

Dynamic deformable phantom, method and program for preparing radiation treatment plan

Accuracy evaluation of dose aggregation using image deformation technology is possible

Overview

In recent years, the development of irradiation equipment capable of pinpoint irradiation by accurately grasping the position of the cancer affected area has advanced, making it possible to perform highly accurate treatment. Deformable image registration (DIR), which is the alignment using images obtained by 4D-CT, etc. is often used to prepare the treatment plan. Although the use of DIR is expected to expand in the future, the accuracy of images obtained as a result of DIR and the accuracy of the calculated combined dose remain controversial.

To solve the above problem, the inventors devised a Dynamic deformable phantom that can perform complex movements as if it were a patient's organ, and can insert acrylic markers and dosimeters.

The present invention makes it possible to evaluate the combined dose distribution using image deformation techniques. It is possible to accurately evaluate the dose distribution in cases where a treatment plan is to be reformulated or where some irradiation fields overlap between past and present treatments. These effects are expected to improve treatment outcomes and reduce side effects.

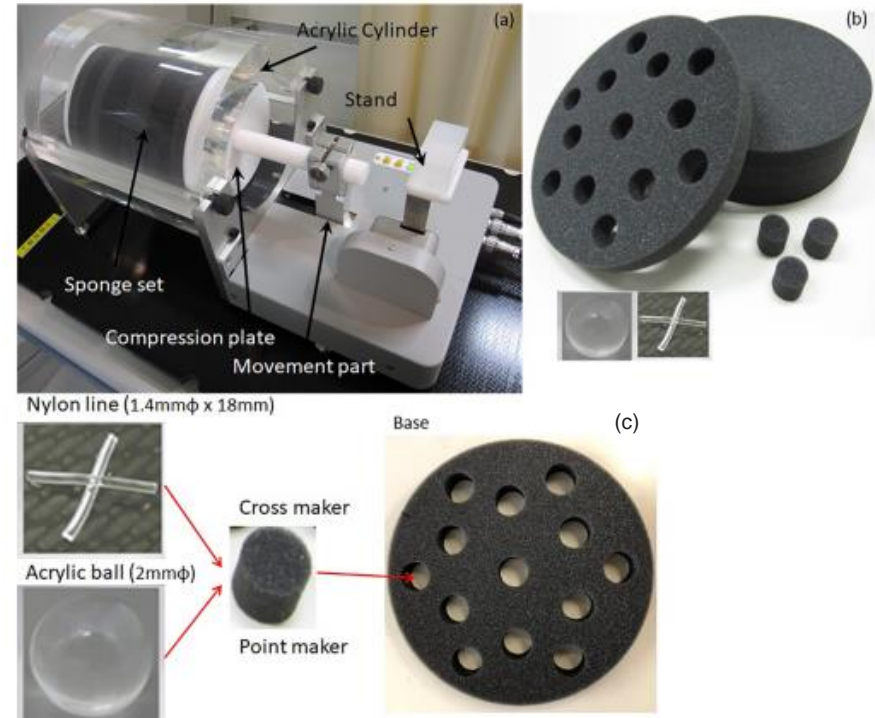
Product Application

- Deformable image registration (DIR)
- Radiation therapy

IP Data

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Reproduce the movement of patient organs in three dimensions [1]



(a) Image of the phantom (b) Verification material for DIR (bead and cross marker) (c) Another marker and a disc-shaped sponge for placing it. Each marker can be selectively placed at any position.

Related Works

[1] Sugawara Y, Kadoya N, et al. "Development of a dynamic deformable thorax phantom for the quality management of deformable image registration", Phys Med. 2020 Sep;77:100-107.

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