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NEUROCOM SOLE SOURCE

NeuroCom® Balance Manager® systems consist of hardware and software that provide objective methods to assess components of a person's balance and mobility. NeuroCom systems are the only systems on the market that offer a comprehensive library of standardized impairment and functional assessment protocols associated with balance and mobility disorders. NeuroCom systems are the only computerized assessment tools on the market that meet the definition of Computerized Dynamic Posturography (CDP) as defined by the American Academy of Otolaryngology – Head & Neck Surgery (AAO-HNSF).

NeuroCom® Balance Manager® systems are covered by multiple patents in the US and other countries. NeuroCom®, Balance Master®, and EquiTest® are registered trademarks of Natus® Medical Incorporated.

Natus Medical Incorporated is the sole designer, manufacturer, and seller of the following systems:

- **VSR™**
- **VSR™ Sport**
- **BASIC Balance Master®**
- **Balance Master®**
- **inVision®**
- **SMART Balance Master®**
- **EquiTest®**
- **SMART EquiTest®**
- **EquiTest® Clinical Research System (CRS)™**
- **SMART EquiTest® Clinical Research System (CRS)™**

STANDARDIZED ASSESSMENT & TREATMENT PROTOCOLS	VSR		BALANCE MASTER			EQUITEST		
	VSR	VSR Sport	BASIC	Balance Master	SMART BM	SMART EQ	EQ	SMART CRS***
Sensory Impairment Assessments								
Sensory Organization Test (SOT)					X	X	X	X
Head Shake-SOT (HS-SOT)					Optional**	Optional**	Optional**	Optional**
modified SOT (mSOT)								
modified Clinical Test of Sensory Interaction on Balance (mCTSIB)	X	X	X	X				
Automatic Motor Assessments								
Adaptation Test (ADT)					X	X	X	X
Motor Control Test (MCT)						X	X	X
Voluntary Motor Assessments								
Limits of Stability (LOS)	X	X	X	X	X	X		X
Rhythmic Weight Shift (RWS)		X	X	X	X	X		X
Weight Bearing Squat (WBS)		X	X	X	X	X	X	X
VOR Impairment Assessments								
Dynamic Visual Acuity (DVA)	Optional*	Optional*	Optional*	Optional*	Optional*	Optional*	Optional*	Optional*
Gaze Stabilization Test (GST)								
Functional Limitation Assessments								
Unilateral Stance (US)		X	X	X	X	X	X	X
Stability Evaluation Test (SET)		X		Optional****	<i>Protocols included with Long Force Plate Option ****SET is optional</i>			
Sit-To-Stand (STS)				X				
Walk Across (WA)				X				
Tandem Walk (TW)				X				
Step/Quick Turn (SQT)				X				
Step Up/Over (SUO)				X				
Forward Lunge (FL)				X				
Training Protocols								
VOR Rehab Training	Optional*	Optional*	Optional*	Optional*	Optional*	Optional*	Optional*	Optional*
Sequence Training		X	X	X	X	X		X
Weight Bearing Training	X	X	X	X	X	X		X
Custom Training	X	X	X	X	X	X		X

*included with inVision Software Package

**included with inVision Software Package for Dynamic Balance System configurations

***SMART EquiTest CRS includes the Research Module in the software

****SET is optional for the Balance Master & Long Force Plate Option

PERFORMANCE SPECIFICATIONS

Sensory Organization Test (SOT) The SOT protocol objectively identifies abnormalities in the patient's use of the three sensory systems that contribute to postural control: somatosensory, visual and vestibular. During the assessment, inaccurate information is delivered to the patient's eyes, feet and joints through sway referencing of the visual surround and/or the support surface.

Head Shake-Sensory Organization Test (HS-SOT) The HS-SOT is a two-condition enhancement to the SOT. During the assessment, inaccurate information is delivered to the patient's feet and joints through sway referencing of the support surface while the patient performs rhythmic head movements about a specified head axis. Separate protocols allow isolation of problems to yaw, pitch, and roll movement axes.

modified Sensory Organization Test (mSOT) The mSOT is a four-condition derivative of the SOT. The mSOT excludes conditions 3 and 6 (which require the visual surround) and as such does not provide information about visual-vestibular conflict resolution.

modified Clinical Test of Sensory Interaction on Balance (mCTSIB) The mCTSIB is a simplified derivative of the SOT that provides objective evidence of sensory dysfunction, but not specific information related to the individual senses. Postural sway velocity is quantified under four sensory conditions: eyes open firm surface; eyes closed firm surface; eyes open unstable surface; and eyes closed unstable surface.

