Clinical Justification

*Computerized Dynamic Posturography*

Available on the

*EquiTest®* and *SMART EquiTest®*

systems and as described by the AAO-HNS

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At A Glance

A successful approach to clinical appeal for payment for 92548 needs not be complex or time consuming. Benefit from the collective wisdom of those who went before you.

DON’T

- Assume it is a “done deal.”

DO

- Remember, the payer has incentive to hold onto a denial position for as long as possible – until forced to review the evidence basis.
- Note that a significant percentage of payers in the country do reimburse.
- Identify and contact your payer Medical Director to discuss the appeal process and the new evidence.

DON’T

- Reinvent the wheel.

DO

- Reference the strong evidence basis for CDP – it is long-established and well-documented.
- Use existing coverage policies to support this position (payers don’t like to reinvent things either).
- Position the information that is made available by NeuroCom for use by its customers.

DON’T

- Take it on alone.

DO

- Join forces with other NeuroCom customers within your region, or even nationwide!
- Contact your professional organization and keep them “in the loop.”
- Keep NeuroCom informed as to your status and any additional payer requests – we can help.

This approach, combined with these materials, has effectively reversed non-coverage positions over the last two years across numerous payers, including Medicare. The evidence has never been stronger. The time is now.

Contact Marcia Hall Thompson, D.P.T., Director of Clinical Education at NeuroCom International, Inc. for additional information or clarification, (503) 653-2144, ext. 3345.
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Computerized Dynamic Posturography (CDP) is a critical technique for developing an effective treatment pathway and improving clinical outcomes in the management of chronic dizziness and balance impairment, and is dependent on the proper application of the technique as supported by an accurate and comprehensive description of the procedure.

**CLINICAL OVERVIEW**

Dizziness is a significant medical problem resulting in more than 7 million clinic visits in the United States every year. Dizziness refers to a wide variety of symptoms, including sensations of motion, disorientation, light-headedness, and instability. Dizziness represents 3.2% of all new patients visiting a primary care physician, is the fourth most common neurological complaint of geriatric patients, and is the most common complaint of persons aged 85 and older. Among elder persons, chronic dizziness (present for > 1 month) is estimated to comprise between 13 and 38% of the total dizzy population. Chronic dizziness is associated with increased risk for falls, syncope, functional disability, nursing home placement, and death.

The clinical approach to dizziness has historically assumed that the symptoms are caused by one or more of the discrete disorders listed in Appendix 1. The medical workup, including selection of diagnostic tests, was therefore structured to confirm and/or rule out the presence of localized disease (Appendix 2: Diagnostic Tests of Dizziness). While the localized disease approach continues to work well for the majority of younger patients and for patients of all ages with acute dizziness, it has proven unproductive in many patients with chronic dizziness. This is because a localizing diagnosis either cannot be established or, when established, does not contribute to the treatment design in an estimated 50% of chronic dizzy patients. Because of limitations in the localized disease oriented approach, the diagnoses made by physicians from different specialties are variable and inconsistent and many patients with chronic dizziness remain undiagnosed (and untreated).
Approach to Treatment without Impairment Information

Historical treatment approaches to the dizzy patient include medication, counseling, surgery and, more recently, vestibular rehabilitation. Although medications and counseling have been shown ineffective for the majority of chronically dizzy patients, medications are prescribed for 61 to 89% of patients seen for dizziness in the primary care setting. Behavioral counseling is prescribed for at least 15% of these same patients. Surgery is applicable only to unstable labyrinthine conditions, such as Meniere’s syndrome and perilymphatic fistula, progressive lesions, such as Acoustic Neuroma and vestibular schwannoma, and is appropriate on rare occasions for intractable benign positional vertigo – conditions which represent a minority of dizzy patients. Vestibular Rehabilitation and Canalith Repositioning Procedures designed to treat conditions representative of a majority of patients with chronic dizziness have proven to be effective in providing relief from chronic disequilibrium, as well as motion and position provoked vertigo.

A recent study of practice patterns in patients with benign positional vertigo (BPV), a representative population of chronically dizzy patients with peripheral vestibular pathology, provided some insight into the significant medical costs associated with the misdiagnosis and inappropriate treatment of patients with chronic dizziness. In their retrospective review of 46 BPV patients, the sum of all disease-related expenses prior to referral for effective workup and treatment was determined to be $2009.63 per patient. Contributing to the prior expenses was an average of 4 consultations with other physicians per patient. In addition, more than half received non-contributory imaging studies. The authors concluded that early diagnosis and appropriate treatment can obviate significant unnecessary expenses in most patients and should be incorporated into routine practice.

Treating Dizziness in Older Persons with Impairment Reduction Strategies

Recent studies by leading authorities in geriatrics have indicated that chronic dizziness and related falling disorders in older adults are expressions of a geriatric syndrome rather than localized diseases. According to this clinical view, symptoms and disability can be attributed to multiple, interacting systems. Impairment reduction strategies, similar to those used in other chronic disease management programs, are most effective in reducing the symptoms and disabilities associated with chronic dizziness. These investigators identify that impairments of balance and gait should be identified and targeted for treatment.
Quantifying Functional Impairments Associated with Dizziness

Problems with a patient’s balance can be identified using simple devices and observational tests. Differentiating among the many possible combinations of sensory and motor impairments underlying balance problems, however, requires objective measurements, calibrated control of the support surface and visual conditions, and the delivery of accurately timed external perturbations. Computerized Dynamic Posturography (CDP) is an objective method for identifying and differentiating among the functional impairments associated with balance system disorders. During CDP testing, the patient stands on a movable, force-sensing support surface and within a movable visual surround. Movements of the support surface and/or visual surround, under precise control of a computer, are used to modify the sensory conditions and/or to impose unexpected perturbations. The computer processes the signals from the force-sensing surface to quantify the patient’s postural stability under modified sensory conditions, as well as the patient’s motor reactions to the unexpected perturbations.

