

## I-Portal® Test Battery:

### Dynamic Unilateral Centrifugation (DUC) and Combined DUC/SVV

#### **Test Description:**

The Dynamic Unilateral Centrifugation (DUC) test is an off-axis rotation test (sometimes referred to as eccentric rotation) performed in the I-Portal® NOTC chair in an isolated testing enclosure. The patient is brought up to a constant speed while rotating on center (300-400 degrees per second) until the canal stimulus has decayed (approx. 30 seconds). The NOTC then translates the patient off axis to a position of centrifugal rotation where the center of rotation is first about the left otolith and next about the right. The horizontal force (approximately 0.5G) on the centrifugal otolith versus the one G vertical force to the on-center otolith enables differential otolith assessment.

In addition to the standard test, there is an option to combine the DUC with Subjective Visual Vertical (SVV) testing. During rotation the patient is presented with an offset line that is projected by the Pursuit Tracker™ laser target generator mounted on top of the I-Portal® NOTC patient chair. Using the pushbuttons on the chair hand grips, the patient is tasked with orienting the line to their perceived vertical.

#### **Clinical Outcome:**

- Only known test for lateral utricle assessment that delineates utricle function from both saccule and semicircular canal function.
- Provides data on the otolith-ocular response by measuring the ocular induced counter rolling from the Gravity Inertial Acceleration (GIA) stimulus in each direction.
- When combined with the SVV option the test provides data on the processing of otolith information in the higher brain centers (thalamus, vestibular cortex).

#### **NKI test battery advantage:**

- Increases efficiency by eliminating the need to stop and start the test for mechanical adjustments of the chair (ie unseating the patient and manually moving the chair to different positions).
- Increases patient comfort by accelerating patient to constant velocity to “zero out” horizontal canal VOR prior to centrifugal rotation.
- The combined DUC/SVV test provides additional performance data on utricle function, observing a patient’s change in perceived vertical during off-axis stimulation. During the test the patient experiences a tilt as the patient’s eyes roll to offset the Gravitational Inertial Affect (GIA). Subsequently, they will set the angle of the SVV line to match this roll.
- Comprehensive analysis that allows each utricle to be evaluated separately and includes torsion eye data.

#### **Reimbursement:**

- No current Medicare reimbursement

#### **Relevant Research Articles/Books:**

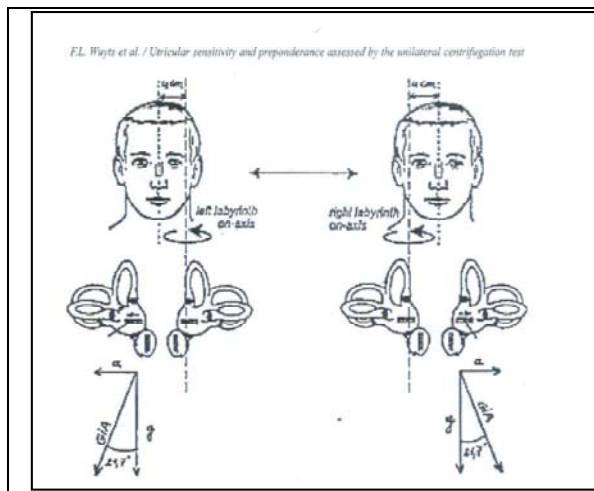
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- Clark, A., Shonfeld, U. and Helling, K., Unilateral Examination of Utricle and Saccule Function, 2003, Journal of Vestibular Research, 13: 215-225.

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- Clarke, A., Schonfeld, U., Hamann, C., and Scherer, H., Measuring Unilateral Otolith Function Via the Otolith-ocular Response and the Subjective Visual Vertical, 2001, Acta Otolaryngol, Suppl 545: 84-87.
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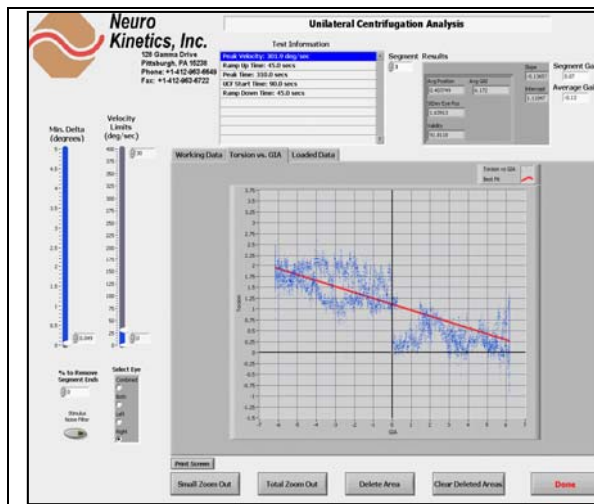
**Additional Notes:**

- Neuro Kinetics offers custom software modules for clinical research which allow the user to fully customize the timing, order, and distance of the DUC profile. This option will also allow you to perform multiple SVV tests at each position. Contact NKI for quotation.

**Screen Captures / Illustrations:**



- When the chair moves off-axis to the right the Right Utricle is stimulated by Gravity Inertial Acceleration (GIA) forces.
  - The left utricle is centered on the rotation axis
- When the chair moves off-axis to the left the Left Utricle is stimulated by GIA Forces.
  - The right utricle is centered on the rotation axis



- VEST™ Torsional Analysis shown for patient with right Utriclar weakness.
- Torsional eye responses plot in 1st and 2nd quadrants.
  - Normal (healthy) response on the left side (intact counter rolling).
  - Abnormal (no response) on the right side.