# Evaluation of Three-dimensional Treatment Planning System (TPS) performance in dose calculation of virtual wedged fields using film dosimetry

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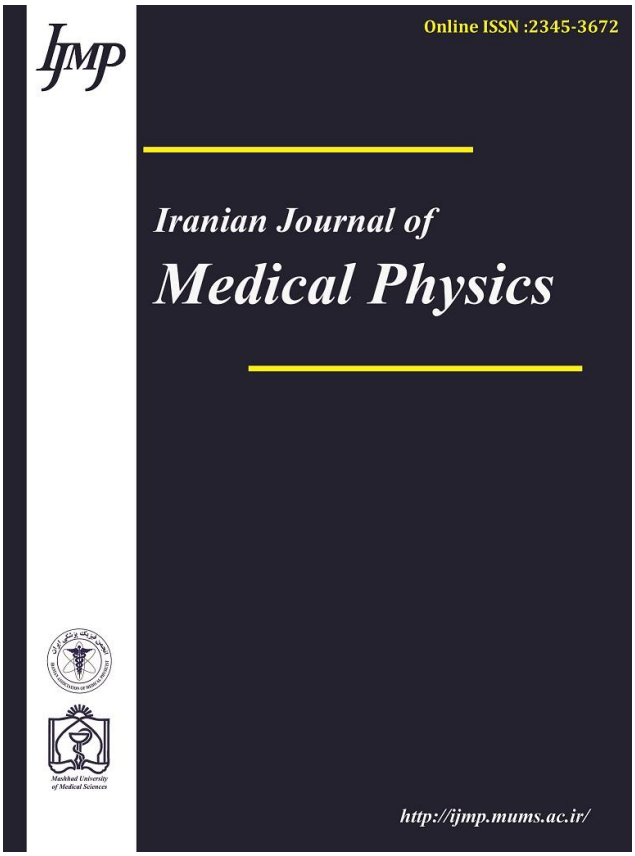
**Abstract**

**Introduction**: Nowadays radiotherapy plays an important role in cancer treatment. Different radiotherapy techniques improvement emphasizes on using of the precise ، appropriate and useful algorithms. one of these techniques are wedged which is used in radiotherapy to compensate missing tissues and create a uniform dose distribution in tissues. The Siemens Artiste linear accelerator supports a virtual wedge ، that this wedge creates a dose distribution similar to a physical wedge without the use of any extra accessory and wedged profiles are produced moving collimator jaw during irradiation with a constant speed but varying the dose rate. In this study ، TPS performance is evaluated in virtual wedged fields by comparing the calculated and measured results.
**Materials and Methods:** The calculations were performed by the collapsed cone superposition algorithm based TPS for two tangent fields in anthropomorphic slab phantom using 15، 30، 45، 60 virtual wedges for field size of 20 × 20 cm2 for 6 and 15 MV photon beams. Measurements were produced by Gafchromic EBT films and reading exposed films with scanner.
**Results:** Good agreement between the measured dose with film dosimetry and calculated dose with collapsed cone superposition algorithm based TPS with using virtual wedge in heterogeneous environment and different energies were found ، with the maximum difference not exceed 3 -5%. The increase in wedge angle due to increase in the difference between calculated and measured data.
**Conclusion:** : The results from this study showed that the accuracy of collapsed cone superposition algorithm based TPS used with the virtual wedges for two tangent fields is enough for the clinical usage under the studied experimental conditions.

**Keywords**

virtual wedge ; Treatment planning systems(TPS) ; Gafchromic film film dosimetry

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