CDP includes three protocols: (1) The Sensory Organization Test (SOT) assesses the patient’s ability to balance using visual, vestibular, and proprioceptive information and to appropriately suppress disruptive visual and/or proprioceptive information under sensory conflict conditions. (2) The Motor Control Test (MCT) measures the patient’s ability to reflexively recover from unexpected external provocations. And the (3) Adaptation Test (ADT) measures the ability to modify automatic reactions when the support surface is irregular or unstable. The efficacy of the CDP sensory and motor protocols to differentiate among impairments in visual, proprioceptive, or vestibular inputs, central adaptation, as well as control of motor reactions has been validated by the controlled clinical studies reviewed in Appendix 3.

The Impact of Impairment Information on Treatment and Outcome

As already discussed, a localizing diagnosis either cannot be established or is non-contributory in approximately one-half of chronically dizzy patients. Chronic dizziness in older individuals is best described as a syndrome effectively treated with symptom reduction strategies focusing on treatable impairments. The effectiveness of a symptom(s) reduction strategy was recently demonstrated in a controlled outcome study of 48 patients whose standard diagnostic workup was non-contributory and suggestive of “watch and wait”. One-half of the patients were randomly placed in a control group and “watch and wait” continued. The remaining patients were placed in a treatment group receiving vestibular rehabilitation individualized to reduce the impairments identified by the patients’ CDP findings alone. The impairment reduction group showed significant recovery of function, while the “watch and wait” group
showed no significant changes. Another study used an impairment reduction approach incorporating CDP to show that this intervention strategy can reduce the incidence of falls in the elderly.  

A cost-effectiveness study analyzed the use of diagnostic technologies commonly used in working up the dizzy patient to identify those tests having the greatest impact on outcome relative to their cost.  A retrospective chart review revealed that the combination of an audiogram, CDP, and ENG had the highest clinical value. This combination of tests was significantly more cost-effective than imaging studies, a finding in common with a study conducted by Gizzi and colleagues. In that study, based on a statistical analysis with respect to the epidemiology of Acoustic Neuroma, the authors reported the probability of an abnormal MRI finding in a dizzy patient with no CNS signs and symmetrical hearing to be nearly 1:10,000.

**Indications for Use of Balance Impairment Testing**

CDP information is critical to planning treatment focused on impairment reduction, and is therefore indicated whenever impairment reduction is appropriate. Based on a retrospective study of the treatment planning process in more than 4000 chronic dizzy patients, the following guidelines were developed for the use of CDP in treatment planning:

1. Symptoms persisting for an extended period of time (up to a year or more);
2. Multiple inconclusive evaluations already performed by other specialists;
3. Complaints of unsteadiness when standing or walking; and
4. History of known pathology involving the posture control pathways.

In a prospective study of dizzy patients with and without secondary gain, the following additional guideline for direct referral for CDP testing was recommended:

5. Suspicion of symptoms exaggeration due to secondary gain or anxiety.

Patients who do not meet the criteria for immediate CDP testing should receive a basic (limited) balance test. These patients should be referred for subsequent CDP testing based on the following criteria:

6. Abnormal or questionable performance on the simple balance test.
**Clinical Justification**

**Medical Necessity of CDP Information**

The medical necessity of Computerized Dynamic Posturography is well established within the literature and written coverage policy. Specific clinical indications are identified for coverage and documentation requirements are outlined.

The technical performance of the test, as well as the interpretation, must be completed by a knowledgeable clinician.22 The procedure requires general supervision or a minimal level of physician supervision if provided by a licensed audiologist. “General supervision” means the procedure is furnished under the physician’s overall direction and control, but physician presence is not required during the performance of the procedure. “Direct supervision” is required if trained, non-physician personnel perform the diagnostic procedure. The maintenance of the necessary equipment and supplies are the continuing responsibility of the physician.23, 24

Indications of coverage and medical necessity:

I. Neurologic disease and disorders; Inherited disorders.20, 25

- Patients with significant disequilibrium and dysfunction following head trauma, and a complete neurological workup is negative and symptoms persist.22,29

  CDP may be considered medically necessary for patients who are being evaluated for balance impairment after trauma. Either brain trauma or damage to the inner ear may result in disequilibrium and impaired postural stability. Posturography may help identify and characterize abnormalities of vestibulo-spinal function when other tests do not.

- Differentiation of peripheral sensory and central nervous system postural control abnormalities.25

- Gait or balance disorders in whom neurologic evaluation is insufficient to explain symptoms.20, 26,29

- Identification of early Multiple Sclerosis in patients with balance impairment when the MRI is normal.27
II. **Peripheral Vestibular Disorders**^{22, 25, 26}

- Patients with non-localizing vestibular function tests (e.g. ENG performed prior to platform testing is normal or does not localize lesion to a specific inner ear) but symptoms of dizziness or disequilibrium persist.\(^ {22, 26, 29}\)
- Differentiation of vestibular, visual, and somatosensory impairments to postural control.\(^ {25}\)

  CDP may be considered medically necessary for patients who have symptoms of disequilibrium and conventional tests of vestibular function have not detected an abnormality. Because it is used to test vestibular-oculomotor reflexes primarily mediated by the lateral semicircular canal, and electronystagmography does not test many of the vestibular receptors, CDP may be helpful when it is important to document whether an abnormality in postural control is present. It may show an abnormality for patients who have dysfunction of the other receptors that are important for balance or may point to non-organic disorders.

- Post aminoglycoside therapy, chemotherapy, or post-operative inner ear surgery with persistent symptoms.\(^ {26}\)

III. **Aging and the Elderly**\(^ {20, 25, 26}\), **Dyssequilibrium**

- History of one or more falls due to persistent vertigo or dizziness with disequilibrium and normal EKG/ECG testing.\(^ {22, 26}\)
- Severe disabling disequilibrium without obvious explanation.\(^ {26}\)
- Vertigo or dizziness not responsive to usual medications.\(^ {26}\)
- Documentation of age-related changes in balance function (including falls in the elderly).\(^ {25}\)

  Aging patients are most prone to falls and injuries related to falls. Many of these patients do not have true vertigo but instead exhibit chronic disequilibrium. CDP may help identify deficits in balance function when the vestibular-oculomotor reflexes are intact, leading to effective intervention.

