

## Objective Balance Assessment & Dynamic Training Protocols

Interactive, functional training exercises using visual biofeedback, coupled with sensitive, real-time monitoring of movement motivates patients to achieve greater balance control faster. Exercise protocols available on the SMART Balance Master can be tailored to meet individual patient needs and can be progressed as the patient's capabilities improve.

### SMART Balance Master

- ✓ Sequence Training
- ✓ Weight Bearing Training
- ✓ Custom Training



Long Force Plate  
(Optional Add-on)



SMART Balance Master  
Dynamic System

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*“The biggest problem for older people is that their balance issues cause them to restrict activities, which leads to more weakness and puts them at greater risk for falls.”*

— Kevi Ames, PT, DPT Physical Therapist

*“We purchased the SMART Balance Master and it has been the talk of Glenaire. Residents are given the opportunity on their birthday month to take a balance assessment. This gives our residents at Glenaire a balance baseline. Residents are excited to have this opportunity; they say it helps them stay independent and active. Some residents have moved to Glenaire because of our programs like The Balance Center.”*

— Wendy Heinzmann, Glenaire Retirement Community • Cary, NC

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Proprioceptive/sensory-motor and visual training can be enhanced as the clinician can independently set the movement of the support surface and/or visual surround:

#### Responsive:

The Force Plate and visual surround move in response to, and as a result of patient movement.

#### Variable:

The Force Plate and visual surround move in response to the patient, but the degree of movement varies each time the patient moves.

#### Random:

The surface and/or visual surround movements are computer driven and are completely unpredictable, so the patient must constantly adjust their balance in response to the changing surface and/or visual environment.

# Technical Specifications

## Components Include:

- NeuroCom® Balance Manager Software Suite
- Dynamic forceplate (rotate)
- Moveable visual surround with LCD display and illumination
- Overhead support bar with patient harness set
- Windows®-based computer
- Color printer
- Wireless mouse
- Ergonomic point-of-care cart

## Accessories Included:

- **B100012-00**  
Harness Kit (Sizes: S/M/L)
- **NCM-FOAM**  
Foam pad: 18 x 18 x 5 in (46 x 46 x 13 cm)
- **P102604-00** Blocks for Prepkit include:  
Rocker board  
Step-up blocks: 4 in (10 cm) and 6 in (15 cm)  
Leveling block: 2 in (5 cm)  
Heel/toe wedges: 6° and 12° A/P  
Inversion/eversion wedges: 3° and 6° M/L

## Options

- **NCM-LFP**  
18" x 60" static forceplate
- **NCM-INV-D**  
inVision software and head tracker  
(PTT, DVA, GST, HS-SOT & VOR Training)
- **NCM-GAMES**  
NeuroGames
- **NCM-DATA-D**  
Data Acquisition Tool Kit (D.A.T.a) for research

## Standard Software Protocols Include:

### Sensory Impairments

Sensory Organization Test (SOT)

### Functional Limitations

Unilateral Stance

### Motor Impairments

Adaption Test (ADT)

Limits of Stability (LOS)

Rhythmic Weight Shift (RWS)

Weight Bearing Squat (WBS)

### Training Protocols

Sequence Training

Weight Bearing Training

Custom Training

## Physical Dimensions

(W x D x H)	in	cm
Assembled dimensions	53 x 61* x 94	135 x 155* x 239
Base	53 x 61 x 6	135 x 155 x 15
System cart	25 x 24 x 44-57**	64 x 61 x 112-145**
Dual Forceplate	18 x 18	46 x 46
Step height	6	15
Visual surround	42 x 36 x 74	107 X 91 X 188
Maximum subject height	80	203
Maximum subject weight	440 lb	200 kg
*Depth extends to 64 in (163 cm) with surround in resting position.		
** Minimum-maximum monitor extension height.		
Minimum footprint required	96 x 75	244 x 191
Minimum ceiling height	95	242
Total system weight	775 lb	352 kg

## Electrical Characteristics

- 100–240 V / 50–60 Hz / 1200 W
- Compliant with the latest medical standards.

## Performance Characteristics

Rotation of the dual force plate and visual surround is controlled by independent direct current servo motors.

- Force plate rotation  $\pm 10^\circ$ , maximum velocity 50°/sec
- Visual surround rotation  $\pm 10^\circ$ , maximum velocity 15°/sec

## Count on objective, evidence-based information from the NeuroCom Family of Balance Manager Solutions

### Concussion Management – Head Injury

Current recommendations from the NCAA® and NATA® indicate that the best practices in concussion management include a balance assessment.

- Baseline balance test with SOT
- Help make better return-to-play decisions
- Greater understanding of balance issues that can be addressed in training

### Vestibular Rehabilitation & NeuroRehabilitation – Dizziness

- Technology from the balance leader
- NeuroCom systems use NASA-based science
- Pose activities specifically based on your patient's problem level for effectiveness

### Fall Prevention – Older Adults

Somewhere today, a person over the age of 65 will likely fall — with serious consequences.

