

2017 Revised Classification of Seizures

The International League Against Epilepsy (ILAE) is the world's main scientific body devoted to the study of epilepsy, and it has recently revised its classification of seizures. The changes will help make diagnosing and classifying seizures more accurate and easier.

In this article, you'll find the new general outline of basic seizure classification.

Background

People with epilepsy have recurring seizures that often occur spontaneously and without warning. The official definition of a seizure is “a transient occurrence of signs and/or symptoms due to an abnormal excessive or synchronous neuronal activity in the brain.”

This means that during a seizure, large numbers of brain cells are activated abnormally at the same time. It is like an “electrical storm” in the brain.

The nature of the seizures depends on many factors, such as the person's age, the sleep-wake cycle, prior injuries to the brain, genetic tendencies, medications, which circuits in the brain are involved, and many others.

Separating seizures into different types helps guide further testing, treatment, and prognosis or outlook. Using a common language for seizure classification also makes it easier to communicate among clinicians caring for people with epilepsy and doing research on epilepsy. The classification also provides common words for people with epilepsy and the general public to describe their seizures.

History of Seizure Classification

For decades, the most common words to describe seizures were grand mal and petit mal. Although the medical meaning of these terms was fairly precise, some people often used them loosely when referring to any big or little seizure.

For over 35 years, the terms partial and generalized seizures were used to describe types of seizures. This system divided seizures into partial (seizures starting in one area or side of the brain) and generalized (seizures starting in both sides of the brain at the same time).

Partial seizures were then defined by whether a person was aware or conscious during the seizure.

- **Simple partial seizures:** Person is aware of what happens during the event.
- **Complex partial seizures:** Person has some impaired awareness during the seizure. They may be confused, partially aware, or not aware of anything during a seizure.

The old classifications worked for many years but did not capture many types of seizures. This new version will hopefully be more complete.

The New Basic Classification

The basic classification is a simple version of the major categories of seizures. The new basic seizure classification is based on **3 key features**.

1. *Where seizures begin in the brain*
2. *Level of awareness during a seizure*
3. *Other features of seizures*

Defining Where Seizures Begin

The first step is to separate seizures by how they begin in the brain. The type of seizure onset is important because it affects choice of seizure medication, possibilities for epilepsy surgery, outlook, and possible causes.

Focal seizures: Previously called partial seizures, these start in an area or network of cells on one side of the brain.

Generalized seizures: Previously called primary generalized, these engage or involve networks on both sides of the brain at the onset.

Unknown onset: If the onset of a seizure is not known, the seizure falls into the unknown onset category. Later on, the seizures type can be changed if the beginning of a person's seizures becomes clear.

Focal to bilateral seizure: A seizure that starts in one side or part of the brain and spreads to both sides has been called a secondary generalized seizures. Now the term generalized refers only to the start of a seizure. The new term for secondary generalized seizure would be a *focal to bilateral seizure*.

Describing Awareness

Whether a person is aware during a seizure is of practical importance because it is one of the main factors affecting a person's safety during a seizure. Awareness is used instead of consciousness, because it is simpler to evaluate.

- **Focal aware:** If awareness remains intact, even if the person is unable to talk or respond during a seizure, the seizure would be called a *focal aware seizure*. This replaces the term **simple partial**.
- **Focal impaired awareness:** If awareness is impaired or affected at any time during a seizure, even if a person has a vague idea of what happened, the seizure would be called *focal impaired awareness*. This replaces the term **complex partial seizure**.
- **Awareness unknown:** Sometimes it's not possible to know if a person is aware or not, for example if a person lives alone or has seizures only at night. In this situation, the awareness term may not be used or it would be described as awareness unknown.
- **Generalized seizures:** These are all presumed to affect a person's awareness or consciousness in some way. Thus no special terms are needed to describe awareness in generalized seizures.