IV. **Other Indications:**

- Progressive rigidity or spasticity.\(^ {26}\)
- Identification of the malingering patient.\(^ {26}\)
• Differentiation of organic balance problems versus aphysiologic postural sway.\textsuperscript{25}
• Determination of permanent disability.\textsuperscript{28}
• Assessment of the effects of novel motion environments on human balance function.\textsuperscript{25}

**Documentation Requirements:**

1. When CDP is performed for patients who have a history of falls due to persistent vertigo or dizziness and their EKGs are normal, the medical record must clearly document the falls, and contain their most recent EKG report.
2. When CDP is performed for patients with significant disequilibrium and dysfunction following head trauma, the medical record must clearly reflect the nature of the trauma and the date that the trauma occurred.
3. When CDP is performed for patients with non-localizing vestibular function tests, but symptoms of dizziness or disequilibrium persist, the medical record must clearly reflect that the vestibular study was performed.

**Clinical Efficacy:**

NeuroCom\textsuperscript{®} International, Inc. received FDA permission under Section 510(k) of the Federal Food, Drug and Cosmetics Act to market its Computerized Dynamic Posturography (CDP) systems, including the EquiTest\textsuperscript{®} system in 1986 and those systems are currently classified as Class I devices. CDP has been used extensively in both clinical and research applications since receiving that permission.

Computerized Dynamic Posturography is considered an established test of postural control (non-investigational) for those clinical indications described. The clinical efficacy of the procedure has been established and is well documented within the literature. A summary of the most recent literature is provided in Appendix 3: Scientific Evidence 1997-2001, Table 1.
Cost-Efficacy and Improved Health Outcomes Using the Information from CDP

The role of the information obtained from CDP testing in the management and outcomes of those patients with balance and dizziness disorders is well documented within the literature. The following citations meet the basic criterion established by Medicare and 3rd party insurers.


Additional evidence can be found in Appendix 3: Scientific Evidence 1997-2001, Table 2.
REFERENCES


APPENDIX I: EPIDEMIOLOGY

Dizziness is generally divided by history of sensation into five categories: (1) vertigo: a rotary motion, either of the patient with respect to the environment (subjective vertigo) or of the environment with respect to the patient (objective vertigo), the key element being the perception of motion; (2) disequilibrium (unsteadiness, imbalance, gait disturbance): a feeling (primarily involving the trunk and lower extremities rather than the head) that a fall is imminent; (3) presyncope (faintness, lightheadedness): a feeling that loss of consciousness is imminent; (4) mixed dizziness: a combination of two or more of the above types; and (5) nonspecific dizziness: a sensation of instability that does not fit readily into any of the above categories.1

Although the reported prevalence for specific causes varies widely, the most commonly reported discrete disorders causing chronic dizziness include peripheral vestibular disorders (e.g., benign paroxysmal positional vertigo, neurolabyrinthitis, Meniere’s disease); cervical disorders, particularly spondylosis; cerebrovascular disorders, including vertebrobasilar insufficiency and brainstem infarcts; carotid hypersensitivity; and psychiatric disorders, particularly depression and anxiety. Additional common causes include degenerative neurological disorders such as Parkinson’s disease and multiple sclerosis.

The following represent the incidence of primary populations known to present with complex balance or dizziness disorders.

Vestibular System Impairments

- 3,200 per 100,000 new patients per year visit a primary care physician. 300 per 100,000 new cases per year are recurrent episodes. 2

Visual System Impairments

- In individuals over age 65, there are 59.8 cases per 1,000 annually of blindness and other visual impairments. In individuals over age 75, the rate raises to 110.6 per 1,000 cases annually. 15.8% report a limitation of activity. This does not include glaucoma or cataracts which also impact visual function for balance. 3
Somatosensory System Impairments:

- There are 15.7 million people or 5.9% of the population in the United States who have diabetes. Approximately 60-70% of people with diabetes have mild to severe forms of diabetic nerve damage which can impact the sensory function available for balance. 4

Mild Traumatic Brain Injury

- There are 131 per 100,000 new cases per year. 5, 6

Aging

- Nearly 20% of community dwelling adults aged 60 or over reported having “suffered dizziness significant enough to result in a physician visit, taking a medication, or interfering with normal activities” within the previous year. 7

- Among elder persons, chronic dizziness (present for > 1 month) exhibits a prevalence ranging from 13-30%. 1

Neural Diseases

Parkinson’s Disease

- There are 20 new cases of Parkinson’s Disease per 100,000 population per year with one million victims in the United States alone. 8

Multiple Sclerosis

- 180,000 new cases of Multiple Sclerosis are reported annually. 69.4% have limitations of activity and 100% have 1 or more physician visits per year. 3

- Over 70% of cases report imbalance as their primary and initial complaint, often before disease progression is classified. 9

Stroke

- 730,000 new or recurrent cases of stroke are reported annually in the United States with 4.0 million stroke survivors. 10
Exaggeration of Imbalance

- Non-organic sway patterns exist in 76% of patients with the potential for secondary gain. 50% have normal audiovestibular evaluations. 11

REFERENCES:

