
Medical Policy



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***Current Policy Effective Date: 7/1/23**
(See policy history boxes for previous effective dates)

Title: Dynamic Posturography

Description/Background

BALANCE DISORDERS

Complaints of imbalance are common in older adults and contribute to the risk of falling in this population. Falls are an important 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, and proprioceptive/somatosensory system, and central reflex mechanisms. Balance is also influenced by the general health of the patient (ie, muscle tone, strength, range of motion). Therefore, identifying and treating the underlying balance disorder can be difficult. Commonly used balance function tests (eg, electronystagmography, rotational chair tests) attempt to measure the extent and site of a vestibular lesion but do not attempt to assess the functional ability to maintain balance.

Role in Diagnosis

Dynamic posturography aims to provide quantitative information on 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 available for balance are vestibular cues. Results of computerized dynamic posturography have been used to determine what type of information (ie, visual, vestibular, proprioceptive) can and cannot be used to maintain balance. Dynamic posturography cannot be used to localize the site of a lesion.

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 (ie, foam pads) with the eyes open or closed. By closing the eyes, the visual input into balance is eliminated. 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:

In 1985, the NeuroCom EquiTest® (NeuroCom International, Portland, OR; now Clackamas, OR), a dynamic posturography device, was cleared for marketing by the U.S. Food and Drug Administration (FDA) through the 510(k) process. Other dynamic posturography device makers include Vestibular Technologies (Cheyenne, WY) and Medicateurs (Balma, France). Companies that previously manufactured dynamic posturography devices include Metitur (Jyvaskyla, Finland) and Micromedical Technology (Chatham, IL). FDA product code: LXV.

Medical Policy Statement

Dynamic posturography is considered experimental/investigational. The evidence is insufficient to determine whether dynamic posturography improves health outcomes in individuals with balance disorders.

Inclusionary and Exclusionary Guidelines

N/A

CPT/HCPCS Level II Codes *(Note: The inclusion of a code in this list is not a guarantee of coverage. Please refer to the medical policy statement to determine the status of a given procedure.)*

Established codes:

N/A

Other codes (investigational, not medically necessary, etc.):

92548

92549

Note: Individual policy criteria determine the coverage status of the CPT/HCPCS code(s) on this policy. Codes listed in this policy may have different coverage positions (such as established or experimental/investigational) in other medical policies.

Rationale

Evidence reviews assess whether a medical test is clinically useful. A useful test provides information to make a clinical management decision that improves the net health outcome. That is, the balance of benefits and harms is better when the test is used to manage the condition than when another test or no test is used to manage the condition.

The first step in assessing a medical test is to formulate the clinical context and purpose of the test. The test must be technically reliable, clinically valid, and clinically useful for that purpose. Evidence reviews assess the evidence on whether a test is clinically valid and clinically useful. Technical reliability is outside the scope of these reviews, and credible information on technical reliability is available from other sources.

Promotion of greater diversity and inclusion in clinical research of historically marginalized groups (e.g., People of Color [African-American, Asian, Black, Latino and Native American]; LGBTQIA (Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, Asexual); Women; and People with Disabilities [Physical and Invisible]) allows policy populations to be more reflective of and findings more applicable to our diverse members. While we also strive to use inclusive language related to these groups in our policies, use of gender-specific nouns (e.g., women, men, sisters, etc.) will continue when reflective of language used in publications describing study populations

This review was informed by a 1996 Blue Cross Blue Shield Association TEC Assessment, which concluded that the evidence was insufficient to determine whether dynamic posturography distinguished between peripheral and central vestibular dysfunction.¹

DYNAMIC POSTUROGRAPHY

Clinical Context and Test Purpose

The purpose of dynamic posturography in patients who have balance dysfunction is to inform a decision whether to pursue additional diagnostic workup (eg, imaging studies that would not have been indicated based on clinical presentation alone) or immediate treatment.

Populations

The relevant population of interest is patients presenting with balance dysfunction or dizziness. It would be expected that these patients will have had an initial basic evaluation directed by symptoms that will have included a clinical examination and history, with appropriate vital signs and orthostatic blood pressure measurements, and may have had basic evaluations as directed by their symptoms (eg, electrocardiogram).