ILAE 2017 Classification of Seizure Types Basic Version ¹

Focal Onset

Aware

Impaired
Awareness

Motor Onset
Nonmotor Onset

focal to bilateral tonic-clonic

Generalized Onset

Motor

Tonic-clonic
Other motor

Nonmotor (Absence)

Unknown Onset

Motor

Tonic-clonic
Other motor

Nonmotor

Unclassified ²

Describing Motor and Other Symptoms in Focal Seizures

Many other symptoms may occur during a seizure. In this basic system, seizure behaviors are separated into groups that involve movement.

- **Focal motor seizure:** This means that some type of movement occurs during the event. For example twitching, jerking, or stiffening movements of a body part or automatism (automatic movements such as licking lips, rubbing hands, walking, or running).
- **Focal non-motor seizure:** This type of seizure has other symptoms that occur first, such as changes in sensation, emotions, thinking, or experiences.
- It is also possible for a focal aware or impaired awareness seizure to be sub-classified as motor or non-motor onset.
- **Auras:** The term aura to describe symptoms a person may feel in the beginning of a seizure is not in the new classification. Yet people may continue to use this term. It's important to know that in most cases, these early symptoms may be the start of a seizure.

Describing Generalized Onset Seizures

Seizures that start in both sides of the brain, called generalized onset, can be motor or non-motor.

- **Generalized motor seizure:** The generalized tonic-clonic seizure term is still used to describe seizures with stiffening (tonic) and jerking (clonic). This loosely corresponds to “grand mal.” Other forms of generalized motor seizures may happen. Many of these terms have not changed and a few new terms have been added. (see image on next page)
- **Generalized non-motor seizure:** These are primarily absence seizures and the term corresponds to the old term “petit mal.” These seizures involve brief changes in awareness, staring, and some may have automatic or repeated movements like lipsmacking.

Describing Unknown Onset Seizures

When the beginning of a seizure is not known, this classification still gives a way to describe whether the features are motor or non-motor.



The New Expanded Classification

The expanded classification keeps the framework of the basic classification, but adds more seizure types as subheadings. In the following image, the types of features under motor and non-motor seizures are listed for all types: focal, generalized, and unknown onset

ILAE 2017 Classification of Seizure Types Expanded Version ¹

Focal Onset

Aware

Impaired
Awareness

Motor Onset

automatisms
atonic ²
clonic
epileptic spasms ²
hyperkinetic
myoclonic
tonic

Non-Motor Onset

autonomic
behavior arrest
cognitive
emotional
sensory

focal to bilateral tonic-clonic

Generalized Onset

Motor

tonic-clonic
clonic
tonic
myoclonic
myoclonic-tonic-clonic
myoclonic-atonic
atonic
epileptic spasms

Non-Motor (absence)

typical
atypical
myoclonic
eyelid myoclonia

Unknown Onset

Motor

tonic-clonic
epileptic spasms
Non-Motor
behavior arrest

Unclassified ³

¹ Definitions, other seizure types and descriptors are listed in the accompanying paper and glossary of terms

² Degree of awareness usually is not specified

³ Due to inadequate information or inability to place in other categories

General Comments

Classification of a seizure type is only part of the seizure description. The work to update the seizure classification has been done by a large group of dedicated people in epilepsy over a number of years. This new system will move us forward, making it easier to describe seizures and using a common language to talk about them.

A few other points:

- The new classification is designed to have some flexibility. Use of other descriptive terms or even free text is encouraged.
- Most seizures can be classified by signs and symptoms that happen during a seizure. However, other information is useful when available, for example, phone videos, EEG, MRI, and other brain imaging, blood tests, or gene tests. For practical purposes, long descriptive terms are probably not useful for day-to-day life.
- This new seizure classification does not change the definition of epilepsy or epilepsy syndromes. The ILAE also has produced a new classification of the epilepsies, which we look forward to learning more about. The epilepsy classification includes the whole clinical picture, with information on seizure types, causes, EEG pattern, brain imaging, genetics, and epilepsy syndromes, such as Lennox-Gastaut syndrome and juvenile myoclonic epilepsy.

While the ILAE 2017 seizure classification is exciting, changing terms can be confusing and can take a lot of work. The Epilepsy Foundation and HeadWay Victoria Epilepsy and Parkinson's Centre are committed to helping educate people about the changes, what it means for them, and how older terminology relates to this new system.

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