TomoTherapy

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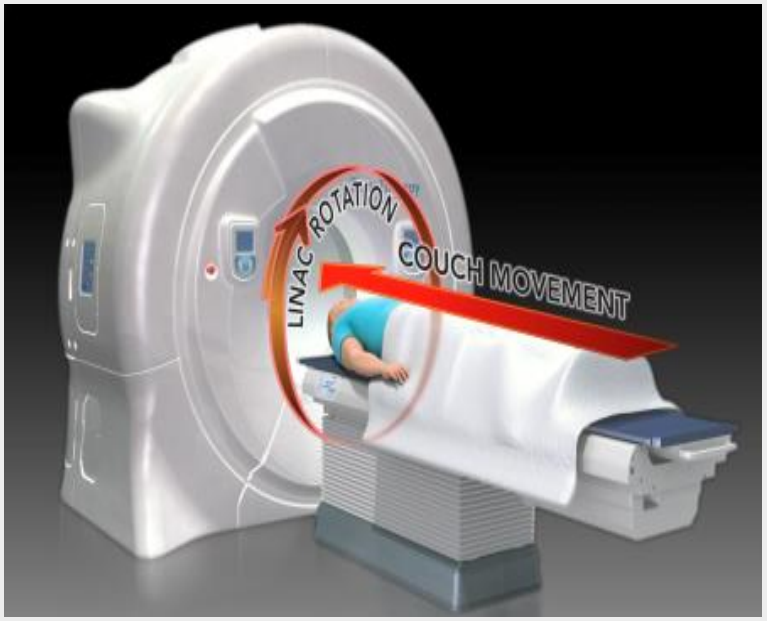
TomoTherapy – The Facts

- Greek – Tomo = slice
- Advanced form of IMRT
- 3D computerised tomography (CT) imaging immediately prior to treatment to verify the position of the tumour and surrounding anatomy
  - Ability to adjust the patient position based on CT information
- Linear accelerator mounted on a ring gantry, which moves in unison with a multileaf collimator

TomoTherapy – How it Works

- TomoTherapy differs from IMRT in that it is a helical IMRT delivery system
- Patients are placed onto a treatment couch which slowly moves them through a ring in which the radiation beam is housed



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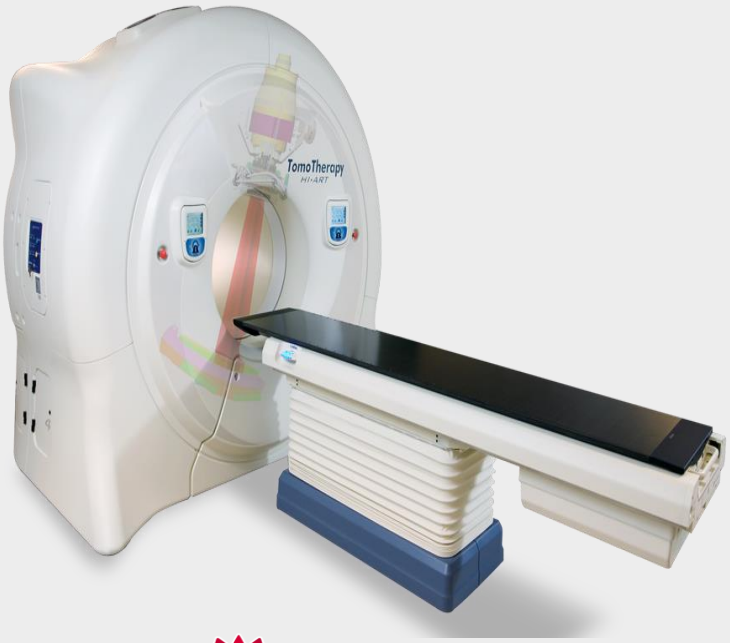
TomoTherapy – How it Works

- The beam rotates around the patient allowing tumours to be targeted from all angles continuously, compared with conventional radiotherapy machines which deliver radiation from a limited number of angles



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How it works!