Interventions

The intervention includes a class of dynamic posturography tests. A number of tests have clearance from the U.S. Food and Drug Administration. The specific maneuvers may be operator dependent.

Comparators

Depending on the clinical presentation, patients with balance dysfunction may be managed with clinical evaluation alone or with more intensive evaluations including vestibular function testing, which can be used to localize the cause of the dysfunction.

Outcomes

The outcomes of interest are to diagnose and treat the underlying condition correctly. The time frame of interest is months to approximately a year.

Study Selection Criteria

For the evaluation of clinical validity of dynamic posturography, studies that meet the following eligibility criteria were considered:

- Reported on the accuracy of the marketed version of the technology (including any algorithms used to calculate scores)
- Included a suitable reference standard
- Patient/sample clinical characteristics were described
- Patient/sample selection criteria were described.

Clinically Valid

A test must detect the presence or absence of a condition, the risk of developing a condition in the future, or treatment response (beneficial or adverse).

REVIEW OF EVIDENCE

No studies were identified that evaluated the sensitivity and specificity of dynamic posturography for diagnosing any specific balance disorder compared with commonly accepted balance tests. There is no criterion standard test for measuring balance, which is a physiologic parameter. Absent a criterion 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 (ie, individuals at increased risk of falling due to balance issues).

Several studies have used both dynamic posturography and another test to assess balance. For example, Fritz et al (2015) assessed the correlation between dynamic and static posturography and other measures of gait and balance dysfunction in 57 ambulatory patients with multiple sclerosis.² Two dynamic posturography parameters and 4 static posturography parameters were measured. Walking velocity (the alternative test) was measured in 2 ways: (1) in a laboratory using the Optotrak Motion Capture System and (2) using the timed 25-foot walk test. In regression analysis, demographics, one of the dynamic posturography parameters (anteroposterior sway), and one of the static posturography parameters (eyes open, feet apart) explained 95.3% of the variance in walking velocity. A higher degree of anteroposterior sway, assessed using dynamic posturography, was significantly associated with higher walking velocity. Although the study found that dynamic posturography was associated with measures

of walking velocity, the utility of this information regarding impact on patient management is uncertain.

A study by Ferrazzoli et al (2015) compared dynamic posturography with the Berg Balance Scale score.³ The Berg Balance Scale is a 14-item tool that assesses performance on a variety of functional tasks, each rated 0-to-4 (maximal score, 56 points). Lower scores indicate higher fall risk. The study included 29 patients with Parkinson disease (PD) not complaining of balance problems and 12 healthy controls matched for age and sex. Scores on the BBS were significantly lower in PD patients than in controls ($p=.002$). Similarly, results of body sway analysis assessed by posturography differed significantly between PD patients and controls. Specifically, compared with controls, PD patients had higher standard deviation of body sway measurements in the eyes open ($p=.005$) and in the eyes open counting ($p=.020$) conditions. The standard deviation of PD patients was also higher than controls in posturography along the mediolateral axis in the eyes open condition ($p=.019$), but results were similar in the eyes open counting condition. The authors suggested that posturography could be used to identify early balance disorders in PD patients before they develop clinical symptoms, and that rehabilitation programs could be developed to address specific balance issues. As discussed in the next section, there is a lack of prospective studies comparing health outcomes in patients managed with and without dynamic posturography.

Other published literature on dynamic posturography has assessed fall risk in older individuals and other populations.^{4,5,6,7} For example, Whitney et al (2006) retrospectively reviewed 100 charts of individuals referred to a balance and falls clinic with a vestibular diagnosis using dynamic posturography.⁷ Patients who reported multiple falls over 6 months had lower initial scores on the Sensory Organization Test than those who reported 1 or no falls.

Additional studies have used dynamic posturography as a research tool to study balance (eg, in older individuals, PD patients, knee osteoarthritis patients); these studies were not designed to evaluate the clinical validity of dynamic posturography.^{8,9,10,11,12} Dynamic posturography has also been considered a control technique in studies evaluating other novel methods of assessing balance. For example, Alahmari et al (2014) assessed the reliability and validity of a balance rehabilitation device and compared findings with dynamic posturography using the EquiTest.¹³

Section Summary: Clinically Valid

Describing the diagnostic performance of dynamic posturography in terms of sensitivity and specificity is difficult given the lack of a true criterion standard for measuring balance. The available studies comparing dynamic posturography with other types of clinical measures of measuring balance have suggested that posturography results correlate with those measures; however, whether dynamic posturography can be used as a diagnostic test is unknown.