## APPENDIX 2: DIAGNOSTIC TESTS OF DIZZINESS

### Clinical Benefits and Limitations of Site-of-Lesion Diagnostic Tests

<table>
<thead>
<tr>
<th>Site-of-Lesion Test</th>
<th>System Assessed</th>
<th>Benefits</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronystagmography (ENG)</td>
<td>Vestibular</td>
<td>• “Gold Standard” for documenting unilateral vestibular loss and locating site of lesion&lt;br&gt;• “Gold Standard” for documenting central lesions within the vestibulo-ocular system</td>
<td>• Tests horizontal canals only&lt;br&gt;• Tests very low frequencies only&lt;br&gt;• Weak correlation with functional impairments of balance control&lt;br&gt;• Does not quantify central mechanisms related to balance control</td>
</tr>
<tr>
<td>• Caloric Irrigation&lt;br&gt;• Ocular Motility</td>
<td>Peripheral, Central/Brainstem</td>
<td></td>
<td></td>
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<tr>
<td>Rotational Chair</td>
<td>Vestibular</td>
<td>• “Gold Standard” for assessing severity of vestibular loss&lt;br&gt;• Sensitive&lt;br&gt;• Wide frequency range&lt;br&gt;• Impulse test can detect unilateral loss</td>
<td>• Tests horizontal canals only&lt;br&gt;• Weak correlation with functional impairments of balance control&lt;br&gt;• Requires very expensive equipment&lt;br&gt;• Available in large, regional centers only</td>
</tr>
<tr>
<td>Autorotation Testing</td>
<td>Vestibular</td>
<td>• Simple test&lt;br&gt;• Functional</td>
<td>• Clinical applications not established (under investigation &amp; development)</td>
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<tr>
<td>• Peripheral&lt;br&gt;• Central</td>
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<tr>
<td>Magnetic Resonance Imaging (MRI)</td>
<td>Peripheral &amp; Brain structures</td>
<td>• “Gold Standard” test for documenting brain mass and structural lesions</td>
<td>• No correlation with functional impairments of balance control&lt;br&gt;• Very low yield in chronic vestibular disorders</td>
</tr>
<tr>
<td>Audiometric Tests</td>
<td>Auditory</td>
<td>• “Gold Standard” test for peripheral and central auditory disease&lt;br&gt;• Correlation with vestibular abnormalities is disease-dependent</td>
<td></td>
</tr>
<tr>
<td>• Peripheral&lt;br&gt;• Central</td>
<td></td>
<td></td>
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<tr>
<td>Auditory Evoked Potential</td>
<td>Auditory Pathways</td>
<td>• “Gold Standard” test for documenting 8th nerve and brainstem pathology&lt;br&gt;• No correlation with functional impairments of balance control</td>
<td></td>
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<tr>
<td>• Central/brainstem</td>
<td></td>
<td></td>
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<tr>
<td>Nerve Conduction Tests</td>
<td>Peripheral nerves</td>
<td>• “Gold Standard” test for documenting peripheral nerve pathology&lt;br&gt;• Weak correlation with functional impairments of balance control</td>
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</table>
A substantial number of studies defining the validity and/or efficacy of CDP as a diagnostic test of functional balance impairment have been published in peer-reviewed journals since the original technology assessments of CDP were conducted from 1992 to 1997. Collectively, the more recent studies, conducted from 1997 to 2001, cover 2,438 patients with a wide variety of balance disorders and normal controls.

**TABLE 1: Validity of CDP (Compared To Gold Standards)**

<table>
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<th>Class</th>
<th>Design</th>
<th>Reference Standards</th>
<th>Conclusions</th>
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<tbody>
<tr>
<td>1</td>
<td>II</td>
<td>Diagnostic cost-effectiveness study Patients with dizziness (N=192). Retrospective Blinded statistical analysis</td>
<td>Classification by: Audiometry, Bithermal Calorics, Electronystagmography, Magnetic Resonance Imaging</td>
<td>CDP was one of the most cost-effective tests of the battery of tests in the dizzy patient population.</td>
</tr>
<tr>
<td>2</td>
<td>II</td>
<td>Evaluate the clinical utility of measures of balance in vestibular disorder patients (N=35) and normal controls (N=69). Prospective Blinded statistical analysis</td>
<td>Classification by: History, Bithermal Calorics, Electronystagmography</td>
<td>CDP plays an important role in the functional evaluation and management of vestibular disorder patients.</td>
</tr>
<tr>
<td>3</td>
<td>II</td>
<td>Discriminate between dizziness patients (N=37) and controls (N=22). Prospective Blinded statistical analysis</td>
<td>Classification by: Audiometry, Bithermal Calorics, Electronystagmography, Tympanography, Rotational Chair</td>
<td>CDP was the most sensitive diagnostic test for identifying abnormality in the dizzy patient population.</td>
</tr>
<tr>
<td>4</td>
<td>II</td>
<td>Discriminate between noise induced hearing loss (NIHL) patients with and without Tullio Phenomenon patients (N=20), with normal controls (N=15). Prospective Blinded statistical analysis</td>
<td>Classification by: History, Audiometry</td>
<td>CDP discriminated between NIHL patients with and without Tullio phenomenon, and discriminated both NIHL groups from the normal controls.</td>
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### 1-A: Peripheral/Central Vestibular Deficits (continued)

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<th>Source</th>
<th>Class</th>
<th>Design</th>
<th>Reference Standards</th>
<th>Conclusions</th>
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<tbody>
<tr>
<td>5 Sargent, et al. (1997) “Idiopathic bilateral vestibular loss.” <em>Otolaryngol Head Neck Surg</em> 116(2): 157-62</td>
<td>II</td>
<td>Discriminate between idiopathic bilateral vestibular loss patients (N=13) and normal controls (N=194). Prospective Blinded statistical analysis</td>
<td>Classification by: Physical Exam, Bithermal Calorics, Rotational Chair</td>
<td>CDP discriminated between patients with idiopathic bilateral vestibular loss (BVL) and normal controls. CDP was the only test that quantified differences in sensory impairments among the BVL patients.</td>
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### 1-B: Medical Legal

