

Extent of resection classification

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- [Proliferation-Diffusion Modeling in Glioblastoma: Impact of Supramaximal Resection on Survival](#)
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- [Imaging features and consideration of progression pattern of diffuse hemispheric gliomas, H3 G34-mutant](#)
- [Safety and Efficacy in the Transcortical and Transsylvian Approach in Insular High-Grade Gliomas: A Comparative Series of 58 Patients](#)
- [Prognostic revalidation of RANO categories for extent of resection in glioblastoma: a reconstruction of individual patient data](#)

□ 1. Total Resection

Definition: Complete removal of the visible and identifiable tumor.

Usage: General term, sometimes used interchangeably with Gross Total Resection, though may imply a broader removal (including microscopic disease).

Limitation: May overstate if no imaging or histological confirmation is done.

□ 2. Partial Resection

Definition: Only a portion of the tumor is removed.

Indications: Tumor is infiltrative, near eloquent brain areas, or patient cannot tolerate longer surgery.

Outcome: Generally associated with lower survival/progression-free survival rates compared to more extensive resections.

□ 3. Gross Total Resection (GTR)

Definition: 100% removal of contrast-enhancing tumor on postoperative imaging (usually MRI with gadolinium).

Goal: Remove all visible tumor on imaging, not necessarily microscopic infiltration.

Limitation: Microscopic disease may remain, especially in gliomas.

□ **4. Maximal Safe Resection**

Definition: Remove as much tumor as possible without causing significant neurological deficit.

Principle: Balance between oncological benefit and functional preservation.

Common Practice: Used especially in gliomas or tumors near eloquent areas (motor cortex, speech centers, etc.).

□ **5. Near Total Resection (NTR)**

Definition: >90–95% of tumor removed, but small residual remains (often due to risk of damage to critical areas).

Imaging: Tiny enhancing remnant visible on postop scan.

Use: Common compromise when Gross Total Resection risks too much morbidity.

□ **6. Subtotal Resection**

Definition: Less than Gross Total Resection, often <90% tumor removal.

Cause: Tumor location, size, vascularity, or infiltration into eloquent brain.

Prognosis: Intermediate between biopsy/partial and GTR.

□ **7. Supramaximal Resection**

Definition: Resection goes beyond the enhancing tumor margins, including removal of surrounding non-enhancing T2/FLAIR abnormality.

Goal: Target potential microscopic infiltration—especially in high-grade gliomas.

Benefit: Shown in some studies to improve survival, but with increased risk if not carefully planned.

□ **8. FLAIRectomy**

Definition: Surgical removal of areas of FLAIR hyperintensity on MRI (often non-enhancing, infiltrative parts of gliomas).

Specific to: Diffuse gliomas, particularly IDH-mutant gliomas where FLAIR abnormalities correlate with tumor infiltration.

Relation to Supramaximal: FLAIRectomy is a type of supramaximal resection.

Challenge: Differentiating between tumor infiltration and peritumoral edema or gliosis.

Total resection

Partial resection

Gross total resection (GTR)

Maximal safe resection

Near total resection (NTR)

Subtotal resection

Supramaximal resection.

FLAIRectomy

see [Kobayashi tumor removal grading system](#).

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