



Balance System Assessment

This standard describes procedures to assess and monitor the status of the peripheral or central vestibular system and the sensory or motor component of balance. These tests would normally be carried out in collaboration with, or on referral from, other clinical specialists such as Otolaryngologists or Neurologists.

Expected Outcomes

Balance system assessment is conducted to:

- Detect pathology within the vestibular or balance system
- Determine probable site of lesion
- Monitor change in balance function and also to
- Determine the contribution of the visual, vestibular and proprioceptive systems to functional balance

Assessment may result in recommendations for rehabilitation.

Clinical Indications

Individuals of all ages are assessed when they present with balance dysfunction and/or abnormalities of gait.

Assessment may also be applied as a general assessment of cranial nerve function or for monitoring of clients having vestibulotoxic treatment

Balance system assessment is prompted by referral or by results of an Audiological assessment.

Clinical Process

Prior to undertaking specific balance system assessments a comprehensive history and a full audiological assessment should be carried out. This should include auditory evoked potentials where appropriate.

Recording of eye movement may be accomplished by:

- Videonystagmography - Infrared video goggles placed on the clients head and eye movement recorded by tracking pupil movement .
- Electronystagmography - Electrodes placed strategically around the eyes and the corneo-retinal potential is recorded.



Balance System Assessment

These methods document nystagmus and other eye movements (Electrooculography) in response to the presence or absence of stimulation of the vestibular end organs and their central connections.

Caloric stimulation may be performed using bithermal air or water irrigations.

Electronystagmography sub-tests primarily focus on the horizontal semicircular canals, the superior branch of the vestibular nerves, and the vestibular and ocular motor pathways in the brainstem and cerebellum. These may include:

- Gaze test
- Saccade test
- Occular pursuit test
- Optokinetic test
- Positional tests
- Dynamic positioning (Dix-Hallpike) test
- Bithermal caloric tests (and failure of fixation suppression (FFS) test).
- Torsion swing test
- Posturography

A computerised rotary chair is used to measure phase, gain, and symmetry of the VOR and computerised dynamic posturography (CDP) employing computer-induced platform movements may be used with the above conditions.

Vestibular Evoked Myogenic Potentials (VEMP) may be used to assist in a differential diagnosis.

Setting/Equipment Specifications

Mains power instruments for recording the corneo-retinal potential (e.g. electronystagmographs), infrared video goggles and those for providing the caloric stimulation (either water or air irrigators) should conform to the electrical safety requirements of the organisation carrying out the procedures.

As with all potentials measured from the body, the environment should be satisfactorily free of electrical interference so as not to adversely affect the measurement of the responses.

Calibration of eye movements prior to the assessment should follow a standardized protocol and calibration should be repeated as appropriate during the procedures. Appropriate equipment to perform the sub-tests required should be available, e.g. a tracking/pursuit



Balance System Assessment

device, fixed points subtending required angles of eye movement, couch or chair with adjustable back.

Safety and Health Precautions

An otoscopic inspection and/or tympanogram are done prior to any caloric irrigation of the ear. A medical opinion should be sought prior to testing where ear pathology is suspected.

AC powered instruments used for this testing should be checked regularly as in the event of malfunction the client is directly attached to electrical equipment and water is employed during the procedures.

Recording electrodes should be single use/disposable or conform to acceptable sterile conditions. Caloric delivery probes should be sterile. If using water irrigation, the tanks should be cleaned and refilled daily.

Given the cardiac stimulation afforded by caloric irrigation, the professional performing the procedures must know facility specific emergency procedures.

Documentation

A standard reporting form should be used for all assessments. This form should include space for equipment details, electrode types, calibration values in addition to the vestibular assessment. It is essential that the reporting form be completed at the time of the procedures.

Clinical events including client/patient comments should be recorded at the appropriate place in the assessment records.

Documentation contains identifying information, pertinent background information, contra-indications to caloric assessment, vestibular assessment results, interpretation and specific recommendations. Recommendations may address the need for further assessment, follow-up, referral, or vestibular rehabilitation therapy.

A report detailing the results and interpretations with suggested recommendations should be sent to the referee and other relevant persons.



Balance System Assessment

Related References

Jacobson, G, Newman, C. & Kartush, J (1997) *Handbook of Balance Function Testing*, San Diego, CA: Singular Publishing.

Shepard, N.T. & Telian, S.A. (1996). *Practical Management of the Balanced Disordered Patient*. San Diego, CA: Singular Publishing.

AS/NZS 3200.1.0:1998, *Approval and test specification – Medical Electrical equipment – General requirements for safety – Parent Standard*

AS/NZS 2500:2004, *Guide to the safe use of electricity in patient care*

Teter, D.L. (1983). The Electronystagmography. Test Battery and Interpretation. *Seminars in Hearing*, 4(1), 11-22