<table>
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<th>Source</th>
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<th>Design</th>
<th>Reference Standards</th>
<th>Conclusions</th>
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<tr>
<td>7 Krempl and Dobie. (1998) “Evaluation of posturography in the detection of malingering subjects.” <em>American Journal of Otology</em> 19: 619-627</td>
<td>II</td>
<td>Discriminate among normal, transient vestibulopathy, and symptoms exaggeration groups (N=50). Prospective Subjects as own controls Blinded ROC statistical analysis</td>
<td>Classification by: History, Instructions, Experimental procedures</td>
<td>CDP differentiated among the normal, transient vestibulopathy, and symptoms exaggeration groups. CDP was the only diagnostic test to provide positive indications for symptoms exaggeration.</td>
</tr>
<tr>
<td>8 Goebel, et al. (1997) “Posturographic evidence of non-organic sway patterns in normal subjects, patients, and suspected malingers.” <em>Otolaryn Head-Neck Surg</em> 117 (4): 293-302</td>
<td>II</td>
<td>Discriminate among three instructed (N=72), selected patient (N=347), and control (N=122) groups. Prospective/retrospective Blinded statistical analysis</td>
<td>Classification by: History, Audiometry, Bithermal Calorics, Electronystagmography</td>
<td>CDP differentiated among the normal, vestibulopathy, and symptoms exaggeration groups. CDP was the only diagnostic test to provide positive indications for symptoms exaggeration.</td>
</tr>
<tr>
<td>9 Cevette, et al. (1995) “Aphysiologic performance on dynamic posturography.” <em>Head and Neck Surgery</em> 112:676-688</td>
<td>II</td>
<td>Develop statistical criteria to discriminate among two selected patient (N=104) and control (N=53) groups. Prospective Blinded linear discriminate analysis</td>
<td>Classification by: History, Audiometry, Bithermal Calorics, Electronystagmography</td>
<td>CDP was the only diagnostic test to provide positive indication for symptoms exaggeration.</td>
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### 1-C: Central Nervous System and Movement Disorders

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<tr>
<td>Di Girolamo, et al. (1999)</td>
<td>II</td>
<td>Discriminate between patients with <em>congenital nystagmus</em> (N=15) and normal controls (N=15). Prospective Blinded statistical analysis</td>
<td>Classification by: Neurological Evaluation, Computerized Eye Movement Records</td>
<td>CDP showed a unique pattern of sensory impairment indicating abnormal visual control of balance.</td>
</tr>
<tr>
<td>Jauregui-Renaud, et al. (1998)</td>
<td>II</td>
<td>Discriminate between patients with <em>chronic polyneuropathy</em> (N=14) and normal controls (N=14). <em>Quantify changes over 6-year follow-up period.</em> Prospective Blinded statistical analysis</td>
<td>Classification by: Physical Exam, Vibration Threshold Tests</td>
<td>CDP demonstrated a unique pattern of sensory and motor impairments in which somatosensory control was abnormal. CDP documented significant declines over the 6-year period.</td>
</tr>
<tr>
<td>Williams, NP et al. (1997)</td>
<td>III</td>
<td>Descriptive study of functional balance problems in patients with <em>multiple sclerosis</em> (N=10). Prospective</td>
<td>Classification by: Magnetic Resonance Imaging, Bithermal Calorics, Electronystagmography</td>
<td>CDP provided the most useful balance impairment information in patients with early stage multiple sclerosis.</td>
</tr>
</tbody>
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### 1-D: Metabolic Diseases and Drug Effects

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### 1-E: Disorders Associated With Aging

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<tr>
<td>Topp, et al. (1998)</td>
<td>II</td>
<td>Discriminate differences in functional abilities within a random sample of 28 older adults and to correlate impairment test results with daily life activities. Prospective Exclusion by history</td>
<td>Classification by: History, Clinical rating scales for pain and daily life activities, Strength tests</td>
<td>CDP measures of dynamic postural control were significant predictors of performance on all daily life functional tasks. CDP provided unique information related to balance impairment.</td>
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</table>

* Orthopedic Sports Physical Therapy 27: 144-153

### 1-F: Sports and Occupational Medicine

<table>
<thead>
<tr>
<th>Source</th>
<th>Class</th>
<th>Design</th>
<th>Reference Standards</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td></td>
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</tr>
<tr>
<td>Guskiewicz KM, et al. (1997) Alternative approaches to the assessment of mild head injury in athletes.</td>
<td>II</td>
<td>Document functional impairments following mild head injury and monitor recovery in young adult athletes (N=36), with normal controls (N=36). Blinded statistical analysis.</td>
<td>Classification by: History, Neuropsych. tests: Trail Making A Wechsler Digit Span Stroop</td>
<td>CDP was the only test to document significant sensory impairment following mild head injury. Average time to full recovery was 4 to 7 days.</td>
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</table>
## TABLE 2: Efficacy of CDP In Improving Health Outcomes

### 2-A: Vestibular Disorders

<table>
<thead>
<tr>
<th>Source</th>
<th>Class</th>
<th>Design</th>
<th>CDP Impact on Outcome</th>
</tr>
</thead>
</table>
| 17 Black, et al. (2000)  
“Outcome analysis of individualized vestibular rehabilitation protocols.” *The American Journal of Otology* 21: 543-551 | II | Outcome of rehabilitation treatment in *peripheral vestibular disorder* patients (N=37), with a normal control (N=12) group. Prospective with treat, no-treat, and control groups. Blinded statistical analysis | 1. CDP was the most effective diagnostic test (over ENG & Rotary Chair tests) in determining appropriate treatment.  
2. Customized vestibular rehabilitation treatment programs based on CDP results significantly improved health outcomes in patients with peripheral vestibular disorders. |
| 18 Blatt, et al. (2000)  
2. Patients with residual balance deficits benefit from additional vestibular rehabilitation. |
“Postural control in benign paroxysmal positional vertigo before and after recovery.” *Acta Otolaryngol (Stockb)* 118: 289-293 | II | Outcome of canalith repositioning therapy in patients with *idiopathic BPPV* (N=32), with normal controls (N=32). Prospective Blinded statistical analysis | 1. CDP was the only diagnostic test to identify and monitor otolithic deficits following repositioning therapy.  
2. Untreated otolithic deficits place patients at increased the risk for gait instability. |
| 20 Gillespie, et al. (1999)  
“Prognosis in bilateral vestibular hypofunction.” *Laryngoscope* 109:35-41 | III | Outcome of vestibular rehabilitation therapy in patients with bilateral *vestibular hypofunction* (N=35). Retrospective Blinded statistical analysis | 1. CDP differentiated bilateral vestibular loss patients with pure vestibular impairment from those with additional sensory and/or motor impairments.  
2. Bilateral loss patients with pure vestibular impairments benefited the most from vestibular rehabilitation therapy. |
### 2-B: Medical Legal

