MEDICAL POLICY – 2.01.73

Actigraphy

BCBSA Ref. Policy: 2.01.73
Effective Date: Sept. 1, 2019
Last Revised: Aug. 6, 2019
Replaces: N/A

RELATED MEDICAL POLICIES:
None

Select a hyperlink below to be directed to that section.

POLICY CRITERIA | CODING | RELATED INFORMATION
EVIDENCE REVIEW | REFERENCES | HISTORY

∞ Clicking this icon returns you to the hyperlinks menu above.

Introduction

Actigraphy is the recording of how a body moves. Actigraphy uses a small device that is usually placed on the wrist or ankle. In some cases the device is placed on a leg to assess restless legs syndrome. It also has been used to try to look at a person’s sleep-wake cycles. High quality medical studies do not show that actigraphy works as well as or better than the usual ways of determining sleep-wake cycles. For this reason, actigraphy is considered investigational (unproven).

Note: The Introduction section is for your general knowledge and is not to be taken as policy coverage criteria. The rest of the policy uses specific words and concepts familiar to medical professionals. It is intended for providers. A provider can be a person, such as a doctor, nurse, psychologist, or dentist. A provider also can be a place where medical care is given, like a hospital, clinic, or lab. This policy informs them about when a service may be covered.

Policy Coverage Criteria
Service | Investigational
--- | ---
Actigraphy | Actigraphy is considered investigational when used as the sole technique to record and analyze body movement, including but not limited to its use to evaluate sleep disorders.

**Note:** This does not include the use of actigraphy as a component of portable sleep monitoring.

### Coding

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPT</td>
<td></td>
</tr>
<tr>
<td>95803</td>
<td>Actigraphy testing, recording, analysis, interpretation and report (minimum of 72 hours to 14 consecutive days of recording)</td>
</tr>
</tbody>
</table>

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### Related Information

N/A

### Evidence Review

**Description**

Actigraphy refers to the assessment of body movement activity patterns using devices, typically placed on the wrist or ankle, during sleep, which are interpreted by computer algorithms as periods of sleep and wake. Sleep-wake cycles may be altered in sleep disorders, including insomnia and circadian rhythm sleep disorders. Also, actigraphy could be used to assess sleep/wake disturbances associated with other disorders.
Background

Sleep Disorders

Sleep disorders affect a large percentage of the U.S. population. For example, estimates suggest that 15% to 24% of the U.S. population suffers from insomnia. Lack of sleep also contributes reduced cognitive functioning, susceptibility to heart disease, and workplace absenteeism.

Diagnosis

Actigraphy refers to the assessment of activity patterns (body movement) using devices, typically placed on the wrist or ankle, which are interpreted by computer algorithms as periods of sleep (absence of activity) and wake (activity). Actigraphy devices are typically placed on the nondominant wrist with a wristband and are worn continuously for at least 24 hours. Activity is usually recorded for a period of three days to two weeks but can be collected continuously over extended periods with regular downloading of data onto a computer. The activity monitors may also be placed on the ankle to assess restless legs syndrome or on the trunk to record movement in infants.

The algorithms for detecting movement vary across devices and may include “time above threshold,” the “zero crossing method” (the number of times per epoch that activity level crosses zero), or “digital integration” method, resulting in different sensitivities. Sensitivity settings (eg, low, medium, high, automatic) can also be adjusted during data analysis. The most commonly used method (digital integration) reflects both acceleration and amplitude of movement.

Data on patient bed times (lights out) and rise times (lights on) are usually entered into the computer from daily patient sleep logs or by patient-activated event markers. Proprietary software is then used to calculate periods of sleep based on the absence of detectable movement, along with movement-related level of activity and periods of wake. In addition to providing graphic depiction of the activity pattern, the device-specific software can then analyze and report a variety of sleep parameters, including sleep onset, sleep offset, sleep latency, total sleep duration, and wake after sleep onset (actigraphy could also be used to measure the level of a person’s physical activity).

Actigraphy has been used for more than two decades as an outcome measure in sleep disorders research. For clinical applications, actigraphy is being evaluated as a measure of sleep-wake cycles in sleep disorders, including insomnia and circadian rhythm sleep disorders. Also,
actigraphy is being investigated as a measure of sleep-wake disturbances associated with other diseases and disorders.

Summary of Evidence

For individuals who have circadian sleep-wake rhythm disorders who receive actigraphy the evidence includes ancillary study within a randomized controlled trial. The relevant outcomes are test accuracy and test validity. Comparison with PSG has shown that actigraphy is limited in differentiating between sleep and wake in more disturbed sleep. Actigraphy appears to reliably measure sleep onset and total sleep time in some patient populations. Comparisons with PSG and sleep diaries are limited. Evidence has shown that actigraphy does not provide a reliable measure of sleep efficiency in this patient population. The evidence is insufficient to determine the effects of the technology on health outcomes.

