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# Single Arc Vs. Multiple Arc VMAT for Brain Tumors

Centro Diagnostico Italiano (CDI)  
Frontiers of Radiosurgery  
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# In NCCI

- Ergo ++

- Precise

Synergy(LINAC based SBRT & SRS)

- Monaco 5.1 (recently installed)

- Leksell Gamma Knife

Gamma Knife  
(SRS based)

# WHAT IS VMAT

- The dose rate varies as the gantry rotates around the patient.
- Radiation is on while gantry is rotating with MLC leaves moving continuously.

## VARIOUS WAYS TO DELIVER SRS/SBRT

✓ ICON Gamma Knife Radiosurgery

Rotating Gamma System(RGS)

Proton Radiosurgery

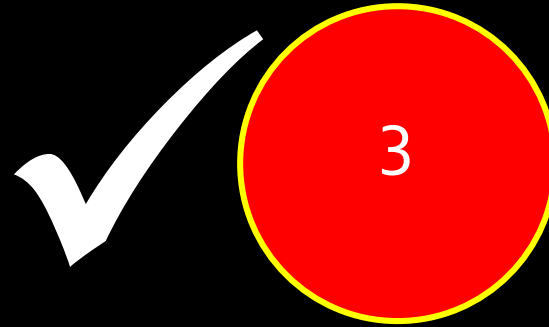
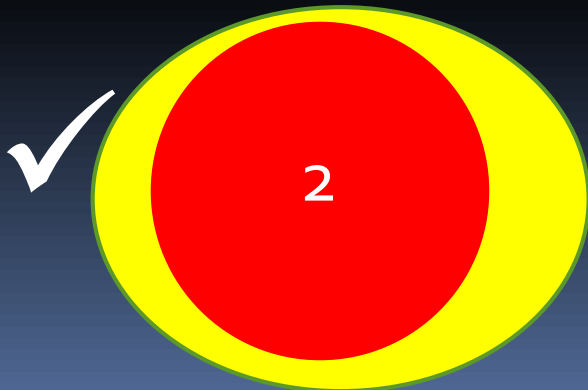
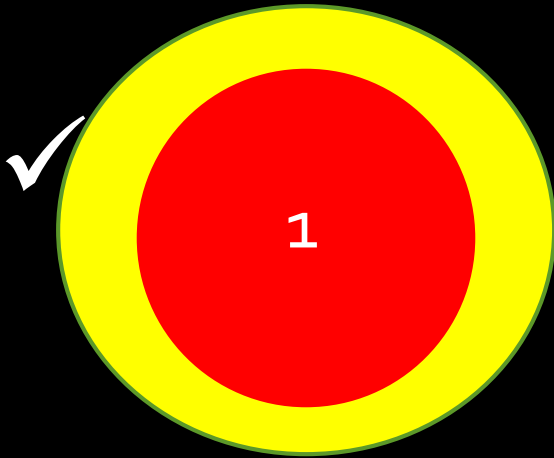
✓ LINAC Based Radiosurgery

Tomotherapy

LINAC Image guided Radiotherapy

# Selectivity Optimization

- Target
- Isodose line



# Elekta VMAT

- Anatomy based inverse (Ergo++).
- Full inverse planning solution (Monaco)

## VMAT Plan Design

- Coplanar vs. Noncoplanar
- Single arc vs. Multi-arc delivery

# Single vs. Multi Arc

Increasing the number of arcs provides additional flexibility in shaping the dose distribution.

The key questions are which cases benefit from the use of multiple arcs and what number of arcs should be used.

