



Holding steady — the importance of stable vision

Patients with balance problems often complain about problems with their vision, particularly blurring, jumpy vision or dizziness when moving or in busy environments such as the grocery store or shopping mall. Maintaining both visual clarity *and* balance is necessary to safely perform activities of daily living. This requires a stable gaze and a stable body while moving about, particularly when head movements are required. The complex process of assessing and rehabilitating the function of the **Vestibulo-Ocular Reflex (VOR)** can now be easily, reliably and objectively performed in clinic with NeuroCom's *inVision* package.

The world's first system for quantifying visual acuity & stable gaze

- Unique** *inVision* protocols document the presence of VOR dysfunction
- Practical** Reliable objective data help clinicians develop targeted treatment and monitor patient progress
- Specific** Used by leading researchers in balance & mobility programs worldwide



VOR Assessment

Rigorous stimulus control, reliable DVA testing, and a new GST protocol come together to identify and quantify VOR performance deficits.

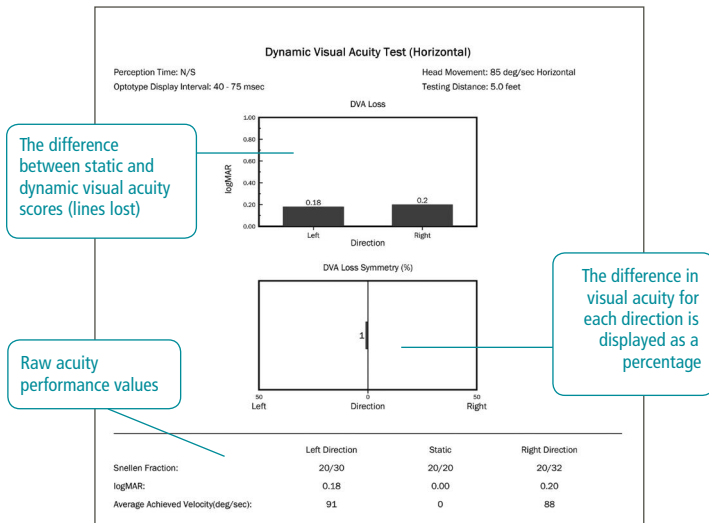
NEW! VOR Rehabilitation Training Exercises

Track direction of head movement and duration of training performance, capture accuracy of visual acuity at the point of retinal slip, and set parameters for target head movement velocity specific to the patient's GST results and customize to adjust at the clinician's discretion.

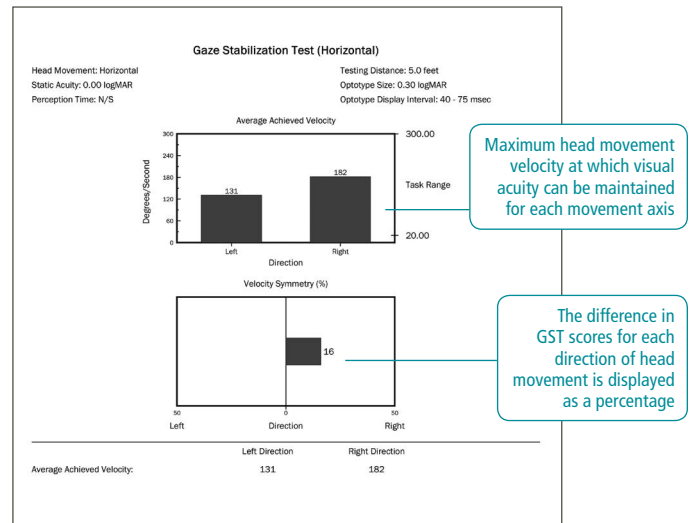
Assessment of VOR Function

Evaluation of the vestibular system is an important part of the examination of balance problems, and it can be the most challenging. The Vestibulo-Ocular Reflex (VOR) is responsible for stabilizing the visual field during high velocity head movements. The challenge is to first isolate VOR performance and then to understand how it is contributing to the balance problem. Identifying problems within the gaze stabilization system and quantifying their effect upon function with the Dynamic Visual Acuity (DVA) and the Gaze Stabilization Test (GST) protocols can provide the key to resolving these interactions.

Dynamic Visual Acuity Test



Gaze Stabilization Test



CLINICAL SIGNIFICANCE

PATIENT 24 year old male — post mild sports concussion without loss of consciousness. Complaining of blurring vision while driving and when attempting to return to play.

IMPAIRMENTS Sensory Organization Test (SOT) revealed mild impairments in postural control and Gaze Stabilization Test (GST) also highlighted a deficit in Dynamic Visual Acuity during higher velocity activities.

