



## Clinical Applications of Frameless SRS

AAPM Annual Meeting – 2019  
San Antonio



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## radiosurgery

- First defined by Lars Leksell (1951)
  - the use of a stereotactically focused single high dose of ionizing radiation to destroy an intracranial target through the intact skull.



Leksell, 1907-1986



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### First Radiosurgery Treatment - 1951

- Karolinska Institute
- 280 kVp orthovoltage x-ray beam



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**Protons for Radiosurgery – 1958**

- Leksell and Larsson (physicist)



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**First Gamma Knife – 1968**

- Cobalt-60 sources



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**Use of Linac for SRS proposed by Larsson in 1974**

- Early 1980s when clinics started this approach
- First published reports of clinical results from Buenos Aires and Vicenza



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### Stereotactic localization



**Stereotactic Radiosurgery (SRS):**  
**Stereotactic:** Implies defining a point in 3D space relative to a Cartesian coordinate system (frame)

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### Stereotactic localization

- Concept developed by Robert Clarke in 1895
- First device constructed by Clarke (engineer, surgeon) and Victor Horsely (neurosurgeon) in 1905



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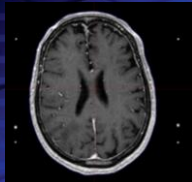
### Stereotactic localization



Leksell (Elekta)



CRW (Integra Life Sciences)



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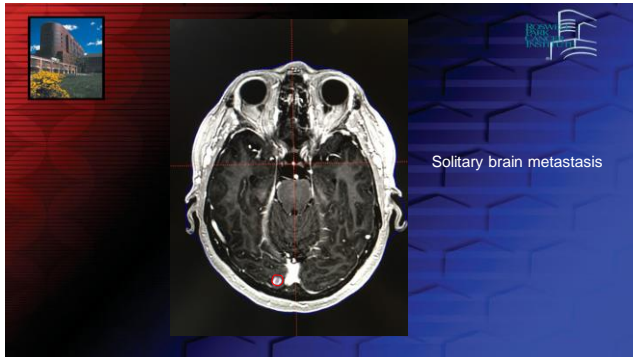
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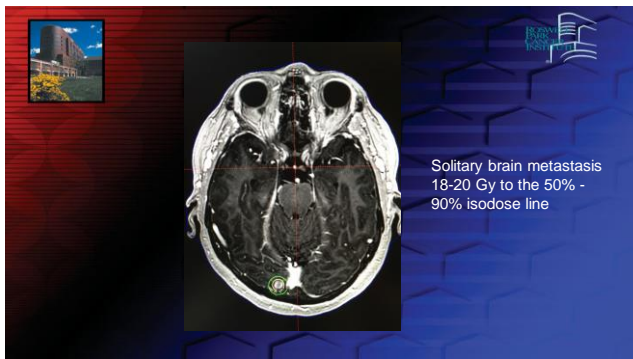
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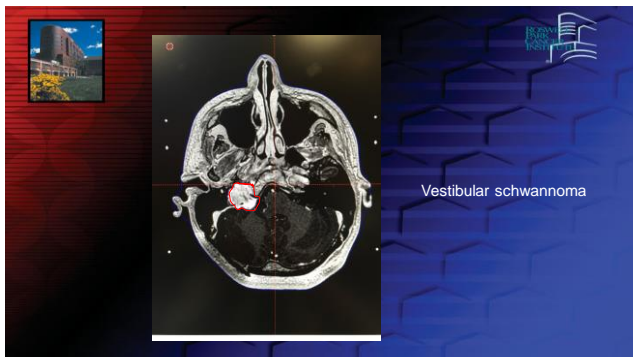
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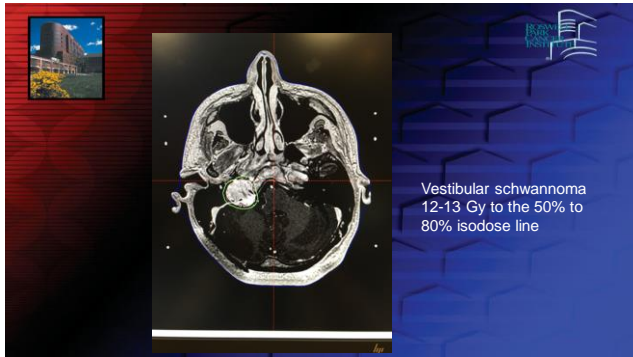
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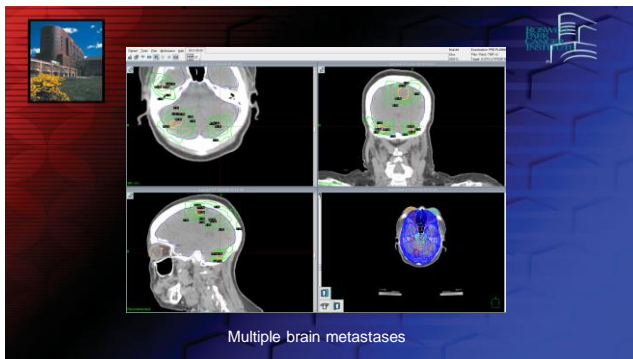
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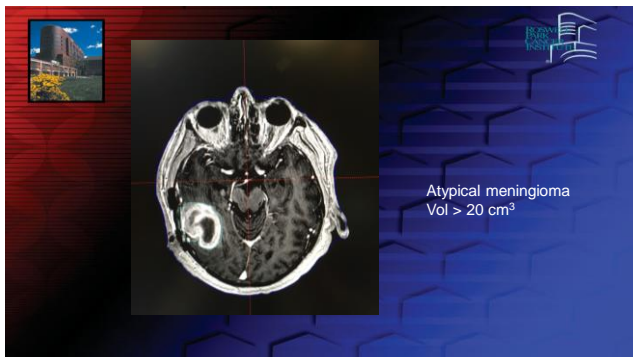
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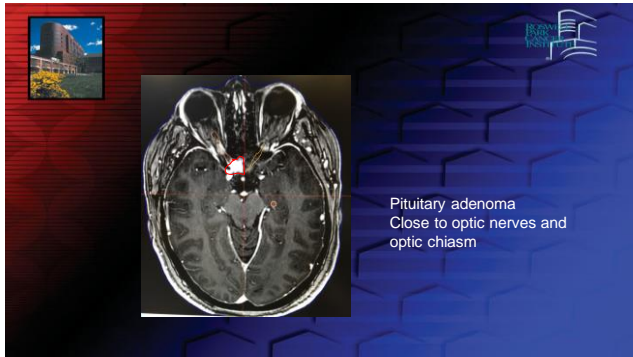
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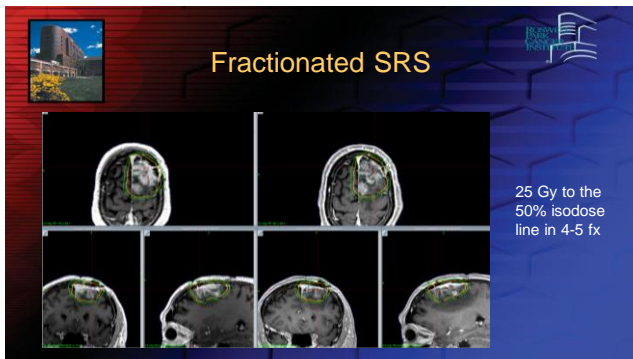
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### Learning objectives

1. Gain detailed knowledge of the components of each technology specific to frameless SRS
2. Understand the workflow involved in the application of each technology
3. Learn about the QA requirements for each technology

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