Medical Policy

BlueCross BlueShield of Kansas
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Title: Dynamic Posturography

Professional
Original Effective Date: January 1, 1997
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DESCRIPTION

Dynamic posturography tests a patient's balance control in situations intended to isolate factors that affect balance in everyday experiences. It provides quantitative information regarding balance.

Dynamic posturography attempts to provide quantitative information regarding a patient's functional ability to maintain balance. The patient, wearing a harness to prevent falls, stands on an enclosed platform surrounded by a visual field. By altering the angle of the platform or shifting the visual field, the test assesses movement coordination and the sensory organization of visual, somatosensory, and vestibular information relevant to postural control. The patient undergoes 6 different testing situations designed to evaluate the vestibular, visual, and proprioceptive/somatosensory components of balance. In general terms, the test measures an individual's balance (as measured by a force platform to calculate the movement of the patient's center of mass) while visual and somatosensory cues are altered. These tests vary by whether the eyes are open or closed, the platform is fixed or sway-referenced, and whether the visual surround is fixed or sway-referenced. Sway-referencing involves making instantaneous computer-

aided alterations in the platform or visual surround to coincide with changes in body position produced by sway. The purpose of sway-referencing is to cancel out accurate feedback from somatosensory or visual systems that are normally involved in maintaining balance. In the first 3 components of the test, the support surface is stable, and visual cues are either present, absent, or sway-referenced. In tests 4 to 6, the support surface is sway-referenced to the individual, and visual cues are either present, absent, or sway-referenced. In tests 5 and 6, the only accurate sensory cues that are available for balance are vestibular cues. Results of computerized dynamic posturography have been used to determine what type of information (i.e., visual, vestibular, proprioceptive) can and cannot be used to maintain balance. Dynamic posturography cannot be used to localize the site of a lesion.

Complaints of imbalance are common in older individuals and contribute to the risk of falling in the elderly population. Falls are the most common cause of death and disability in this population in the United States. Maintenance of balance is a complex physiologic process, requiring interaction of the vestibular, visual, proprioceptive/somatosensory system, and central reflex mechanisms and is influenced by the general health of the patient (i.e., muscle tone, strength, and range of motion [ROM]). Therefore, identifying and treating the underlying balance disorder may be difficult. Commonly used balance function tests such as electronystagmography (ENG) and rotational chair tests attempt to measure the extent and site of a vestibular lesion but do not attempt to assess the functional ability of the patient to maintain balance. Posturography tests a patient's balance control in situations intended to isolate factors that affect balance in everyday experiences. Balance can be rapidly assessed qualitatively by asking the patient to maintain a steady stance on a flat or compressible surface (i.e., foam pads) with the eyes open or closed. By closing the eyes, the visual input into balance is eliminated. The use of foam pads eliminates the sensory and proprioceptive cues. Therefore, only vestibular input is available when standing on a foam pad with eyes closed.

Regulatory Status

The NeuroCom EquiTest® is a dynamic posturography device that received 510(k) marketing clearance from the U.S. Food and Drug Administration (FDA). Other dynamic posturography device makers include Micromedical Technology, Metitur, and Vestibular Technologies.

POLICY

Dynamic posturography is considered **experimental / investigational.**

RATIONALE

Assessment of a diagnostic technology such as dynamic posturography typically focuses on 3 parameters: 1) technical performance; 2) diagnostic performance (i.e. sensitivity and specificity) in appropriate populations of patients; and 3) demonstration that the diagnostic information can be used to improve patient outcomes (clinical utility).

Technical performance of a device is typically assessed with 2 types of studies, those that compare test measurements with a gold standard and those that compare results taken with the same device on different occasions (test-retest).

Diagnostic performance is evaluated by the ability of a test to accurately diagnose a clinical condition in comparison with the gold standard. The sensitivity of a test is the ability to detect a disease when the condition is present (true-positive), while specificity indicates the ability to detect patients who are suspected of disease but who do not have the condition (true-negative). Evaluation of diagnostic performance, therefore, requires independent assessment by the 2 methods in a population of patients suspected of disease but who do not all have the disease.

Evidence related to improvement of clinical outcomes with use of this testing assesses the data linking use of a test to changes in health outcomes (clinical utility). In some cases, tests can be evaluated adequately using technical and diagnostic performance; however, when a test identifies a new or different group of patients with a disease, randomized trials are needed to demonstrate impact of the test on the net health outcome.

What is the evidence on the technical performance of dynamic posturography?

As recently as 2011, the published literature on the technical performance of dynamic posturography addressed the optimal way to conduct or analyze test findings. (2-5) For example, Pang and colleagues in Hong Kong evaluated a modified version of the Sensory Organization Test (SOT) that included a head movement component designed to improve the ability of dynamic posturography in assessing balance. (3) In addition, a 2010 study by Visser and colleagues compared results of the commonly used pooled mean response to a series of trials, to an analysis using only findings of the first unpracticed trial. (4)

Several studies identified in updated literature searches have examined the technical and diagnostic performance of the test but did not identify a reliable and valid reference standard. For example, Baloh and colleagues studied balance control in a group of elderly patients who complained of balance disorders and a group of age-matched controls; the subjects were tested in a variety of situations (i.e., eyes open and closed, while standing on a foam pad to disrupt sensory cues, tilting of the platform, etc.). (6) The authors concluded that posturography data provided little information about the cause of imbalance and did not correlate with the frequency of reported falls.

Other authors have pointed out that the way in which results of computerized dynamic posturography may correlate to functional activities, such as gait, is uncertain. (7) For example, measurements of gait, frequently gait velocity, are often used in the elderly population to assess balance and mobility. A variety of patient questionnaires have been designed to measure self-perceived dizziness or balance. The correlation between the results of these clinical tests, questionnaires, and computerized dynamic posturography is uncertain. (8)

What is the evidence on the accuracy of dynamic posturography for identifying balance disorders?