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TomoTherapy vs Conventional

- Time on couch longer than conventional
  - Daily CT is used to precisely place the radiation beam and allows the modification of treatment should the patients anatomy change due to weight loss or tumour shrinkage (adaptive radiotherapy)
  - Daily CT imaging to guide treatment based on patient anatomy for that day, rather than for last week or last month
- Beam on time comparable

TomoTherapy - Advantages

- More beam directions gives more control in how treatments are planned, and more assurance that the dose will be confined to the tumour, reducing the risk of acute and late term treatment effects
- Minimize radiation exposure to healthy tissue
- TomoTherapy has enhanced precision (compared to conventional IMRT) in accurately distributing the radiation dose while delivering less radiation to the surrounding healthy tissue and altering radiation dose to compensate for patient/tumour movement

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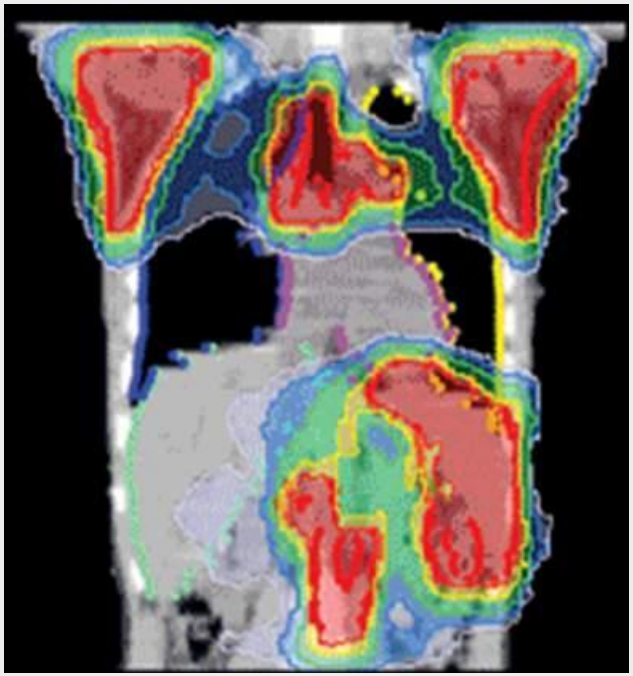
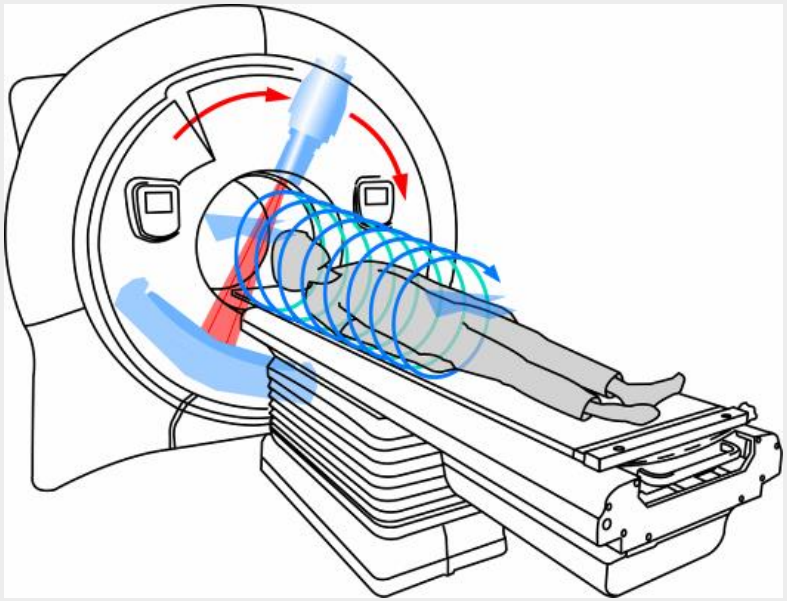
TomoTherapy - Advantages

- Retreating previously irradiated areas of the body
- Treating all sites throughout the body simultaneously
  - No need to reposition the patient



TomoTherapy - Advantages

- Allows treatment of tumours that might have been considered untreatable in the past due to close proximity of vital organs and structures



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TomoTherapy - Disadvantages

- Slight increased risk of radiation induced second malignancies
radiation-induced second malignancies years or even decades following treatment

TomoTherapy – Tumour Sites

- H&N
  - Highly conformal treatment with avoidance of sensitive organs, e.g. Salivary Glands
- CNS
- Pelvis
  - Sparing of female genitalia and small bowel

