Introduction

Modern conformal treatment planning and delivery, using techniques such as 3D-CRT and IMRT, requires imaging of the patient, delineation of the target volumes and OARs, calculation of dose distributions, and QA procedures before the treatment is delivered as planned. Each step is vulnerable to errors.

To evaluate an institution’s ability to deliver the planned dose to patients, four unique anthropomorphic phantoms have been designed and constructed by the Radiological Physics Center (RPC).

General Phantom Design

The phantoms provide realistic geometry for dose constraints used in treatment planning and densities similar to normal tissue densities. The phantom external shell is similar to the actual body contour. TLD dosimetry is used as an absolute dosimeter for point dose determination while film dosimetry is used as a relative dosimeter for dose distribution analysis.

Stereotactic Head Phantom

Goal: Credentialing for RTOG 0022, 0225 and 0126 and COG ACNS0033

Parameters under analysis: dose to the center of the target, treated volume.

Dosimetry: TLD in the target and radiochromic film in the coronal and sagittal planes through center of the target.

Alternative configuration: Hip prosthesis for evaluation of heterogeneity corrections algorithms.

Hip prosthesis on femoral head.

Dosimetric insert.

CT comparison: Phantom/patient.

Stereotactic Head Phantom

CT of phantom.

Gel dosimetry insert.

Stereotactic Head Phantom

Dosimetric insert.

Hip prosthesis on femoral head.

Liver phantom (under construction).

CT comparison: Phantom/patient.

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