# Example

DMS Version 2.6.3

Patient Name: GHULAH FATIHA  
ID: SS2140  
Plan: 33

Treatment Type: DYNAMIC ARCS  
Optimization Mode: None  
Calculation Mode: NORMAL - Recomputed

Head First Supine

AXIAL Plane Z = 102.0 mm  
SAGITTAL Plane X = 119.0 mm  
CORONAL Plane Y = 32.1 mm

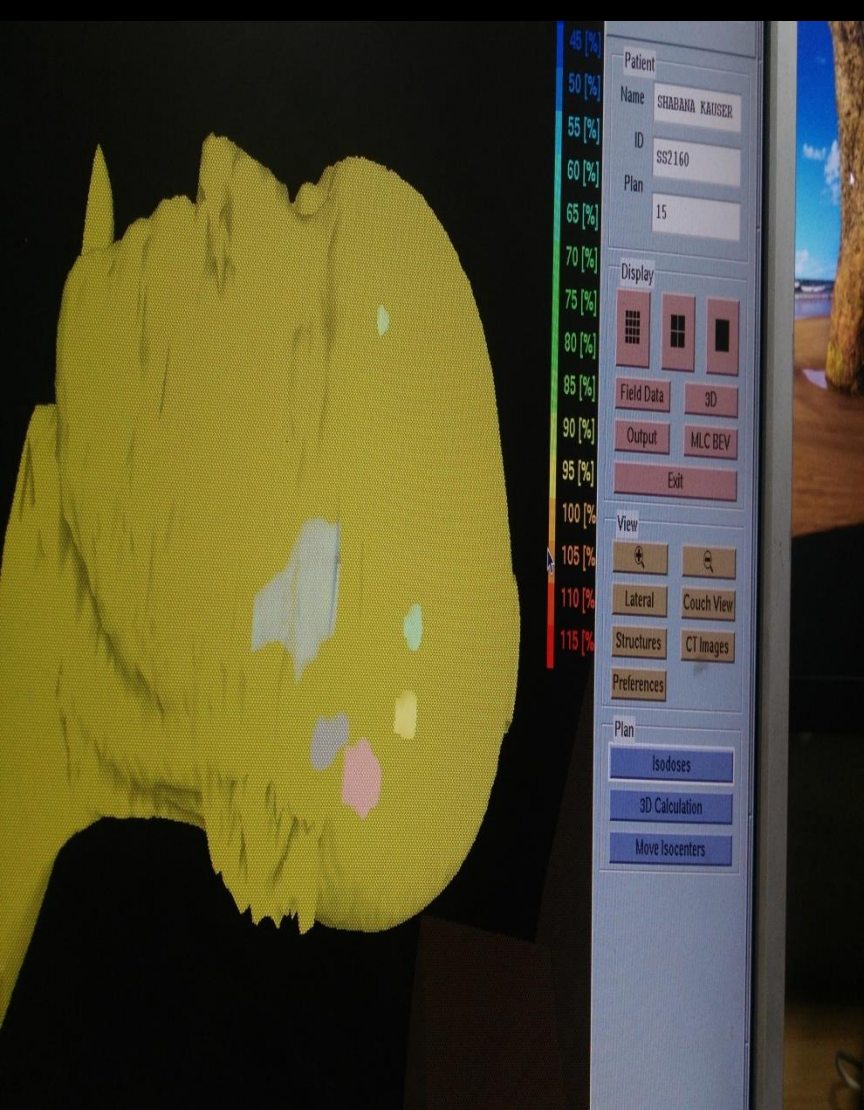
Dynamic Arc # 2  
GANTRY: 10  
COUCH: 0  
Collimator: 80