Clinically Useful

A test is clinically useful if the use of the results informs management decisions that improve the net health outcome of care. The net health outcome can be improved if patients receive correct therapy, or more effective therapy, or avoid unnecessary therapy, or avoid unnecessary testing.

Direct Evidence

Direct evidence of clinical utility is provided by studies that have compared health outcomes for patients managed with and without the test. Because these are intervention studies, the preferred evidence would be from randomized controlled trials (RCTs).

No randomized or nonrandomized controlled studies were identified that compared health outcomes in patients when treatment decisions were made with and without the results of dynamic posturography. A 2009 RCT was identified, but it used dynamic posturography as an outcome measure, rather than as a tool for making treatment decisions; thus conclusions cannot be drawn from it on the impact of posturography on patient management.¹⁴

Several retrospective studies have described a customized exercise program based on results of a complete medical and neuro-otologic history and physical examination that included platform posturography.^{15,16} However, the contribution of dynamic posturography to the overall assessment and customization of the exercise program by the Badke group 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.¹⁷ These retrospective reports were also limited by selection bias and lack of follow-up. Moreover, while these studies showed that individualized therapy can improve patient outcomes, no controlled trials have assessed whether individually customized therapy programs are more effective than generic vestibular exercises.

Also, other related studies have included the use of posturography in the assessment of patients after a clinical intervention. Examples included studies conducted with patients PD patients.^{18,19} and assessment of patients with idiopathic normal pressure hydrocephalus before and after shunt surgery.²⁰ For instance, Nocera et al (2009) used posturography to evaluate the effectiveness of a home-based exercise program on postural control for 10 patients with PD.¹⁹ The 10 patients individuals 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.

Chain of Evidence

Indirect evidence on clinical utility rests on clinical validity. If the evidence is insufficient to demonstrate test performance, no inferences can be made about clinical utility.

Section Summary: Clinically Useful

Direct evidence of how dynamic posturography can be used to improve outcomes is lacking. In the absence of direct evidence for a diagnostic test, a chain of evidence can sometimes be identified to demonstrate improvement in health outcomes. However, in the case of dynamic posturography, the chain of evidence about clinical validity and how the test would be used in practice is uncertain; therefore, no inferences can be made about clinical utility.

SUMMARY OF EVIDENCE

For individuals with suspected balance disorders who receive dynamic posturography, the evidence includes cross-sectional comparisons of results in patients with balance disorders and healthy controls and retrospective case series reporting outcomes for patients assessed

with dynamic posturography as part of clinical care. Relevant outcomes are test accuracy and validity, symptoms, and morbid events. There are no generally accepted reference standards for dynamic posturography, which makes it difficult to determine how testing results can be applied in clinical care. There are no studies demonstrating the clinical utility of the test that would lead to changes in management that improve outcomes (eg, symptoms, function). The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

SUPPLEMENTAL INFORMATION

The purpose of the following information is to provide reference material. Inclusion does not imply endorsement or alignment with the evidence review conclusions.

Practice Guidelines and Position Statements

Guidelines or position statements will be considered for inclusion in 'Supplemental Information' if they were issued by, or jointly by, a US professional society, an international society with US representation, or National Institute for Health and Care Excellence (NICE). Priority will be given to guidelines that are informed by a systematic review, include strength of evidence ratings, and include a description of management of conflict of interest.

The American Academy of Otolaryngology-Head and Neck Surgery

In a position statement adopted in 2007 and revised in 2014, the American Academy of Otolaryngology-Head and Neck Surgery recognized computerized dynamic platform posturography and dynamic (or moving) platform posturography as medically indicated and appropriate tools in the evaluation or therapy of certain persons with suspected balance or dizziness disorders.²¹

In 2017, updated guidelines on the management of benign paroxysmal positional vertigo were published; posturography is not mentioned.²²

U.S. Preventive Services Task Force Recommendations

Not applicable.

ONGOING AND UNPUBLISHED CLINICAL TRIALS

A search of ClinicalTrials.gov did not identify any ongoing or unpublished trials that would likely influence this review.