<table>
<thead>
<tr>
<th>Source</th>
<th>Class</th>
<th>Design</th>
<th>CDP Impact on Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gianoli, et al. (2000) “Posturographic performance in patients with the potential for secondary gain.” <em>Otolaryngology – Head and Neck Surgery</em> 122 (1): 11-18</td>
<td>II</td>
<td>Determine the prevalence of symptoms <em>exaggeration</em> in two dizzy patient groups with and without secondary gain (N=100). Retrospective Blinded statistical analysis</td>
<td>1. CDP effectively screened balance disorders for which treatment was medically necessary. 2. Exaggeration was identified in 76% of patients with secondary gain and 8% of patients without secondary gain. 3. To maximize outcome in patients without secondary gain, exaggeration suggests anxiety and psychological factors that must be addressed.</td>
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</table>

### 2-C: Central Nervous System and Movement Disorders

<table>
<thead>
<tr>
<th>Source</th>
<th>Class</th>
<th>Design</th>
<th>CDP Impact on Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Savino, et al. (2000) “The role of ocular oscillations upon visually dependent postural stabilization in patients affected by congenital nystagmus.” <em>J of Vestibular Research</em> 10:201-206</td>
<td>II</td>
<td>Determine if involuntary eye movements or other neurological factors cause loss of balance in patients with <em>congenital nystagmus</em> (N=9). Prospective Patients as own controls Blinded statistical analysis</td>
<td>1. CDP demonstrated that deficits in balance were caused by the involuntary eye movements. 2. Balance is improved by reducing the involuntary eye movements.</td>
</tr>
<tr>
<td>Ondo, et al. (2000) “Computerized posturography analysis of progressive supranuclear palsy.” <em>Arch Neurol</em> 57: 1464-1469</td>
<td>II</td>
<td>Discriminate between Parkinson’s disease (N=20) and <em>Progressive Supranuclear Palsy</em> (PSP) (N=20) in their earliest stages, with a normal control (N=20) group. Prospective Patients as own controls Blinded multivariate analysis</td>
<td>1. CDP was more effective than standard diagnostic tests (MRI) in differentiating between Parkinson’s and PSP in their early stages. 2. Early differentiation improves outcome, because PSP patients do not respond well to dopaminergic medication.</td>
</tr>
<tr>
<td>Chong, et al. (1999a) “Sensory organization for balance: specific deficits in Alzheimer’s but not in Parkinson’s disease.” <em>J of Gerontology Med Sciences</em> 54A (3): M122-M128</td>
<td>II</td>
<td>Quantify causes for frequent falls in <em>Alzheimer's</em> (N=11) and <em>Parkinson's</em> (N=15) patients, with normal controls (N=17). Prospective Blinded statistical analysis</td>
<td>1. CDP demonstrated significant differences in sensory impairments between the Parkinson's and Alzheimer's patients. 2. Parkinson's patients demonstrated the ability to improve sensory balance with practice/training, while the prognosis for Alzheimer's patients was less clear.</td>
</tr>
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</table>
2-C: Central Nervous System and Movement Disorders (continued)

<table>
<thead>
<tr>
<th>Source</th>
<th>Class</th>
<th>Design</th>
<th>CDP Impact on Outcome</th>
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<tbody>
<tr>
<td>Chong, et al. (1999b) “Postural set for balance control is normal in Alzheimer’s but not in Parkinson’s disease.” J of Gerontology: Med Sciences 54A (3): M129-M135</td>
<td>II</td>
<td>Quantify differences in postural instability between Alzheimer’s (N=11) and Parkinson’s (N=8) patients, with normal controls (N=12). Prospective Blinded statistical analysis</td>
<td>1. CDP demonstrated significant differences in motor impairments between Parkinson’s and Alzheimer’s patients. 2. Parkinson’s patients are at increased risk for falls when making transitions between supported and unsupported conditions. 3. Parkinson’s patients can benefit from rehabilitation training focused on proper transitions.</td>
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2-D: Metabolic Diseases and Drug Effects

<table>
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<th>Source</th>
<th>Class</th>
<th>Design</th>
<th>CDP Impact on Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roebuck, et al. (1998a) “Neuromuscular responses to disturbances of balance in children with prenatal exposure to alcohol.” Alcoholism: Clinical and Experimental Research 22: 1992-1997</td>
<td>II</td>
<td>Determine whether balance system impairments in children with prenatal alcohol exposure (N=12) are likely to be central processing or peripheral vestibular, with normal controls (N=12). Prospective Blinded statistical analysis</td>
<td>1. CDP demonstrated that alcohol exposed children make ineffective use of competing visual and vestibular signals. 2. Central processing deficits are a likely cause. 3. Intervention programs should be developed that focus on the sensory integration deficits.</td>
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### 2-D: Metabolic Diseases and Drug Effects (continued)

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<td></td>
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<td>1. CDP demonstrated that alcohol exposed children make ineffective use of competing visual and vestibular signals. 2. Intervention programs should be developed that focus on the sensory integration deficits.</td>
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<tr>
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<td>1. CDP results indicate no significant drug effects and no re-test learning. 2. When nausea reduces the accuracy of test administration, dimenhydrinate can be reliably used during CDP to provide a more accurate characterization of the patient’s balance problem.</td>
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### 2-E: Disorders of Aging

