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## Development of head docking device for linac-based radiosurgery with a Neptun 10 PC linac

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## Abstract

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Stereotactic radiosurgery is a method for focused irradiation of intracranial lesions. Linac-based radiosurgery is currently performed by two techniques: couch mounted and pedestal mounted. In the first technique a device is required to affix the patient's head to the couch and moreover to translate it accurately. Structure of such a device constructed by the authors plus acceptance test performed for evaluation is described in the article. A head docking device has been designed and constructed according to geometry of linac's couch and also desired functions. The device is completely made from aluminum and consists of four major components: attachment bar, lower structure with four movements, upper structure with two movements equipped with a lock, two handles and a mounting ring for stereotactic frame. Translating accuracy, mechanical stability and isocentric accuracy were assessed in the frame of acceptance test. Translating accuracy, mechanical stability and isocentric accuracy were found to be respectively: 1 mm, 1.64 mm and 3.2 mm with accuracy of 95%. According to AAPM report no.54, a head docking device should translate head with an accuracy of 1 mm; this recommendation has been met. Moreover, we have demonstrated that the isocentric accuracy and mechanical stability of the device are sufficient that the device can confidently be used in stereotactic treatment.

## Author keywords

Head docking device; Mechanical stability; Stereotactic radiosurgery; Translating accuracy

## Indexed Keywords

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