Government Regulations

National/Local:

There is no national or local coverage determination on this topic.

The 2022 CMS Physician Fee Schedule has fees assigned to codes 92548 and 92549. An assigned fee is not a guarantee of coverage.

(The above Medicare information is current as of the review date for this policy. However, the coverage issues and policies maintained by the Centers for Medicare & Medicare Services [CMS, formerly HCFA] are updated

and/or revised periodically. Therefore, the most current CMS information may not be contained in this document. For the most current information, the reader should contact an official Medicare source.)

Related Policies

Gait Analysis
Vestibular Function Testing

References

1. Blue Cross and Blue Shield Association Technology Evaluation Center (TEC). Dynamic posturography in the assessment of vestibular dysfunction. TEC Assessment 1996; Volume 11, Tab 11.
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16. Badke MB, Shea TA, Miedaner JA et al. Outcomes after rehabilitation for adults with balance dysfunction. Arch Phys Med Rehabil. Feb 2004; 85(2):227-33. PMID 14966706
17. Brown KE, Whitney SL, Marchetti GF et al. Physical therapy for central vestibular dysfunction. Arch Phys Med Rehabil. Jan 2006; 87(1):76-81. PMID 16401442
18. Hirsch MA, Toole T, Maitland CG et al. The effects of balance training and high-intensity resistance training on persons with idiopathic Parkinson's disease. Arch Phys Med Rehabil. Aug 2003; 84(8):1109-17. PMID 12917847
19. Nocera J, Horvat M, Ray CT. Effects of home-based exercise on postural control and sensory organization in individuals with Parkinson disease. Parkinsonism Relat Disord. Dec 2009; 15(10):742- 5. PMID 19640769
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The articles reviewed in this research include those obtained in an Internet based literature search for relevant medical references through 3/16/23, the date the research was completed.

Joint BCBSM/BCN Medical Policy History

Policy Effective Date	BCBSM Signature Date	BCN Signature Date	Comments
7/1/02	7/1/02	7/1/02	Joint policy established
3/19/04	3/19/04	3/26/04	Scheduled review of investigational procedure
7/1/07	5/10/07	6/30/07	Policy reviewed
11/1/08	8/19/08	10/28/08	Routine maintenance, policy statement updated
5/1/11	2/15/11	3/3/11	Routine maintenance, revision to policy statement
5/1/13	2/19/13	3/4/13	Routine maintenance, policy titled changed from Computerized Dynamic Posturography to Dynamic Posturography
3/1/15	12/12/14	12/29/14	Routine maintenance
7/1/16	4/19/16	4/19/16	Routine maintenance
7/1/17	4/18/17	4/18/17	Routine maintenance
7/1/18	4/17/18	4/17/18	Routine maintenance
7/1/19	4/16/19		Routine maintenance
7/1/20	4/14/20		Routine maintenance Added procedure code 92549
7/1/21	4/20/21		Routine maintenance
7/1/22	4/19/22		Routine maintenance
7/1/23	4/18/23		Routine maintenance (jf) Vendor Managed: NA

Next Review Date: 2nd Qtr, 2024

**BLUE CARE NETWORK BENEFIT COVERAGE
POLICY: DYNAMIC POSTUROGRAPHY**

I. Coverage Determination:

Commercial HMO (includes Self-Funded groups unless otherwise specified)	Not Covered
BCNA (Medicare Advantage)	See Government Regulations section.
BCN65 (Medicare Complementary)	Coinsurance covered if primary Medicare covers the service.

II. Administrative Guidelines:

- The member's contract must be active at the time the service is rendered.
- Coverage is based on each member's certificate and is not guaranteed. Please consult the individual member's certificate for details. Additional information regarding coverage or benefits may also be obtained through customer or provider inquiry services at BCN.
- The service must be authorized by the member's PCP except for Self-Referral Option (SRO) members seeking Tier 2 coverage.
- Services must be performed by a BCN-contracted provider, if available, except for Self-Referral Option (SRO) members seeking Tier 2 coverage.
- Payment is based on BCN payment rules, individual certificate and certificate riders.
- Appropriate copayments will apply. Refer to certificate and applicable riders for detailed information.
- CPT - HCPCS codes are used for descriptive purposes only and are not a guarantee of coverage.