<table>
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<th>Source</th>
<th>Class</th>
<th>Design</th>
<th>CDP Impact on Outcome</th>
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<tbody>
<tr>
<td>31</td>
<td>Rose, et al. (2000) “Can the control of bodily orientation be significantly improved in a group of older adults with a history of falls?” <em>JAGS</em> 48: 275-282</td>
<td>II</td>
<td>Determine the outcome effectiveness of a biofeedback intervention program customized to CDP documented impairments in reducing fall risk in elderly community dwelling individuals (N=45) <strong>with a history of falls</strong>. Prospective, double cross-over controlled design Blinded statistical analysis</td>
</tr>
<tr>
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<td>1. Only the CDP-based intervention group showed significant improvements in dynamic motor and sensory integration impairments, which were correlated with improvements in all clinical measures of balance and mobility. 2. Best outcomes were achieved through progressive challenges that met, but did not exceed, the individual patient’s capabilities, as documented by CDP.</td>
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<td>1. Visual balance impairments documented by CDP were most strongly predictive of subsequent falls. 2. CDP impairment information identifies individuals at fall risk and provides impairment information to customize effective intervention programs.</td>
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### 2-F: Sports and Occupational Medicine

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| 1. CDP documented a normal 72-hour recovery period that was delayed for 168 hours in an astronaut participating prematurely in disruptive, post-flight high performance activities.  
2. Documenting full recovery prior to the resumption of high performance activities can prevent prolongation of balance deficits that diminish performance and increase risk of accidents. |
| 1. CDP documented that rookie astronauts required significantly longer to re-adapt to earth conditions compared to experienced astronauts.  
2. Understanding how experience speeds adaptation will allow development of effective training programs for rookie astronauts. |
APPENDIX 4: PRACTICE PARAMETERS & POLICY STATEMENTS

1. **American Medical Association.**
   
   
   CDP is a necessary component in the disability evaluation of patients with chronic balance or dizziness disorders.

b. As outlined in question 1c: *Tech Brief: Computerized Dynamic Posturography (EquiTest®)*. American Medical Association, Department of Technology Assessment (1993).

   “The ENG battery evaluates the functional integrity of central vestibular pathways and of the more peripheral components of the vestibular system (horizontal semicircular canals and superior branch of the vestibular nerves). Unlike CDP, ENG cannot supply useful diagnostic information concerning the functions of the remaining portions of the vestibular-spinal system (superior and posterior semicircular canals, utricle, saccule, and inferior branch of the vestibular nerve).”

   The efficacy of CDP in the functional assessment of balance control was generally considered by the committee to be “established” or “promising” (58%) versus “investigational” (29%) at that time.


   Dynamic posturography is identified in its listing of accepted tests and measures for characterizing or quantifying dynamic or static balance.

   

   CDP is medically appropriate in the evaluation or treatment of persons with suspected vestibular disorders.


   [ENG] and rotational chair tests are limited to assessment of visual-vestibular interactions. [CDP] provides information on postural stability and motor control, which relate to balance function. “[CDP] appears to provide unique information that quantifies a patient’s ability to use vision and somatosensation in maintaining postural stability”.

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Clinical Justification                  Computerized Dynamic Posturography                  1_05

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4. **American Academy of Neurology.**


“Dynamic posturography is considered “promising” for use in specialized environments dedicated to the analysis and management of vestibular dysfunction. Its value as a clinically effective and cost-effective tool in general neurology requires further exploration.

This conclusion was based upon the class III evidence available at the time of the review.

5. **Medical Operations Group – Johnson Space Center.**

The SOT (Sensory Organization Test) component of CDP (as implemented on the EquiTest®) is required to document return to preflight performance levels (and serves as a condition of clearing Space Station crew to pilot their aircraft).

6. **Stanford University Hospital – Department of Neurology**

CDP is included within the selection criterion to determine appropriate candidates among Parkinson's patients being considered for surgical pallidotomy, deep brain stimulation, versus medical management.
APPENDIX 5: EXISTING COVERAGE POLICY EXAMPLES

Coverage is documented, but not limited to, the following coverage policy examples. Discussion is focused primarily to Medicare Part B, Part A and BCBS (limited).

MEDICARE

Medicare Part A*
Medicare Part B†

HGSA Medicare Medical Policy
http://www.hgsa.com/professionals/policy-draft/m46b.html

NORIDIAN Administrative Services


Louisiana Medicare Medical Policy
http://www.lamedicare.com/provider/medpol/posturog.asp

Louisiana

Oklahoma/New Mexico Medical Policy

Oklahoma, New Mexico

Wisconsin Physician Services (WPS)
http://www-ss.wpsic.com/medicare_web

Minnesota, Michigan, Wisconsin, Illinois


† Medicare Part B Coverage for 1/ Private Practice/Office based services rendered to outpatients 2/ Diagnostic services that are furnished on an outpatient basis by the hospital or others furnishing the services under arrangements, and ordinarily furnished by the hospital (or others under arrangements) to outpatients for diagnostic study; including the services of technicians (paid on the basis of a fee schedule); 3/ Outpatient rehabilitation services furnished by or under arrangements made by participating providers of services (including clinics, rehabilitation agencies, and public health agencies).
Vestibular Function Test procedures, including 92548 Computerized Dynamic Posturography, may be performed only by licensed audiologists with a physician’s prescription, or by a licensed physician, preferably with certification by the American Board of Medical Specialties in otolaryngology, neurology, or otology/neurotology, or by personnel employed “incident to” a physician (effective March 19, 2004).

