Comparison between image correlation and projection correlation in CT image reconstruction with limited data

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Abstrak

Since the improvement in radiotherapy impacts on cancers at their most curable stages, radiotherapy-related research has a high strategic priority and a great capacity for improving the overall cure rates of the disease. However, some of the treatments involve the delivery of relatively high radiation dose to patients. Thus, it is important to be able to verify the success of the treatment by determining the dose deposited in the patient at each fraction. One possibility to achieve this would be to obtain an image while the patient is on the treatment couch. The aim of this study was to develop an image reconstruction algorithm by collecting limited information while the patient is on the treatment couch. Two methods, image correlation and projection correlation, were developed and compared here. The effectiveness and practicality of each of these methods were compared. The results showed that the projection correlation presents several advantages. It can be applied without any interations, and it produces a fast algorithm. With more advanced image reconstruction software, this method could potentially be used in a clinical environment.