TomoTherapy – Tumour Sites

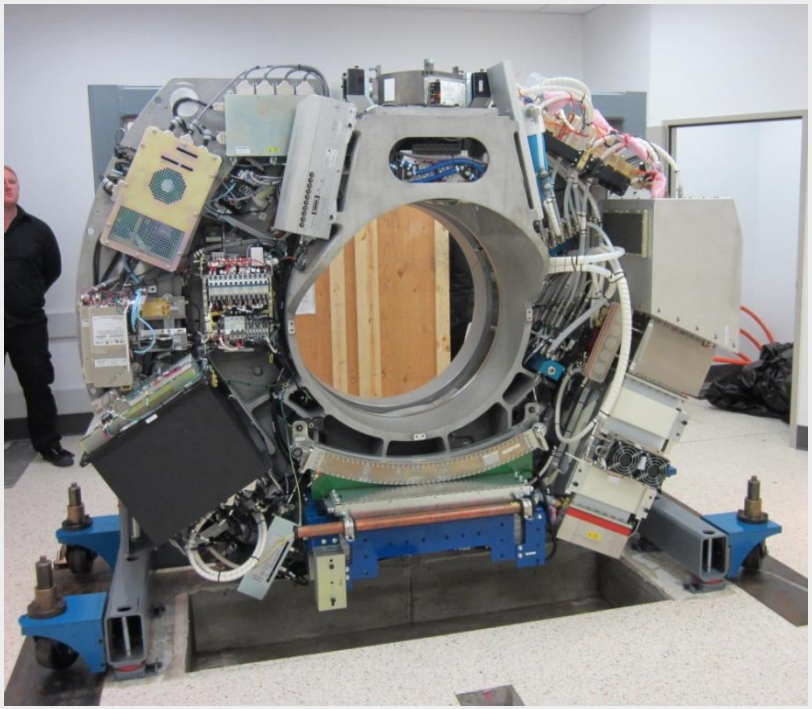
- Bladder
  - Daily image determines which plan to use for that fraction based on bladder fullness
- Breast
  - Minimises hot spots, cardiac sparing, avoids contralateral lung

Tomotherapy – Interesting Stuff

- 4 centers in Australia
  - ROC (Radiation Oncology Centers) Wahroonga, Gosford (NSW) - Private
  - Royal Brisbane & Women's' Hospital (QLD) – Public
  - Liverpool Hospital (NSW) – Public
- 1st TomoTherapy commissioned at Royal Brisbane & Women's in Feb 2010

TomoTherapy at Liverpool Hospital

May 2012



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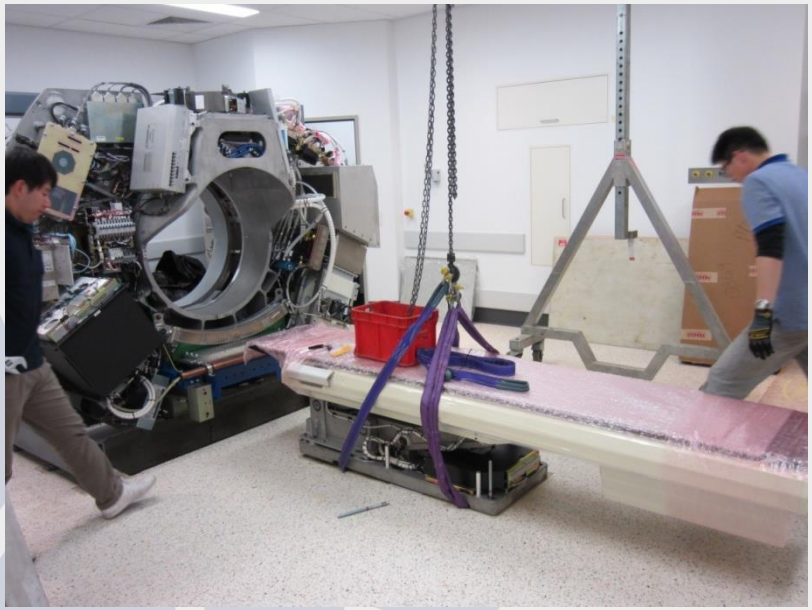
TomoTherapy at Liverpool Hospital



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TomoTherapy - Discussion

- Treatment reactions
  - Brisk
  - Localised
- Fewer pts treated on Tomo / day

60Gy/30#

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