Stability Evaluation Test (SET) The SET assesses functional balance control based on the patient's postural sway velocity during six testing conditions over a period of 2-5 minutes. Results are presented in graphical form, with COG traces shown for each condition tested, and a composite score that quantifies the COG sway or postural stability in a weighted average of all six conditions.

Adaptation Test (ADT) The ADT assesses the patient's ability to minimize sway when exposed to irregularities and unexpected changes in support surface properties. Sequences of platform rotations in the toes-up or toes-down direction elicit automatic motor responses.

Motor Control Test (MCT) The MCT assesses the ability of the automatic motor system to quickly recover following an unexpected external disturbance. Sequences of platform translations of varied sizes in forward and backward directions elicit automatic postural responses. The size of the translation is scaled to the patient's height to produce sway disturbances of equal size.

Limits of Stability (LOS) The LOS quantifies the maximum distance the patient can intentionally displace their COG in the four cardinal directions and the four diagonal directions, and maintain stability at those positions. Measured parameters are reaction time, COG movement velocity, directional control, end point excursion, and maximum excursion.

Rhythmic Weight Shift (RWS) The RWS quantifies the patient's ability to rhythmically move their COG from left to right and forward to backward between two targets at three distinct speeds. The measured parameters are the on-axis COG velocity and directional control.

Weight Bearing Squat (WBS) During the WBS, the patient is instructed to maintain equal weight on each leg while standing erect and then squatting in three positions of knee flexion. The percentage of body weight borne by each leg is measured with the patient standing at 0° (erect), 30°, 60°, and 90° of knee flexion.

Dynamic Visual Acuity (DVA) Test The DVA test measures changes in visual acuity at head velocities associated with the Vestibulo-Ocular Reflex (VOR).

Gaze Stabilization Test (GST) The GST measures the maximum head velocity the patient can achieve while maintaining accurate vision.

Unilateral Stance (US) The US quantifies postural sway velocity with the patient standing on either the right or left foot with eyes open and with eyes closed.

Sit-To-Stand (STS) The STS quantifies the patient's ability to rise from a seated to a standing position. Key components of this task include shifting the body COG forward from an initial position over the seat to a location centered over the base of support, followed by extension of the body to an erect stand while maintaining the centered COG position. The measured parameters are weight transfer time, rising index (force exerted to rise), sway velocity during the rising phase, and left/right symmetry of the rising force.

Walk Across (WA) The WA quantifies characteristics of gait as the patient walks across the length of the forceplate. The test characterizes steady state gait by having the patient begin well behind and continuing beyond the forceplate. Measured parameters are average step width, average step length, speed and step length symmetry.

Tandem Walk (TW) The TW quantifies characteristics of gait as the patient walks heel to toe from one end of the forceplate to the other. Measured parameters are step width, speed, and endpoint sway velocity.

Step-Quick-Turn (SQT) The SQT quantifies turn performance characteristics as the patient takes two forward steps, quickly turns 180° and returns to the starting point. Measured parameters are the time to execute the turn and the sway velocity during the turn execution.

Step-Up-and-Over (SUO) The SUO quantifies motor control characteristics as the patient steps up onto a curb with one foot, lifting the body through an erect standing position over the curb, swings the other foot over the curb, and then lowers the body to land the swing leg on the force plate. Measured parameters are rising index (force to rise), movement time, and impact index (control of impact force descending onto the swing leg).

Forward Lunge (FL) The FL quantifies movement characteristics as the patient lunges or steps forward onto one leg, then pushes back with that leg to return to a standing position. Measured parameters are distance, time, impact index (impact force) and force impulse.

DOCUMENTATION

Comprehensive Report

NeuroCom systems provide the essential elements for objective documentation of each patient's initial and interim performance over time, as well as automatic comparison of patients' data to age-matched normative data. An analysis screen and printed reports provide graphic and numeric documentation of movement time, lifting force, landing impact, movement distance, directional control, and sway velocity during functional assessments.

Evaluation Note

The Evaluation Note provides a printout summarizing the balance performance attributes that were in the abnormal range during the assessment (as compared to the reference population or normative data).

Daily Training Report

The Daily Training Report provides a daily record of the training exercises performed, including the following elements: treatment time, exercise and training parameters, exercise compliance, and clinician-entered notes.

Progress Report

The Progress Report is a graphic summary of the patient's performance over successive testing dates. This report documents improvement over time and provides supportive data for payment or continuation of rehabilitative services.

GOVERNMENT

DICOM Compatibility

NeuroCom Balance Manager systems are on the VistA Imaging Approved DICOM Modality Interface list and meet the DICOM standard for capturing, moving, and storing medical records. The DICOM interface enables the graphic reports generated on a Balance Manager system to be securely transmitted to any VA VistA Imaging workstation.