Engel Epilepsy Surgery Outcome Scale

The Engel Epilepsy Surgery Outcome Scale arose out of the 1992 Palm Desert Conference on Epilepsy Surgery and is widely used to classify outcome after surgical treatment for medically refractory outcome.

Basic Outcome Scale

Class I: Free of disabling seizures

Class II: Rare disabling seizures ("almost seizure-free")

Class III: Worthwhile improvement

Class IV: No worthwhile improvement

Annotated Outcome Scale

Class I - Free of disabling seizures (completely seizure free; non-disabling, simple partial seizures only; some disabling seizures, but free of disabling seizures for at least 2 years; generalized convulsion with antiepileptic drug withdrawal only.)

Class II - Rare disabling seizures (initially free of disabling seizures, but rare seizures now; rare disabling seizures since surgery; more than rare disabling seizures, but rare seizures for at least 2 years; nocturnal seizures only.)

Class III - Worthwhile improvement (worthwhile seizure reduction; prolonged seizure-free intervals amounting to more than half the follow-up period, but not less than 2 years.)

Class IV - No worthwhile improvement (significant seizure reduction; no appreciable change; seizures worse.)

Engel's classification into four classes is not always adequate. For example, it is obvious that there is a difference between postsurgery patients allocated to an Engel class and who had their AEDs discontinued or reduced and those belonging to the same class but who had an increased or unchanged AED intake. One approach is to adjust the Engel classes for postoperative changes in AED state [1].

Engel Class	General Description	Detailed Engel Description		ILAE Classification
I	seizure-free or residual auras	I-A: completely seizure free since surgery		Class 1. Completely seizure free; no auras. Class 1a. Completely seizure free since surgery; no auras. Class 2. only auras; no other seizures
		I-B: nondisabling simple partial seizures only since surgery		
		I-C: some disabling seizures after seizures surgery, but free from disabling seizures for 2 yrs		
		I-D: generalized convulsions with ASM discontinuation only		
II	rare disabling seizures (<3 complex partial seizures per year)	II-A: initially free from disabling seizures, but still has rare seizures		Class 3. 1-3 seizure days/yr; ± auras
		II-B: rare disabling seizures since surgery		
		II-C: occasional disabling seizures since surgery, but rare seizures for the last 2 yrs		
		II-D: nocturnal seizures only		
III	worthwhile improvement	III-A: worthwhile seizure reduction		Class 4. 4 seizure days/yr - 50% reduction in baseline nuber of seizure days; ± auras
		III-B: prolonged seizure-free intervals of seizure days; auras amounting to 50% of follow-up period, but not 2 yrs		
IV	no worthwhile seizure improvement	IV-A: significant seizure reduction		Class 5. <50% reduction in baseline number of seizure days - 100% of baseline number of seizure days; ± auras
		IV-B: no appreciable change		
		IV-C: seizures worse		Class 6. >100% increase in baseline number of seizure days; ± auras

[1]

Kanchanatawan B, Limothai C, Srikijvilaikul T, Maes M. Clinical predictors of 2-year outcome of resective epilepsy surgery in adults with refractory epilepsy: a cohort study. BMJ Open. 2014 Apr 22;4(4):e004852. doi: 10.1136/bmjopen-2014-004852. PubMed PMID: 24755212; PubMed Central PMCID: PMC4010813.