Modelling Anatomical Changes During Radiotherapy Treatment

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Radiotherapy Treatment
Radiotherapy treatment uses high energy radiation beams to treat cancer.

Treatment takes place over a number of weeks.

High quality CT of patient is used for planning radiotherapy treatment.

Lower quality CBCT taken periodically throughout treatment.

Anatomical changes occur in radiotherapy treatment of head and neck cancers.

Anatomical changes can lead to toxicities in healthy tissues and underdosing of the tumour.

Anatomical changes can be accounted for when planning the treatment if they are known in advance.

Image Registration Algorithms

Position of internal structures predicted by the model was within a few mm of registration results.

Patient specific models are able to describe anatomical changes well.

Models are continuous in time, despite being built on sparse image dataset.

Can be used to build population models and anticipate anatomical changes of a patient in advance, aiding in treatment planning.

Model Evaluation

Patient specific computational models can estimate anatomical changes which occur during radiotherapy treatment.

Image Registration Algorithms

Day 1

Day 7

Day 14

Day 21

Day 28

11 cm

10 cm

9 cm

8 cm

8 cm

Number of Treatment days

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