Literature review updates failed to identify any studies that evaluated the sensitivity and specificity of dynamic posturography for diagnosing any specific balance disorder compared to commonly accepted balance tests. There is no “gold standard” test for measuring balance, which is a physiologic parameter. In the absence of a gold standard comparison, the literature search sought to identify studies that systematically compared results of dynamic posturography and other balance tests in an appropriate patient population, i.e., individuals who are at increased risk of falling due to balance issues.

One study that used both dynamic posturography and another test for assessing balance was published in 2011 by Ebersbach and Gunkel in Germany. (9) The study aimed to compare clinical tests (i.e., the pull test) with dynamic posturography. A total of 58 successive patients with Parkinson’s disease and 29 healthy age-matched controls were included in the study. Before undergoing dynamic posturography testing, balance was assessed using the pull test (i.e., rater delivered a sudden pull to both shoulders from behind). These test results were used to stratify the Parkinson patients into sub-groups (normal vs. impaired pull tests) for comparison with the healthy controls. Posturography was performed using a

stabilometer similar to a seesaw. Dynamic performance was assessed by measuring the linear displacement of the base of the platform on the ground over 60 seconds. Patients with normal pull-test results (n=30) had significantly lower sway values with dynamic posturography than controls (p=0.001). There were no significant differences, however, between patients with impaired pull-test results (n=28) and controls in sway values with dynamic posturography (p=0.43). The authors concluded that dynamic posturography was not useful for identifying patients with impaired pull-tests and "it thus remains doubtful whether sway in this type of dynamic posturography is a valid indicator of clinical disequilibrium."

Other published literature on dynamic posturography includes several studies using posturography in the assessment of fall risk. (10-13) For example, Whitney and colleagues conducted a retrospective review of 100 charts of individuals referred to a balance and falls clinic with a vestibular diagnosis who had undergone dynamic posturography. (13) Patients who reported multiple falls over 6 months had lower initial scores on the SOT than those who reported 1 or no falls.

Studies identified in 2012 and 2013 used dynamic posturography as a research tool to study balance e.g., in older individuals, Parkinson's patients and knee osteoarthritis patients; these studies were not designed to evaluate the technical performance or accuracy of dynamic posturography. (14-18)

What is the evidence that use of dynamic posturography improves health outcomes compared to patient assessment without dynamic posturography?

No randomized or non-randomized controlled studies were identified that compared health outcomes in patients when treatment decisions were made with and without the results of dynamic posturography. One randomized controlled trial was identified, but this study used used dynamic posturography as an outcome measure, rather than as a tool for making treatment decisions; thus conclusions cannot be drawn from this study on the impact of posturography on patient management. (19)

Several retrospective studies were published that describe a customized exercise program based on results of a complete medical and neuro-otologic history and physical examination that included platform posturography. (20, 21) However, the contribution of dynamic posturography to the overall assessment and customization of the exercise program is unclear. In particular, the reports do not describe how (or whether) the exercise programs were modified based on specific deficits identified by platform posturography. Customized vestibular rehabilitation programs can be devised with a standard battery of tests. (22) These retrospective reports are also limited by selection bias and lack of follow-up. Moreover, while these studies show that individualized therapy can improve patient outcomes, no controlled trials have assessed whether individually customized therapy programs are more effective than generic vestibular exercises.

In addition, other related studies have included the use of posturography in the assessment of patients after a clinical intervention These include studies assessing results from interventions in Parkinson's disease patients. (23, 24) and assessing patients with idiopathic normal pressure hydrocephalus before and after shunt surgery. (25) For example, a 2009 study by Nocera and colleagues used posturography to evaluate the effectiveness of a home-based exercise program on postural control for 10 patients with Parkinson's disease. (24) The patients and 10 healthy age-matched controls were assessed with dynamic posturography before and after the 10-week intervention. Dynamic posturography was not used to select patients for the intervention or to individualize the intervention.

Summary
Dynamic posturography is a method of measuring balance under controlled laboratory conditions. It can provide information on the degree of imbalance present in an individual but is not intended to diagnosis specific types of balance disorders. The evidence on dynamic posturography consists of studies on technical performance, comparisons of results in patients with balance disorders and healthy controls, and retrospective case series reporting outcomes of patients assessed with dynamic posturography as part of clinical care.

There is a lack of reference standards for dynamic posturography, which makes it difficult to determine how the results can be applied in clinical care. There is a lack of evidence on the performance characteristics of this test for clinically important conditions, such as identifying patients who are at risk of falls. There are no studies that demonstrate the clinical utility of the test, by leading to changes in management that improves health outcomes. As a result of these deficiencies in the evidence base, dynamic posturography is considered investigational for all indications.

Practice Guidelines and Position Statements
The American Academy of Otolaryngology-Head and Neck Surgery Inc. and Foundation has issued two guidelines that mention dynamic posturography:

- In 2007, a guideline on the evaluation of individuals with suspected balance or dizziness disorders listed dynamic posturography as one of 4 medically indicated tests or treatments. (26)
- In 2008, a guideline on the management of benign paroxysmal positional vertigo listed computerized posturography as one of 18 potential tools to consider for diagnosing this condition. (27)

CODING

The following codes for treatment and procedures applicable to this policy are included below for informational purposes. Inclusion or exclusion of a procedure, diagnosis or device code(s) does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

CPT/HCPCS
92548 Computerized dynamic posturography

DIAGNOSES
Experimental / Investigational on all diagnoses related to this medical policy.

REVISIONS

01-30-2014	Policy added to the bcbsks.com web site.

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