at six frequencies ranging from 0.01 - 0.32 Hz. Abnormal findings were considered if values fell outside of normal at two or more frequencies for gain, phase and symmetry.

Results:
There were 53 patients, 22 men and 31 women, ages 24-85 years (mean age 57 years). Patients and controls did not differ significantly in age and gender. When using the caloric irrigation test as the reference standard for unilateral vestibular hypofunction, the sensitivity, specificity and positive predictive value of the BedHSN were 31%, 96% and 97%, respectively. When comparing with results of rotational chair testing (VOR gain and symmetry), the sensitivity of the test increases to 71%. Patients with positive BedHSN had greater self-perceived dizziness handicap (mean DHI scores 23 ± 18, p=0.049) and worse functional level (mean FL score 3.3 ± 2.7, p=0.0377) than those with negative BedHSN.

BedHSN + BedHSN - Total
Unilateral Caloric Weakness 16 37 53
No Caloric Weakness 0 10 10
Total 16 47 63

The means diamonds illustrate a sample mean and 95% CI. The line across each diamond represents the group mean, and the vertical span of each diamond represents the 95% CI for each group. The vertical and horizontal blue lines represent one standard error and one standard deviation above and below each group mean. Patients with positive BedHSN (1) had significantly higher (worse) scores of the DHI and FL than patients with negative BedHSN (0).

Discussion and Conclusions:
A positive HSN usually represents imbalance of the vestibulo-ocular reflex.1 Its clinical value rests on the fact that it is a simple bedside test which does not require expensive instrumentation and, although debated, its presence is considered a sign of unilateral vestibular hypofunction. Our data shows that the BedHSN is only useful when positive due to the high number of false negatives hence, it is not a good screening test for detecting a unilateral reduced caloric response. However, a positive BedHSN is associated with greater perceived handicap by patients with unilateral vestibular disease. This finding supports previous observations that a positive HSN has been associated with greater risk of falls in elder patients.2 Further work will focus on evaluating the association of BedHSN and vestibular compensation.

References: