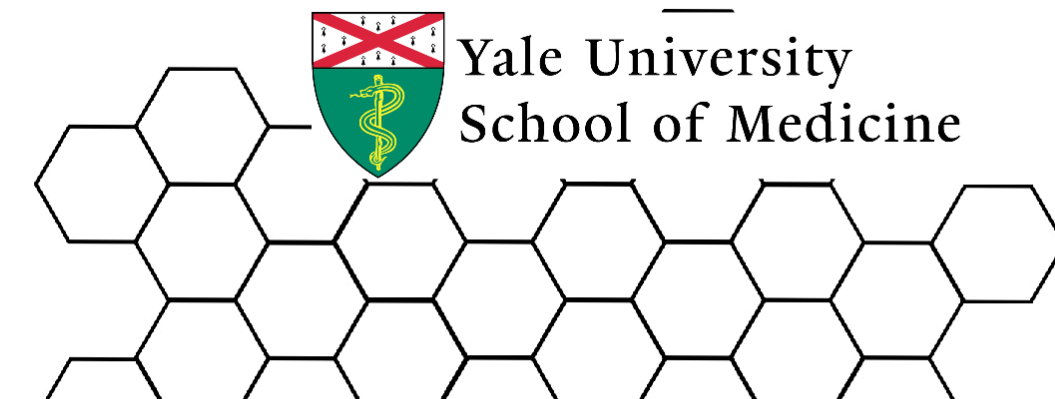


A small footprint couch-top support device for image-guided radiotherapy of heavy patients

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INTRODUCTION

Heavy patients with body weight close to or above 400 lbs present unique challenges in radiation therapy since the weight limit of most treatment couches reduces as the couch-top is extended toward the treatment gantry. Previous techniques using rigid boxes underneath the couch and genie lift devices sitting at the side of the couch have the drawbacks of limiting image acquisition and couch shifts. To our knowledge, except a paper published 15 years ago about the genie lift as a couch support, there is little clinical data/design on this topic. Therefore, to meet the clinical need, this work evaluated and demonstrated the potential of using a small footprint couch-top support device for image guided radiotherapy (IGRT) of heavy patients.

AIM

The purpose of this study was to develop a small footprint couch-top support platform to safely perform image-guided radiotherapy for extremely heavy patients. To meet the clinical need, this work evaluated and demonstrated the potential of using a small footprint couch-top support device for image guided radiotherapy (IGRT) of heavy patients

RESULTS

The study demonstrated the potential of using this new couch-top support platform for image guided radiotherapy for heavy patients

- Newly constructed couch-top support platform was found to provide stable support with smooth couch shifts.
- The small footprint allowed the gantry to rotate from 133 degrees to 313 degrees, either for fixed beam or partial-arc VMAT
- Lateral MV imaging was successful
- Orthogonal 2D KV-KV with source angles of 40 degrees and 130 degrees were acquired successfully for image registration

METHOD

To allow maximum range of treatment gantry movement, a small footprint adjustable jack stand was designed, assembled, and tested for IGRT.

- The commercial jack stand was modified (Fig.1) with an 8-ball transfer roller on the top platform (Fig.2).
- Maximum gantry rotation range was tested
- KV source and panel rotation range (Fig. 3) was tested
- Lateral MV images were acquired
- 2D KV-KV images were acquired
- Orthogonal KV-KV image registration and couch shifts were tested



Fig.1. commercial lift



Fig2. Lift refit with roller



Fig3. Collision testing

CONCLUSIONS

A new couch-top support platform has been designed, assembled, and tested for image-guided radiotherapy. Given the small footprint with the limited posterior occupation, image guided VMAT radiotherapy becomes feasible compared to old couch support devices like the genie lift. Moreover, the new support platform is easy to use, cost effective and would allow heavy patients to be safely treated with image guided radiotherapy.

REFERENCES

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