### MEDICAL POLICY

**SUBJECT:** SURFACE ELECTROMYOGRAPHY (SEMG) IN MUSCULOSKELETAL CONDITIONS

**POLICY NUMBER:** 2.01.46

**CATEGORY:** Technology Assessment

**EFFECTIVE DATE:** 11/16/06

**REVISED DATE:** 09/20/07, 08/21/08, 07/16/09, 06/17/10, 06/16/11, 06/21/12, 06/20/13

**ARCHIVED DATE:** 06/19/14

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- If the member's subscriber contract excludes coverage for a specific service it is not covered under that contract. In such cases, medical policy criteria are not applied.
- Medical policies apply to commercial and Medicaid products only when a contract benefit for the specific service exists.
- Medical policies only apply to Medicare products when a contract benefit exists and where there are no National or Local Medicare coverage decisions for the specific service.

### POLICY STATEMENT:

Based upon our criteria and review of the peer reviewed literature, surface electromyography, including paraspinal SEMG or scanning SEMG, has not been proven to be effective and is considered investigational for diagnosis and management of musculoskeletal conditions including, but not limited to, back pain.

*Refer to Corporate Medical Policy #2.01.09 regarding Biofeedback.*

*Refer to Corporate Medical Policy #2.01.13 regarding Computerized Motion Diagnostic Imaging.*

### POLICY GUIDELINES:

I. This policy does not address needle EMG or the use of surface EMG electrodes in gait analysis or biofeedback.

II. The Federal Employee Health Benefit Program (FEHBP/FEP) requires that procedures, devices or laboratory tests approved by the U.S. Food and Drug Administration (FDA) may not be considered investigational and thus these procedures, devices or laboratory tests may be assessed only on the basis of their medical necessity.

### DESCRIPTION:

Surface EMG records the summation of muscle electrical activity from groups of muscles using one or an array of electrodes placed on the skin surface that transmit data to computer software for analysis. Recordings are made at rest, in various positions, or after exercise. Electrical activity can be assessed by analysis of the frequency spectrum, amplitude, or root mean square of electrical action potentials. Hand held devices for recording and analysis have also been developed. SEMG is proposed as an objective tool to diagnose and monitor response to treatment of musculoskeletal conditions, for example back pain, based on a relationship between pain and muscle function status and myoelectrical activity. Back pain is thought to be associated with increased and/or asymmetrical activity measured by SEMG. The most commonly used electromyographic parameter to detect muscle weakness is related to neuromuscular efficiency which suggests that a weak subject activates more motor units to exert a given absolute force than a stronger subject. Paraspinal surface EMG or surface scanning EMG has been suggested to establish the etiology of back pain, to monitor response to therapy, and establish physical activity limits such as capacity to lift heavy objects or ability to return to work. The technology is generally used in the clinic setting but may be a component of biofeedback equipment used at home. It is also a component of gait analysis devices.

### RATIONALE:

A number of SEMG devices, some of them recording EMG activity in combination with other physiological parameters, have received FDA approval.

Many studies of the technical performance of SEMG have been reported in the medical literature. A technology assessment, “The Use of Surface EMG in the Diagnosis and Treatment of Nerve and Muscle Disorders,” published in 1999 by The American Association of Electrodiagnostic Medicine (now the American Association of Neuromuscular & Electrodiagnostic Medicine) and the American Academy of Physical Medicine and Rehabilitation concluded that there are no clinical indications for the use of SEMG in the diagnosis and treatment of disorders of nerve or muscle. The Therapeutics and Technology Assessment Subcommittee of the American Academy on Neurology (AAN) reported in
2000 that SEMG is considered unacceptable as a clinical tool in the diagnosis of neuromuscular disease and low back pain. Larivière, et al compared SEMG parameters of 20 healthy men with 20 men with chronic low back pain and found that daily individual measurements of individuals were consistent but no parameter was sensitive to differences between groups in back muscle strength or muscle composition. Kramer, et al demonstrated that the muscles of patients with pain have less pronounced signs of fatigue during submaximal endurance contraction. Finneran, et al, using a large array technique, demonstrated that electrical activity patterns were significantly different in normal subjects vs. patients with acute or chronic back pain. Images of regional muscle activity of healthy subjects (n=163) showed symmetrical activity while patients with acute or chronic low back pain (n=38) had multifocal and/or asymmetrical patterns. Three of 13 patients with acute low back pain experienced resolution of their pain during the study, and their SEMG images became symmetrical. In a 2002 analysis of data from previous studies, Lehman found no differences in bilateral symmetry during a flexion task for the upper erector spinae between patients with low back pain and healthy controls, however differences between groups did exist for the lower erector spinae. Data to support the contribution of SEMG to clinical decision making or the impact of its use on health outcomes are not reported in the scientific literature.

The American Association of Neuromuscular and Electrodiagnostic Medicine evidenced-based review on the use of SEMG in the diagnosis and study of neuromuscular disorders (Meekins, et al. October 2008) made the following statement: The data are insufficient to determine the clinical utility of SEMG for distinguishing between neuropathic and myopathic conditions or for detecting the more specific neuromuscular conditions of post-polio myelitis syndrome, pathologic fasciculations, acquired demyelinating peripheral neuropathy, amyotrophic lateral sclerosis, myotonic dystrophy, and hypokalemic periodic paralysis. The data are insufficient to address the question of disease severity detectable by SEMG. The data are insufficient to compare diagnostic utility of SEMG with the conventional technologies of NEMG, NCS, and muscle ultrasonography. Future studies should study patients with neuromuscular diseases defined by a carefully chosen reference (gold) standard. The technique should also be applied to a broad spectrum of subjects including healthy controls and patients with nonneuromuscular diseases. There should be adequate blinding, and the size of the cohorts should be sufficient to detect meaningful differences.

**CODES:**

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<td>Eligibility for reimbursement is based upon the benefits set forth in the member’s subscriber contract.</td>
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CODES MAY NOT BE COVERED UNDER ALL CIRCUMSTANCES. PLEASE READ THE POLICY AND GUIDELINES STATEMENTS CAREFULLY.

Codes may not be all inclusive as the AMA and CMS code updates may occur more frequently than policy updates.

Code Key: Experimental/Investigational = (E/I), Not medically necessary/ appropriate = (NMN).

**CPT:**

No specific CPT codes

**HCPCS:**

S3900 (E/I)  Surface electromyography (EMG)

**ICD9:**

Investigational for all diagnoses

**ICD10:**

Investigational for all diagnoses

**REFERENCES:**


*key article

**KEY WORDS:**
Paraspinal EMG, Scanning EMG, SEMG, Surface Electromyography

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**CMS COVERAGE FOR MEDICARE PRODUCT MEMBERS**

There is currently a Local Coverage Determination (LCD) and article for nerve conduction studies/electromyography. Please refer to the following LCD website for Medicare Members:

- [http://apps.ngsmedicare.com/lcd/LCD_L26869.htm](http://apps.ngsmedicare.com/lcd/LCD_L26869.htm)
- [http://apps.ngsmedicare.com/sia/ARTICLE_A46185.htm](http://apps.ngsmedicare.com/sia/ARTICLE_A46185.htm)