# Clinical Policy: Digital EEG Spike Analysis

Reference Number: PA.CP.MP.105
Plan Effective Date: 06/2018
Date of Last Revision: 10/2024

Coding Implications
Revision Log

**Description**

Electroencephalography (EEG) is a significant component of epilepsy diagnosis, along with a thorough medical history and neurological workup.[1] Most EEGs today are performed on digital machines, which record data and automatically detect spikes that may indicate seizures.[2] For the purpose of this policy, digital EEG spike analysis, also known as 3D dipole localization or dipole source imaging, refers to additional analysis of digitally recorded EEG spikes by a technician and a physician.

**Policy/Criteria**

**I.** It is the policy of PA Health & Wellness (PHW), that digital electroencephalography (EEG) spike analysis, including topographic voltage and/or dipole analysis, is **medically necessary** for the pre-surgical evaluation of members/enrollees with intractable epilepsy, in conjunction with video EEG long-term monitoring.

**II.** It is the policy of PHW that digital EEG spike analysis is **not medically necessary** for any other indication.

**Background**

According to the American Clinical Neurophysiology Society's (ACNS) Guidelines for Long Term Monitoring of Epilepsy, digital electroencephalography (EEG) is the industry standard.[2] Ambulatory EEG, video EEG, and routine EEG all use digital technology and usually incorporate automatic spike detection. These types of EEG analyses are not the same as digital EEG spike (3D dipole localization) analysis. Digital EEG spike analysis assessment and billing should not be used for cases when the EEG was only recorded on digital equipment. Digital EEG spike analysis assessment is reserved specifically for times when substantial additional digital analysis was medically necessary and was performed, such as 3D dipole localization. In these specific circumstances, this would entail an additional hour's work by the technician to process the data from the digital EEG, as well as an extra 20 to 30 minutes of physician time to review the technician's work and review the data produced. This type of analysis is most commonly performed at specialty centers that involve epilepsy surgery programs.[3]

It is important to note that the ACNS specifically states that ambulatory EEG is not appropriate for detailed characterization of EEG features as is required in presurgical evaluation.[2] 3D spike dipole source analysis, or digital EEG spike analysis, has been shown to be concordant with other modes of presurgical evaluation of epilepsy, including a thorough neurological workup with video EEG, magnetic resonance imaging (MRI), and multiple other imaging and neuropsychological tests; electrocorticography; and magnetoencephalography.[4] Studies have demonstrated "that dipole source models can be successfully employed to detect the epileptogenic foci of interictal epileptiform discharges."[4(p320)] Therefore, digital EEG spike analysis is recommended for the presurgical evaluation of intractable epilepsy patients.[4]

**Coding Implications**

| CPT®* Codes | Procedure codes that support medical necessity criteria |
|---|---|
| 95957 | Digital analysis of electroencephalogram (EEG) (eg, for epileptic spike analysis) *when performed in conjunction with any of the following: |
| 95718 | Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation and report, 2-12 hours of EEG recording; with video (VEEG) |
| 95720 | Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, each increment of greater than 12 hours, up to 26 hours of EEG recording; interpretation and report after each 24-hour period; with video (VEEG) |
| 95722 | Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation, and summary report, complete study, greater than 36 hours, up to 60 hours of EEG recording, with video (VEEG) |
| 95724 | Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation, and summary report, complete study, greater than 60 hours, up to 84 hours of EEG, with video (VEEG) |
| 95726 | Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation, and summary report, complete study, greater than 84 hours, with video (VEEG) |

**ICD-10-CM Diagnosis Codes that Support Coverage Criteria**

+ indicates a code requiring an additional character

| ICD-10-CM Code | Diagnosis codes that support medical necessity criteria |
|---|---|
| G40.011 | Localization-related (focal) (partial) idiopathic epilepsy and epileptic syndromes with seizures of localized onset, intractable, with status epilepticus |
| G40.019 | Localization-related (focal) (partial) idiopathic epilepsy and epileptic syndromes with seizures of localized onset, intractable, without status epilepticus |
| G40.111 | Localization-related (focal) (partial) symptomatic epilepsy and epileptic syndromes with simple partial seizures, intractable, with status epilepticus |
| G40.119 | Localization-related (focal) (partial) symptomatic epilepsy and epileptic syndromes with simple partial seizures, intractable, without status epilepticus |