Note: NHIC is the Medicare Part B Intermediary for Massachusetts, Maine, Vermont, and New Hampshire. Policy ‘Dynamic Posturography’ of 1997 was retired January 1, 2002, which can be found at [http://www.medicarenhic.com/ueProv/lmrp/retired/dynamic_retire.htm](http://www.medicarenhic.com/ueProv/lmrp/retired/dynamic_retire.htm). No coverage policy currently exists.

Cahaba Government Benefit Administrators
[http://www.gamedicare.com/newspubs/july01/11c.htm](http://www.gamedicare.com/newspubs/july01/11c.htm) (July 2001)

Cahaba GBA is an operating division of Blue Cross and Blue Shield of Alabama, an independent licensee of the Blue Cross and Blue Shield Association. It is the Medicare contractor that processes claims for the following:

- Part A and Part B claims for Alabama; Part B claims for Georgia and Mississippi;
- Part A claims for Iowa and South Dakota

92548 Computerized Dynamic Posturography requires the following general supervision for payment. Physician supervision policy does not apply when a procedure is personally furnished by a qualified audiologist; otherwise must be performed under the general supervision† of a physician.

Physical Therapy and CDP
United Government Services (UGS) Medicare Part A

Part A coverage in the following states and territories:
Virginia, West Virginia, Michigan, Wisconsin, California, Nevada, Hawaii, Guam, American Samoa and Northern Mariana Islands; Federally Qualified Health Centers in all 50 states.

† General supervision means the procedure is furnished under the physician's overall direction and control, but the physician's presence is not required during the performance of the procedure. Under general supervision, the training of the non-physician personnel that actually performs the diagnostic procedure and the maintenance of the necessary equipment and supplies are the continuing responsibility of the physician.
CPT code 92548 is the appropriate code for the computerized dynamic posturography assessment and reassessment when medically necessary. It can be billed on the same day as the initial therapy evaluation when both services are provided.

**Blue Cross and Blue Shield**

Regence Blue Cross & Blue Shield  
Oregon, Utah,  
Washington, Idaho

**Blue Cross Blue Shield of Nebraska**  
[BluePreferred Reimbursement Schedule April 1, 2003 on file]  
Nebraska
APPENDIX 6: ADVANCED BENEFICIARY NOTICE

Although a well-established test of postural control with more than sufficient evidence to support clinical efficacy and medical necessity, CDP can still be subject to denials at the local medical review level.

In the event of a denial, an appeals process will be necessary and is recommended. The information provided within this document has proven effective in reversing such denial decisions. However, in the interim period, your patients must be informed regarding the potential for non-coverage and their responsibilities.

It is recommended that an Advanced Beneficiary Notice (ABN) be signed by the patient and submitted with the patient’s claim in accordance with the mandate from the Office of Management and Budget (June 18, 2002).

The attached form, CMS-R-131 is the approved ABN for use in these situations. Some information has been provided as an example when completing the ABN as it relates to denial for CDP testing.

It will be important to:
1. Determine the reason for the denial. Denials generally fall into one of three categories:
   - Investigational
   - Medically Unnecessary
   - Undetermined
2. Encourage a letter of patient appeal specific to their case.
3. Generate the evidence to counter the denial reason (easily obtained from within this document) as it relates to your patient’s case.
4. Submit these materials with the claim/appeal.
5. Inform NeuroCom International, Inc. – Clinical Support of any trends or problems outside the scope of the information provided herein. (1-800-767-6744).

**ADVANCE BENEFICIARY NOTICE (ABN)**

NOTE: You need to make a choice about receiving these health care items or services.

We expect that Medicare will not pay for the item(s) or service(s) that are described below. Medicare does not pay for all of your health care costs. Medicare only pays for covered items and services when Medicare rules are met. The fact that Medicare may not pay for a particular item or service does not mean that you should not receive it. There may be a good reason your doctor recommended it. Right now, in your case, Medicare probably will not pay for—

<table>
<thead>
<tr>
<th>Items or Services:</th>
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<tbody>
<tr>
<td>92548 Computerized Dynamic Posturography</td>
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</table>

**Because:** [Select the appropriate response based upon denial reasoning]

1. Undetermined despite coverage for same services in other Medicare regions OR
2. Identified as a medically unnecessary service despite extensive evidence to the contrary within the primary research and within other coverage policies OR
3. Identified as investigational despite its established role in medicine for over 10 years.

The purpose of this form is to help you make an informed choice about whether or not you want to receive these items or services, knowing that you might have to pay for them yourself. Before you make a decision about your options, you should read this entire notice carefully.

- Ask us to explain if you don’t understand why Medicare probably won’t pay.
- Ask us how much these items or services will cost you (Estimated Cost: $__________), in case you have to pay for them yourself or through other insurance.

**PLEASE CHOOSE ONE OPTION. CHECK ONE BOX. SIGN & DATE YOUR CHOICE.**

☐ **Option 1. YES. I want to receive these items or services.**

I understand that Medicare will not decide whether to pay unless I receive these items or services. Please submit my claim to Medicare. I understand that you may bill me for items or services and that I may have to pay the bill while Medicare is making its decision. If Medicare does pay, you will refund to me any payments I made to you that are due to me. If Medicare denies payment, I agree to be personally and fully responsible for payment. That is, I will pay personally, either out of pocket or through any other insurance that I have. I understand I can appeal Medicare’s decision.

☐ **Option 2. NO. I have decided not to receive these items or services.**

I will not receive these items or services. I understand that you will not be able to submit a claim to Medicare and that I will not be able to appeal your opinion that Medicare won’t pay.

<table>
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<tr>
<th>Date</th>
<th>Signature of patient or person acting on patient’s behalf</th>
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**NOTE:** Your health information will be kept confidential. Any information that we collect about you on this form will be kept confidential in our offices. If a claim is submitted to Medicare, your health information on this form may be shared with Medicare. Your health information which Medicare sees will be kept confidential by Medicare.

OMB Approval No. 0938-0566   Form No. CMS-R-131-G   (June 2002)