- Identifying fall risk — *before a fall*
- Improve senior outcomes
- Increase strength and confidence
- Document gains or changes objectively
- Put the care team on the same page
- Bottom line: **PREVENT FALLS**

*Specifications subject to change without notice.*

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## 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.

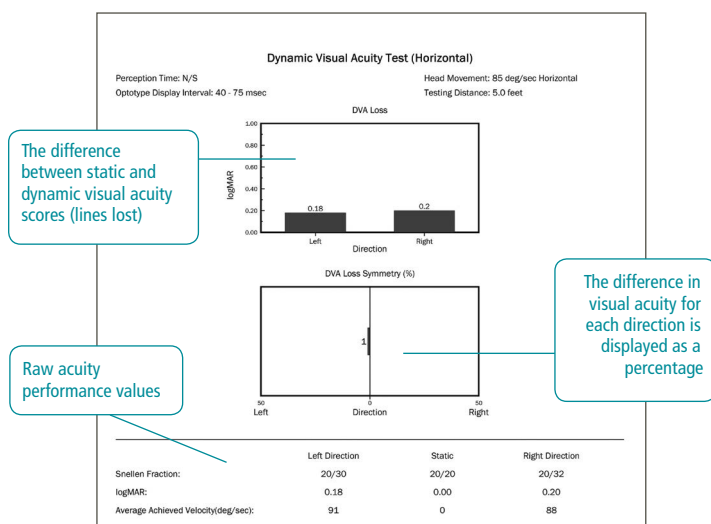
### NEW! VOR Rehabilitation Training Exercises

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.

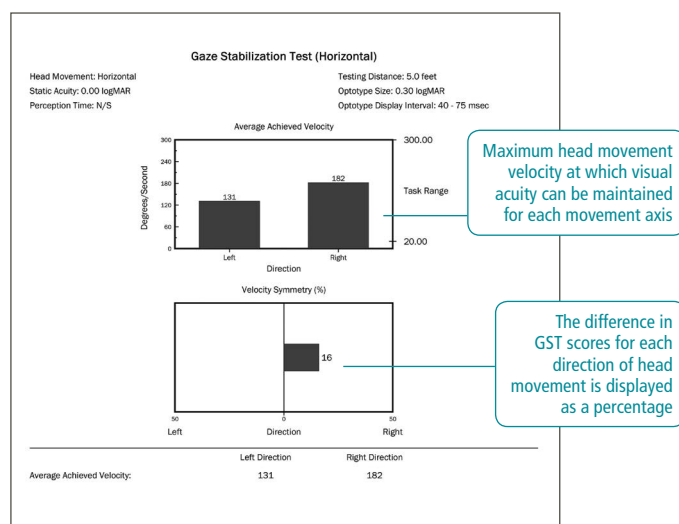
# Assessment of VOR Function

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:

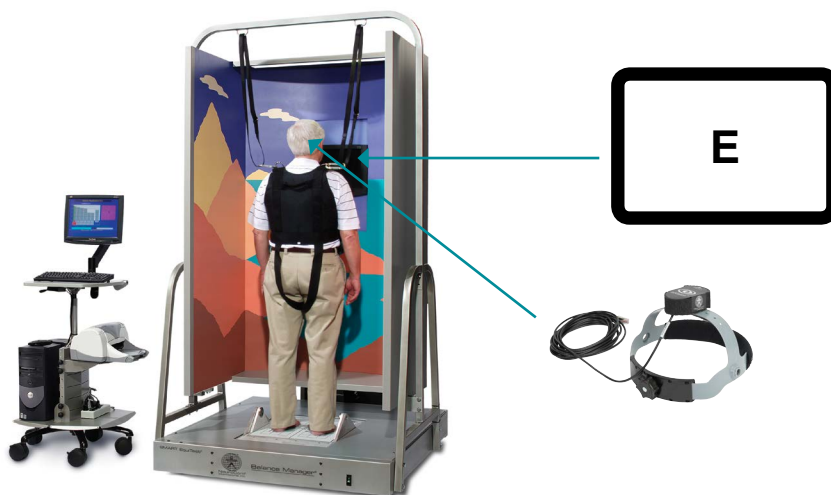
- VSR (Very Simple Rehab)/ VSR Sport
- BASIC Balance Master
- Balance Master
- SMART Balance Master
- EquiTest®
- SMART EquiTest
- EquiTest/SMART EquiTest CRS (Clinical Research System)



\*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	<i>inVision</i> Portable with Laptop
NCM-INV	<i>inVision</i> with Desktop PC and ergonomic cart
NCM-INV-S	<i>inVision</i> add-on to any NeuroCom Static Balance System
NCM-INV-D	<i>inVision</i> 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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Visit our **NERVE Center®** education portal at [nervecenter.natus.com](http://nervecenter.natus.com)

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