| ICD-10-CM Code | Diagnosis codes that support medical necessity criteria |
|---|---|
| G40.211 | Localization-related (focal) (partial) symptomatic epilepsy and epileptic syndromes with complex partial seizures, intractable, with status epilepticus |
| G40.219 | Localization-related (focal) (partial) symptomatic epilepsy and epileptic syndromes with complex partial seizures, intractable, without status epilepticus |
| G40.311 | Generalized idiopathic epilepsy and epileptic syndromes, intractable, with status epilepticus |
| G40.319 | Generalized idiopathic epilepsy and epileptic syndromes, intractable, without status epilepticus |
| G40.411 | Other generalized epilepsy and epileptic syndromes, intractable, with status epilepticus |
| G40.419 | Other generalized epilepsy and epileptic syndromes, intractable. without status epilepticus |
| G40.803 | Other epilepsy, intractable, with status epilepticus |
| G40.804 | Other epilepsy, intractable, without status epilepticus |
| G40.813 | Lennox-Gastaut syndrome, intractable, with status epilepticus |
| G40.814 | Lennox-Gastaut syndrome, intractable, without status epilepticus |
| G40.823 | Epileptic spasms, intractable, with status epilepticus |
| G40.824 | Epileptic spasms, intractable, without status epilepticus |
| G40.911 | Epilepsy, unspecified, intractable, with status epilepticus |
| G40.919 | Epilepsy, unspecified, intractable, without status epilepticus |
| G40.A11 | Absence epileptic syndrome, intractable, with status epilepticus |
| G40.A19 | Absence epileptic syndrome, intractable, without status epilepticus |
| G40.B11 | Juvenile myoclonic epilepsy, intractable, with status epilepticus |
| G40.B19 | Juvenile myoclonic epilepsy, intractable without status epilepticus |
| G40.C11 | Lafora progressive myoclonus epilepsy, intractable, with status epilepticus |
| G40.C19 | Lafora progressive myoclonus epilepsy, intractable, without status epilepticus |

| Reviews, Revisions, and Approvals | Date | Approval Date |
|---|---|---|
| Policy created. | 04/18 | 09/18 |
| References reviewed and updated. | 02/19 | 03/19 |
| References reviewed and updated. Updated description. Removed Quantitative EEG from criteria I and reworded the statement. Removed CPT codes 95830, 95950, 95951, 95953, 95954, 95955, 95956 and 95958. Added CPT: 95718, 95720, 95722, 95724, 95726 (new codes for 2020.) | | |
| Replaced "members" with "members/enrollees' in all instances. References reviewed and updated. Added Section I "Individual consideration on a case by case basis when the long-term EEG is inconclusive and additional testing for possible epileptic spikes or seizures is needed." | 6/3/2021 | |
| Changed "review date" in the header to "date of last revision" and "date" in the revision log header to "revision date." | 07/26/2022 | |

| Reviews, Revisions, and Approvals | Date | Approval Date |
|---|---|---|
| References reviewed, updated and reformatted. Reviewed by specialist. | | |
| Annual review. Minor rewording in Criteria I. Background updated with no impact on criteria. References reviewed and updated. Reviewed by external specialist. | 11/2023 | 01/2024 |
| Annual Review complete. Added new for 2024 ICD-10 codes G40.C11 and G40.C19 to ICD-10 coding table. In the coding description for 95957, added a note that was previously removed in error stating that it is performed in conjunction with any of the CPT codes below it. References reviewed and updated. Reviewed by external specialist. | 06/2024 | 09/2024 |
| Annual review. Aligned with Corporate review schedule; Background updated with no impact on criteria. References reviewed and updated. Reviewed by external specialist. | 10/2024 | |

**References**

1. Moeller J, Haider HA, Hirsch LJ. Electroencephalography (EEG) in the diagnosis of seizures and epilepsy. UpToDate. www.uptodate.com. Published July 22, 2024. Accessed August 08, 2024.
2. American Clinical Neurophysiology Society. Guideline twelve: guidelines for long-term monitoring for epilepsy. *J Clin Neurophysiol*. 2008;25(3):170 to 180. doi:10.1097/WNP.0b013e318175d472
3. Cascino GD. Surgical treatment of epilepsy in adults. UpToDate. www.uptodate.com. Published June 24, 2024. Accessed August 06, 2024.
4. Park CJ, Seo JH, Kim D, et al. EEG Source Imaging in Partial Epilepsy in Comparison with Presurgical Evaluation and Magnetoencephalography. *J Clin Neurol*. 2015;11(4):319 to 330. doi:10.3988/jcn.2015.11.4.319
5. Benczizky S, Rosenzweig I, Scherq M, et al. Ictal EEG source imaging in presurgical evaluation: High agreement between analysis methods. *Seizure.* 2016;43:1 to 5. doi: 10.1016/j.seizure.2016.09.017
6. Staljanssens W, Strobbe G, Van Holen R, et al. EEG source connectivity to localize the seizure onset zone in patients with drug resistant epilepsy. *Neuroimage Clin*. 2017;16:689 to 698. Published 2017 Sep 14. doi:10.1016/j.nicl.2017.09.011
7. Sharma P, Scherg M, Pinborg LH, et al. Ictal and interictal electric source imaging in pre-surgical evaluation: a prospective study. *Eur J Neurol*. 2018;25(9):1154 to 1160. doi: 10.1111/ene.13676
8. Lu Y, Yang L, Worrell GA, He B. Seizure source imaging by means of FINE spatio-temporal dipole localization and directed transfer function in partial epilepsy patients. *Clin Neurophysiol.* 2012;123(7):1275 to 1283. doi:10.1016/j.clinph.2011.11.007
9. Local coverage determination: special EEG tests (L34521). Centers for Medicare and Medicaid Services Web site. http://www.cms.hhs.gov/mcd/search.asp. Published October 01, 2015 (revised January 08, 2019). Accessed August 06, 2024.