

AbstractID: 2808 Title: Performance evaluation and quality assurance of enhanced dynamic wedges

Purpose:

Enhanced dynamic wedges have been used in clinical practice for many years. Obvious superiority of dynamic over physical wedges is accompanied by the increased overhead involved in verifying the accuracy and reliability of their use. Contrary to very limited quality assurance (QA) required to ensure proper functioning of the physical wedges, dynamic wedges, like any other dynamic treatment, require a robust quality assurance program. This work expands upon previous suggestions and describes a comprehensive QA program for Varian Enhanced Dynamic Wedges (EDW) and presents the results of a sixteen-month evaluation of these wedges.

Method and Materials:

Daily, monthly, and annual QA procedures were devised for enhanced dynamic wedges on a dual energy Varian 21ex linear accelerator with seven wedge angles. These include daily constancy checks of the wedge performance as part of the morning QA procedure, monthly evaluation of wedge factors and profiles, and an analysis of dynamic log files generated by linac. Yearly performance evaluation includes measurement of a larger sample of wedge angles and profiles. In addition, individual treatment verification or “per patient” QA consists of visual inspection of the wedge direction at the conclusion of each treatment.

Results:

The daily constancy checks show a stable delivery of the wedged field with a variation of less than 1%. The monthly wedge factors measured have been within 1.5 % of the commissioning values. A comparison of beam profiles over the same time period shows a stable delivery of the wedged beams and good agreement with the expected segmented treatment tables (STT).

Conclusion:

An expanded comprehensive QA of enhanced dynamic wedges is presented. Results of a sixteen-month evaluation demonstrate stable and accurate delivery of these fields. Due to the dynamic nature of enhanced dynamic wedge deliveries, a comprehensive QA program is necessary to verify proper delivery of these fields.