ELEKTA Beam Modulator

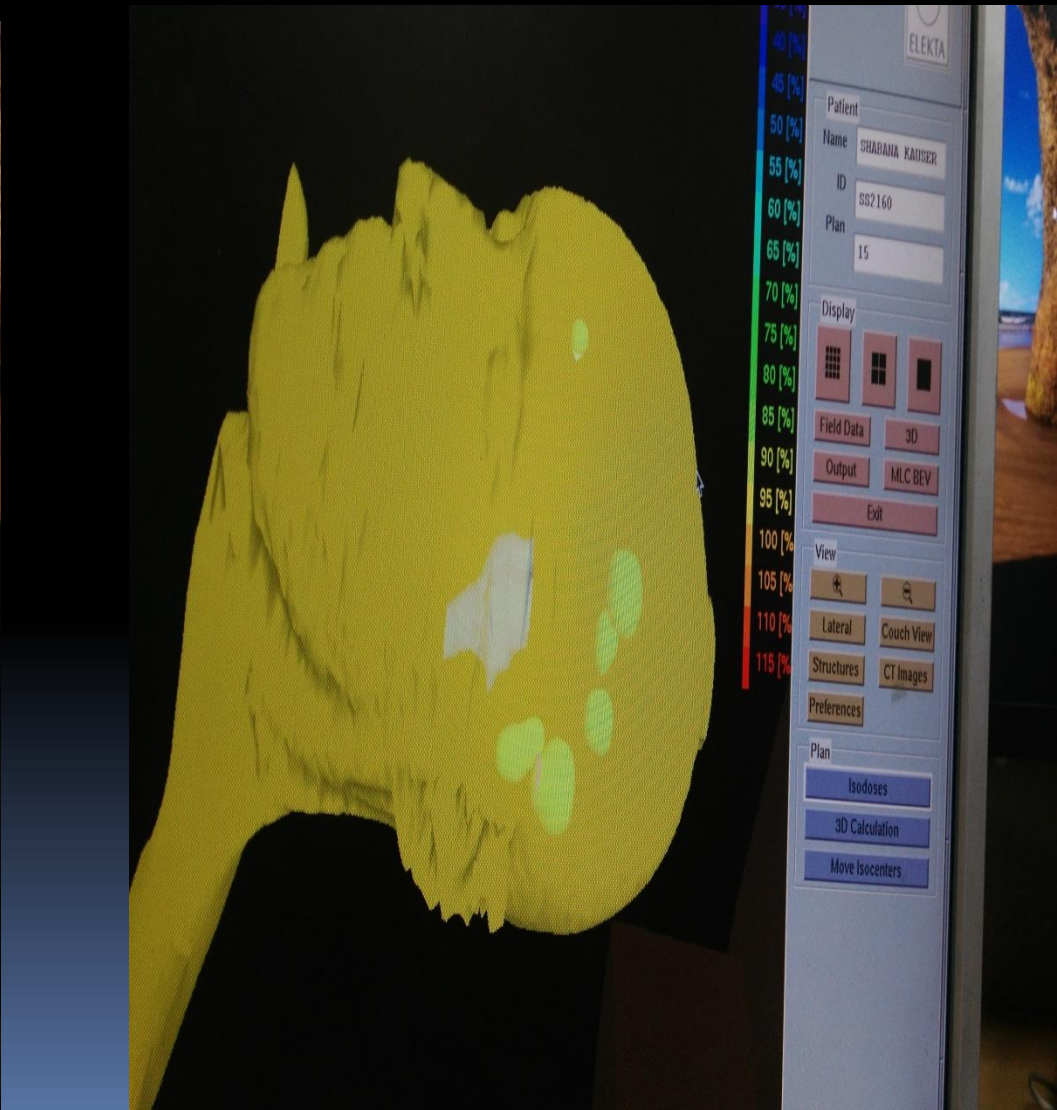
Patient Name: SIHAMA KAUSER  
ID: SS2140  
Plan: 15

Fluence Collimator  
Structures Preferences  
Save DRR  
EDIT Open Field

# Before planning



# After planning





## Advantages of VMAT

A major advantage of VMAT when compared to IMRT is that the Beam on time is greatly reduced and therefore the treatment time is greatly shortened.

Shorter treatment means less time for patient to be uncomfortable under a mask and reduced time for patient to accidentally move.

Treatment time can be cut by 80% when compared to IMRT with couch kicks.

## Disadvantages of VMAT

- Higher skin dose to the patient.
- Greater planning and computation time when compared to IMRT.

More complex treatment, requiring stringent QA to ensure synchronization of gantry, MLC, and dose rate.

Requiring more resources: including hardware and software

***THANK YOU***

