

External/ internal correlation models for motion Management in radiotherapy

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A key challenge in radiation oncology is accurate delivery of the prescribed dose to tumours that move due to respiratory activity. Tumour tracking involves real-time target localisation and correction of radiation beam geometry to compensate for motion. Intra-fractional uncertainties in tumour localisation are crucial issue in particle therapy (proton therapy, carbon-ion therapy), because charged particle beams are highly sensitive to geometrical and beam path length variations, which ultimately may affect the planned dose delivery. Target localisation and motion compensation methods applied in x-ray photon radiotherapy require careful performance assessment for a clinical applications in particle therapy. Efforts required for an application of real-time tumour tracking in particle therapy are reported, by comparing and assessing competing strategies for time-resolved target localisation and related clinical outcomes in x-ray radiation oncology.

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