



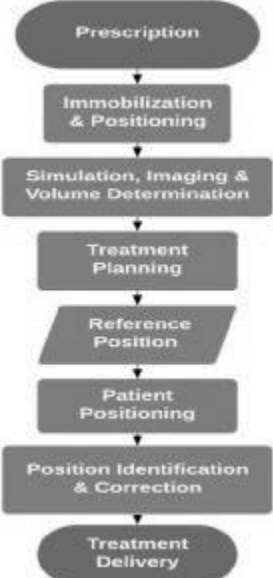

# Immobilization & simulation in radiotherapy




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## General process of radiotherapy



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graph TD; A[Prescription] --> B[Immobilization & Positioning]; B --> C[Simulation, Imaging & Volume Determination]; C --> D[Treatment Planning]; D --> E[/Reference Position/]; E --> F[Patient Positioning]; F --> G[Position Identification & Correction]; G --> H[Treatment Delivery];
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## History

- ▶ No immobilization Devices and Simulation !!!



Historical breast radiotherapy



irradiation in 1957 Retinoblastoma

USA



## Immobilization

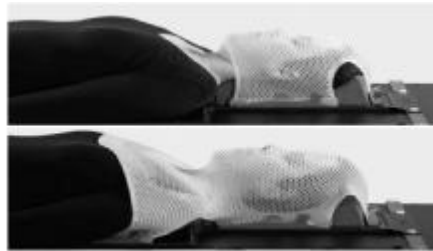
1. Immobilization means “incapable of movement”
2. Radiotherapy is designed very precisely to treat exactly the right area, so it is important to keep that part of the body as still as possible during treatment.
3. **Immobilization** device is used to make sure the patient stays in the treatment position during the course of treatment.



## Immobilization

- ▶ Although the *Primary goal* of immobilization is to limit patient motion and reduce the probability of major positioning errors.
- ▶ Next goal is to reduce the time of daily patient setup.

Result : to delivered precise prescribed dose ( by physician) to the target



## Early 1980 and Onwards...

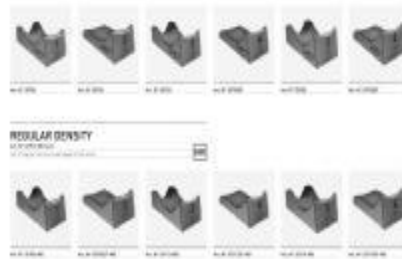
- ▶ Lasers
- ▶ Base plate
- ▶ Head supports
- ▶ Thermoplastic molds
- ▶ Vacuum molds
- ▶ Abdominal Compression

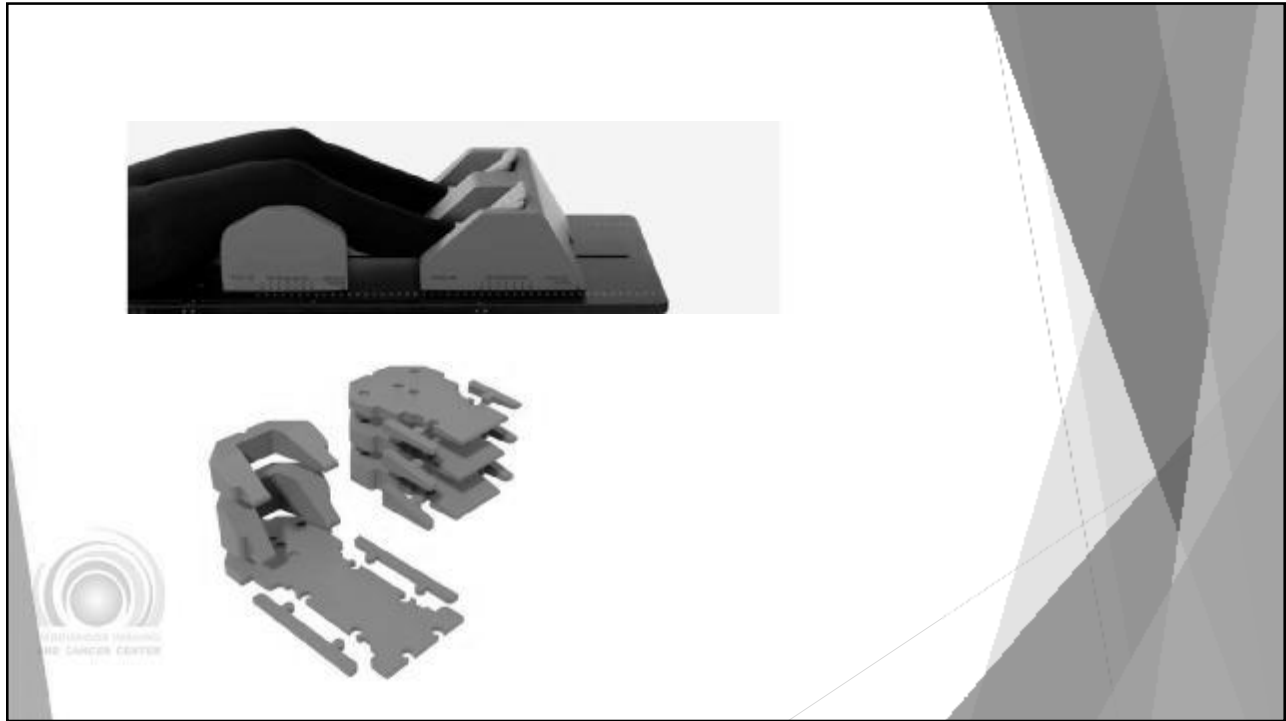


# Simulation

## ► Purpose of CT Simulation

Patients are imaged on a CT scanner **specially configured to acquire three dimensional images used for treatment planning**. The CT scanner allows the radiation oncologist to localize the tumor and surrounding areas that will require radiation treatments.





## Immobilization in TOMOTHERAPY in our clinic

- ▶ Dose scheduling for SRS & SBRT : High dose per fraction in each session  
So precise immobilization and reproducibility are important roles in Treatment course .

Exa : for lung SBRT we are using abdominal Compression device to control respiratory during treatment at each session.