For children and adolescents with sleep-associated disorders in children and adolescents who receive actigraphy the evidence includes prospective and retrospective validation studies. The relevant outcomes are test accuracy and validity. Comparisons with PSG have shown that actigraphy can differ significantly in its estimations of wake and sleep times and sleep onset latency. Comparisons with sleep diaries have also failed to show satisfactory agreement, with greater discrepancies for more disturbed sleep. Evidence has shown that actigraphy does not provide a reliable measure of sleep efficiency in this patient population. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have central disorders of hypersomnolence who receive actigraphy the evidence includes a comparative observational study. The relevant outcomes are test accuracy and validity. Comparison with video-PSG has indicated that actigraphy has a sensitivity of 26.1% and specificity of 95.5%. General evidence has also revealed that the accuracy of actigraphy for differentiating between wake and sleep decreases as the level of sleep disturbance increases. Although actigraphy appears to provide reliable measures of sleep onset and wake time in some patient populations, its clinical utility compared with that of sleep diaries has not been demonstrated. Evidence has shown that actigraphy does not provide a reliable measure of sleep efficiency in this patient population. The complexity of the various syndromes as well as the potential for medical treatment with significant adverse events makes accurate diagnosis essential. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have insomnia who receive actigraphy the evidence includes prospective and retrospective validation studies. The relevant outcomes are test accuracy and validity.
Comparisons with PSG have shown that actigraphy has poor agreement for reporting wake time and can overestimate sleep efficiency. Comparison with sleep diaries has indicated that actigraphy is less effective at differentiating between patients with insomnia and controls. General evidence has also revealed that the accuracy of actigraphy for differentiating between wake and sleep decreases as the level of sleep disturbance increases. Although actigraphy appears to provide reliable measures of sleep onset and wake time in some patient populations, its clinical utility compared with sleep diaries has not been demonstrated. Evidence has shown that actigraphy does not provide a reliable measure of sleep efficiency in this patient population. The evidence is insufficient to determine the effects of the technology on health outcomes.

Ongoing and Unpublished Clinical Trials

A search of ClinicalTrials.gov in April 2019 did not identify any ongoing or unpublished trials that would likely influence this review.

Practice Guidelines and Position Statements

American Academy of Sleep Medicine

The American Academy of Sleep Medicine (2018) published practice guidelines for the use of actigraphy for the evaluation of sleep disorders and circadian rhythm sleep disorders (see Table 1).16

Table 1. Recommendations for Actigraphy

<table>
<thead>
<tr>
<th>Condition</th>
<th>Actigraphy for Diagnosis</th>
<th>Actigraphy to Measure Treatment Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insomnia disorder (adult)</td>
<td>To estimate sleep parameters</td>
<td>Conditional</td>
</tr>
<tr>
<td>Insomnia disorder (pediatric)</td>
<td>Assessment of patients</td>
<td>Conditional</td>
</tr>
<tr>
<td>Circadian rhythm sleep-wake disorder (adult)</td>
<td>Assessment of patients</td>
<td>Conditional</td>
</tr>
<tr>
<td>Circadian rhythm sleep-wake disorder (pediatric)</td>
<td>Assessment of patients</td>
<td>Conditional</td>
</tr>
<tr>
<td>Suspected sleep-disordered</td>
<td>To estimate total sleep time during</td>
<td>Conditional</td>
</tr>
<tr>
<td>Condition</td>
<td>Actigraphy for Diagnosis</td>
<td>Actigraphy to Measure Treatment Response</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>breathing (adult)</td>
<td>recording, integrated with home sleep apnea test devices and in the absence of alternative objective measurements of total sleep time</td>
<td></td>
</tr>
<tr>
<td>Suspected central disorders of hypersomnolence (adult and pediatric)</td>
<td>To monitor total sleep time prior to testing with the Multiple Sleep Latency Test</td>
<td>Conditional</td>
</tr>
<tr>
<td>Suspected insufficient sleep syndrome (adult)</td>
<td>To estimate total sleep time</td>
<td>Conditional</td>
</tr>
<tr>
<td>Periodic limb movement disorder (adult and pediatric)</td>
<td>Recommendation to not use actigraphy in place of electromyography for diagnosis</td>
<td>Strong</td>
</tr>
</tbody>
</table>

“Strong” recommendation is one that clinicians should follow under most circumstances. “Conditional” recommendation reflects a lower degree of certainty regarding the outcome and appropriateness of the patient-care strategy for all patients.

The American Academy of Sleep Medicine (2008) practice parameters evaluated the clinical management of chronic insomnia in adults, stating that actigraphy is indicated as a method (option) to characterize circadian rhythm patterns or sleep disturbances in individuals with insomnia, including insomnia associated with depression.17

Medicare National Coverage
There is no national coverage determination.

Regulatory Status
Numerous actigraphy devices have been cleared for marketing by the U.S. Food and Drug Administration 510(k) process. Some actigraphy devices are designed and marketed to measure sleep-wake states while others to measure levels of physical activity.

Food and Drug Administration product code: OLV.
References


<table>
<thead>
<tr>
<th>Date</th>
<th>Comments</th>
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<tbody>
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<td>11/11/05</td>
<td>Add policy to Medicine Section - New Policy</td>
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<td>06/16/06</td>
<td>Update Scope and Disclaimer - No other changes.</td>
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<td>08/08/06</td>
<td>Replace Policy - Policy reviewed with literature search; references added; no change in policy statement.</td>
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<td>11/13/07</td>
<td>Replace Policy - Policy reviewed with literature search; references added; no change in policy statement.</td>
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<td>01/13/09</td>
<td>Code Update - Code 95803 added, effective 1/1/09.</td>
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<td>Replace Policy - Policy updated with literature review through December 2010; references added and reordered; policy statement unchanged.</td>
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<td>04/10/12</td>
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<td>Annual Review. Policy updated with literature review through January 6, 2014; references 7, 10, 12, 15, 18, and 25 added; policy statement unchanged. ICD-9 and ICD-10 diagnosis and procedure codes removed; they are not utilized in adjudication.</td>
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<td>11/20/15</td>
<td>Update Related Policies. Remove 7.01.516.</td>
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<td>12/01/16</td>
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<tr>
<td>11/01/17</td>
<td>Interim Review, approved October 19, 2017. Policy updated with literature review</td>
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**Date** | **Comments**
---|---
| through July 21, 2017; no references added. Policy statement unchanged. |
01/01/18 | Minor update; removed 2.01.503 from Related Policies as it was archived. |
09/01/18 | Annual Review, approved August 10, 2018. Policy updated with literature review through April 2018; references 1 and 20 added. Policy statement unchanged. |

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