Although Dynamic Visual Acuity (DVA) test revealed no significant loss or asymmetry in the VOR component of dynamic vision, the Gaze Stabilization Test (GST) revealed a loss of visual acuity at velocities greater than 105 deg/sec (adequate for basic function, but inadequate for sports performance). Of greater concern was the 24% asymmetry, with better visual acuity in rightward head movements than in left.

PLAN Patient was referred to physical therapy for a VOR exercise program customized to include visual exercises between 105 and 120 deg/sec, stressing leftward head movements and accurate target recognition.

PROGNOSIS Good for safe function assuming medically stable vestibular and central motor systems.

NeuroCom inVision gives you further insight into your patient's balance and vision problems.

Vestibular Rehabilitation Training of the VOR — NOW with Computerized Exercises*

The patient is tested using the *inVision* DVA and GST protocols. The DVA and GST scores are used to determine the starting point for training. During VOR rehabilitation training exercises, the center target changes direction to record visual accuracy while the head moves at the target velocity. In training, the patient must move their head continuously for up to 2 minutes and call out the correct optotype direction. The operator can modify the training parameters by selecting the optotype size, target velocity and direction of head movement.

Objective Vestibular Training

Velocity of head movement and duration of training performance is tracked over time

Track Reponse Accuracy

Target (E optotype, picture or word) is identified by the patient based on their ability to see the target clearly at the target head movement velocity

Customize VOR Training

Training parameters are adjustable per the clinician's discretion



ADDITIONAL FEATURES

Built-in Metronome for VOR exercises to allow the patient to set metronome specifications for continued at-home exercises.

Patient Summary Report can be printed at the completion of the VOR X1 exercise. This report includes instructions for at-home exercises along with a sample size of the actual size optotype.

inVision software is available for the following NeuroCom Balance Manager® Systems:

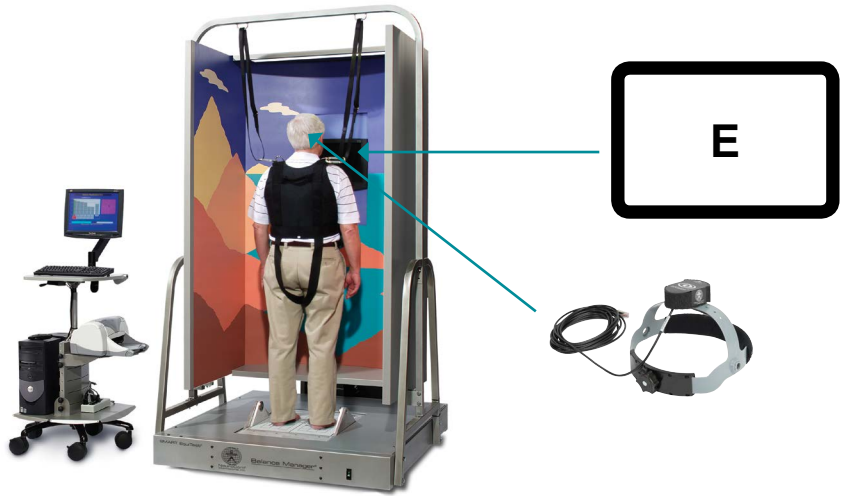
- VSR (Very Simple Rehab)/ VSR Sport
- BASIC Balance Master
- Balance Master
- SMART Balance Master
- EquiTest®
- SMART EquiTest
- EquiTest/SMART EquiTest CRS (Clinical Research System)



*VOR Rehab Training is available on MS Windows® 7 only.

Vestibular Training Exercises with Postural Tasks

Additional clinically significant information can be measured when performing VOR rehabilitation training while maintaining balance on a NeuroCom static or dynamic Force Plate.



On a static balance system, the clinician can incorporate the use of rocker boards or foam on the Force Plate.

On a dynamic balance system, the surround and support can be put into dynamic training responsive, variable, or random mode. To add greater complexity, integrating a "busy" background pattern will trigger patient symptoms.

Additional features to inVision software, integrated with NeuroCom Balance Systems:

Dual Tasking — select the check box to allow the use of the Force Plate to collect balance data during vestibular exercise

Training Report — shows the sway trace based on the assigned task by the clinician; for example, having the patient move to four corners, walking in place, etc.

Patients coming back for follow-up visits receive more information with inVision training instructions

InVision Configuration Options

- NCM-PORINV *inVision* Portable with Laptop
- NCM-INV *inVision* with Desktop PC and ergonomic cart
- NCM-INV-S *inVision* add-on to any NeuroCom Static Balance System
- NCM-INV-D *inVision* add-on to any NeuroCom Dynamic Balance System

All configurations include an *inVision* head tracker (InterSense InertiaCube™, 3-axis, integrating gyro mounted on a headband) with 100 disposable caps, Balance Manager *inVision* Software, MS Windows 7 Operating System and a medical-grade isolation power supply. Minimum hardware footprint required is 36" x 60".



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