

# VESTIBULAR UPDATE

The new millennium is fast approaching so we decided to create a special issue of Vestibular Update to allow you to view all of the exciting things going on at Micromedical.

It was not that many years ago when electrode recording through computer based software was the pinnacle of vestibular diagnostics. Now the state of the art technology is our infrared video, advanced software and new testing paradigms. Never before have you been able to obtain such clear and concise information about the state of your patient's ocular motor and vestibular systems.

We invite you to look to the future and visualize the new millennium with us!

## ***Recent Advances In Rotational Chair Testing***



Balance centers are no longer relying on ENG alone to assess their dizzy patients. Rotational vestibular chair tests are providing fast and conclusive clinical answers to the clinician's questions about the integrity of the vestibular system. Some laboratories have even eliminated caloric testing in favor of rotational chair testing as a more consistent and better tolerated procedure. Follow-up testing after vestibular rehabilitation yields pre and post therapy comparisons.

The ease of clinical rotational testing has been greatly improved with VisualEyes infrared video eye tracking. As part of the head holding apparatus, patients don a lightweight see-through camera system that video records eye movements by tracking the pupil. The patient has a full field of vision in light or complete darkness and the eyes can still easily be seen with IR illumination. Recordings of nystagmus produced by rotation have less noise and drift and are therefore easier for the computer software to analyze and interpret.

Faster testing is accomplished by enhanced Micromedical software running on more powerful PC computers. This means that less time is spent testing and results are available within moments. Graphical reports allow you to quickly differentiate normal from abnormal. If your laboratory is networked, raw data analysis and interpretation is possible from your office or a remote dial-in location.

Enhancing your rotational chair with our centrifuge option to test otolith function is no longer an expensive proposition. For under \$10k you can add an 18 inch centrifuge to your new System 2000 rotational chair. By loosening four bolts and sliding the chair seat to a new location, patients can be tested in three centrifuge positions (face right, face left, and face out). Step velocity testing is used with centrifuge rotation. Approximately 1g of acceleration outward stimulates the otolith organs. The patient senses rotation similar to turning a corner in an automobile. Of course, the centrifuge arm allows the chair to be located in the standard rotational test position.

You can add additional torque with a 150 ft-lb direct drive motor. Higher torque allows greater accelerations in our step velocity tests, accelerations that may help to identify vestibular asymmetries.

To make rotational chairs more economical, Micromedical now offers a System 2000 rotational chair with VisualEyes IR video goggles to provide the dark environment and to record eye movement. This combination does not require a darkened booth for the chair, significantly reducing expense and the amount of floor space required. This chair option can also be combined with our VisualEyes ENG using the same goggles and PC. Patients are seated in the rotational chair for gaze, ocular motor and rotational testing, then moved to the examination table for positional and Dix-Hallpike maneuvers and if need be, caloric tests. Rotational chair tests are Medicare reimbursable and are typically billed for each frequency tested, similar to a caloric. CPT code 92546 is the billing code.

Rotational chair testing has become a standard for small and large balance clinics alike. Valuable clinical information can be obtained from this well tolerated, easy to administer and quick to interpret test. Only with Micromedical can you acquire infrared video on a rotational chair in such a variety of configurations and where all the equipment is provided by the same manufacturer.

## **VORTEQ® / DVA-Test™**

VORTEQ® active head rotation is a method of testing the vestibular ocular reflex (VOR) with head velocities normally experienced in everyday life. Testing is accomplished with a relatively inexpensive instrument in a short time. Eye movements are recorded and compared to head movements as the patient shakes their head while looking straight trying to keep a target in focus. VOR gain, phase and symmetry are calculated and plotted along with norms for quick interpretation. While excellent diagnostic information is gained, VORTEQ® is also a valuable tool for serial testing and vestibular rehabilitation follow-up.

Recently we have added the capability of using VisualEyes video goggles for recording eye position. The benefits of video are the same as ENG, low noise and a stable baseline. Plus of course the ease of use. When VisualEyes ENG testing is being performed, just snap the rate sensor on the goggles to enable you to perform the VORTEQ® tests. These are typically performed after the ocular motor tests before the patient is moved to the ENG exam table. Active head rotation testing using IR video in a completely integrated system is available only from Micromedical.

Perhaps just as significant and just as exciting is the introduction of our Dynamic Visual Acuity (DVA -Test) software for VORTEQ®. The concept behind this test is that each patient has a static visual acuity and a dynamic visual acuity. When you move your head, the VOR should keep the visualized world stable on the retina. If it does not, then the image becomes blurry and the patient complains of vertigo. Quantification of this clinical problem has been achieved with the Dynamic Visual Acuity Test. For the DVA-Test the patient sits in front of a computer screen and wears a headband with the VORTEQ® rate sensor attached. By presenting Snellen chart characters of various sizes on the computer screen, static visual acuity is measured as a base line. Eyeglasses can be worn for this test as well.

The dynamic visual acuity protocol is entered with the computer screen blank. The patient, under direction, must move their head at a velocity faster than 120 degrees per second. As head velocity exceeds this threshold, the characters are displayed on the screen and read by the subject. If the subject's VOR is normal, they will be able to read the characters to the examiner. If the characters are not readable during head movement, the examiner simply makes them larger with a keystroke and continues to test the patient. Testing can be direction sensitive to differentiate right versus left sided lesions. Additional data points can be obtained by increasing the velocity threshold and challenging the patient to read characters at higher head velocities.

DVA-Test is currently being used to evaluate professional athletes, pilots, patients with mild head injury, as well as patients with vestibular pathologies. Published results indicate that this test can differentiate between normal and those with vestibular deficits (Herdman S, American Journal of Otology 1998), (Clark J, Vestibular Update 1998).