

Fractionated **stereotactic radiosurgery** (FSRS) is a treatment approach that combines the precision of stereotactic radiosurgery (SRS) with **fractionation**, or the delivery of radiation in multiple smaller doses over several sessions. Unlike traditional stereotactic radiosurgery, where a single high dose of radiation is delivered in a single session, FSRS spreads the total radiation dose across multiple treatment sessions. This technique is often used for the treatment of various brain conditions, including brain metastases, primary brain tumors, and certain functional neurological disorders.

Key features and considerations of fractionated stereotactic radiosurgery include:

**Dose Fractionation:** Instead of delivering the entire radiation dose in one session, FSRS divides the total dose into smaller fractions, typically administered daily or over a few weeks. This approach helps minimize damage to surrounding healthy tissues and reduces the risk of complications.

**Preservation of Normal Tissues:** Fractionation allows normal tissues surrounding the target area to recover between treatment sessions, reducing the likelihood of side effects such as radiation necrosis. This is particularly important when treating larger tumors or lesions close to critical structures.

**Increased Radiobiological Effect:** Fractionation takes advantage of the principles of radiobiology, where dividing the total dose into fractions can enhance the therapeutic effect on cancer cells while minimizing damage to normal tissues. This can improve the overall efficacy of the treatment.

**Treatment Planning:** Similar to conventional SRS, FSRS requires precise treatment planning and imaging. Advanced imaging technologies, such as magnetic resonance imaging (MRI) and computed tomography (CT), are used to precisely locate and target the lesion.

**Patient Immobilization:** Patients undergoing FSRS typically need to be immobilized during treatment to ensure accuracy. Immobilization devices, such as custom-fitted masks or head frames, are often used to minimize movement.

**Indications:** FSRS is commonly employed for treating larger or irregularly shaped lesions, lesions close to critical structures, or when there is a concern about normal tissue tolerance to a high single radiation dose. It is frequently used for brain metastases, meningiomas, acoustic neuromas, and other intracranial tumors.

**Treatment Schedule:** The total treatment duration and the number of fractions depend on the specific clinical scenario, the size and location of the lesion, and the overall health of the patient.

Fractionated stereotactic radiosurgery represents a balance between delivering an effective dose of radiation to target lesions while minimizing the risk of side effects associated with high-dose single-session treatments. It is essential for patients to discuss the treatment options, potential benefits, and associated risks with their healthcare team to make informed decisions based on their individual circumstances.

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