



PHYSICAL ASPECTS OF STEREOTACTIC BODY RADIOTHERAPY

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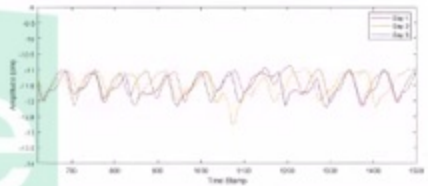
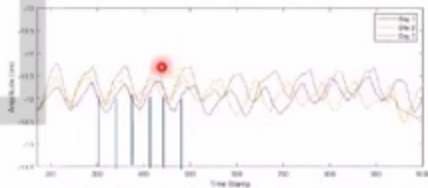
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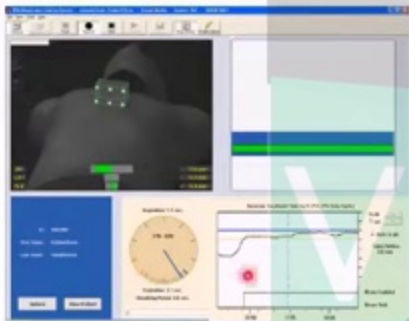
Gated Treatment for SBRT

- Dose is delivered only in particular phase of the respiratory cycle
- Reduces probability of delivering dose to normal tissue and under-dosing the target
- Increases treatment delivery time
- Affected by the reproducibility of a patient's breathing patterns
- The interplay between a mobile target and a dynamic multi-leaf collimator can compromise the accuracy of IMRT / VMAT dose delivery
 - More pronounced for single and fewer fractions



Breath hold scans

- The RPM PC screen is shown to the patient via video goggle



Implications of Flattening Filter

- The dose rate is substantially reduced
- FF scatter photons are one of the major sources of head scatter
- Medium / high Z material of FF, hardens the beam
- FFs are placed on a low Z material
 - Reduces the electrons produced in the thin target
 - Helps in cooling the target
- Therapeutic beams of energy higher than 8 MV produce neutrons due to interactions with the beam defining system
- FFs are one of the main sources of neutrons

Image guidance for SBRT

- kV CBCT
- Matching using bone landmarks
- One CBCT between arcs if more than one arc is used
- Fiducial

Fiducial Markers are Necessary for Accurate Delivery of Liver SBRT

J.P. Robin, B.L. Jones, K.A. Goodman

Department of Radiation Oncology, University of Colorado School of Medicine, Aurora, CO

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SBRT leads to a mean positional error of 4.5 mm as compared to fiducial-based set-up





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