

## **Evaluation of a machine QA software tool for MLC performance checks.**

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## Introduction

One of the main requirements for a correct intensity modulated treatment (IMRT) delivery, is a periodic check of Multileaf Collimator (MLC) parameters.

In some Treatment Planning System (TPS), the Dosimetric Leaf Gap (DLG) is one of the most important parameters for the correct calculation of dose distribution when using dynamic MLC.

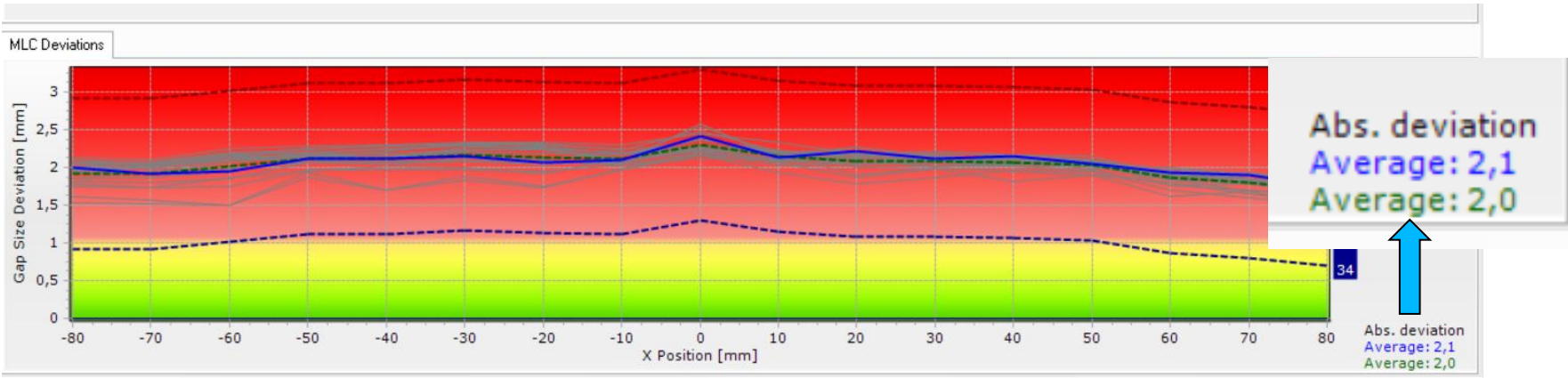
The purpose of this work is to evaluate the feasibility and time saving in using a dedicated machine quality assurance (QA) software tool to monitor over time the DLG parameter and leaves positions.

## Methods and materials

Two 6MV Linac equipped with a 120 leaf MLC were compared to check the measured constancy of the DLG and leaves positions through use of a 3D diode array equipped with a dedicated machine QA software tool.

The MLC checks were performed at 50° and 320° gantry angles due to phantom's plate geometry. In this way it was possible also to verify gravity effects on leaves banks.

The analysis was carried out with a version of picket fence test implemented in the software.



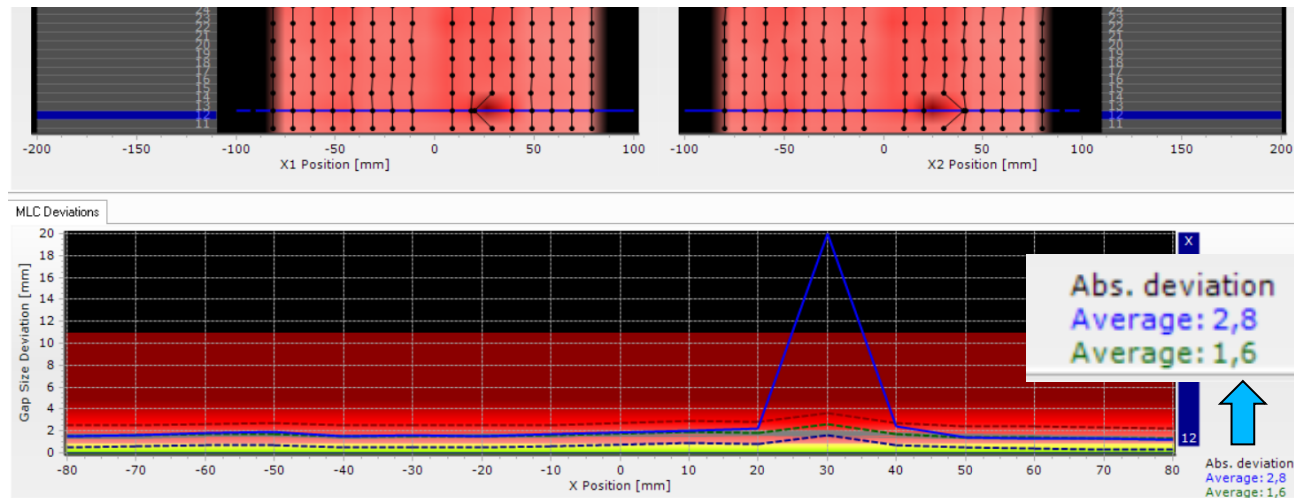
## Results

The Veroli mean DLG values was  $2,0 \pm 0.4$  mm for  $50^\circ$  gantry angle and  $2.1 \pm 0.5$  mm for  $320^\circ$  gantry angle.

The Rieti mean DLG values was  $1.9 \pm 0.1$  for  $50^\circ$  gantry angle and  $2.0 \pm 0.1$  mm for  $320^\circ$  gantry angle.

The check on the leaves movement has shown gravity effect on two different angles.

In particular the Rieti DLG value carried out at gantry  $50^\circ$  was  $1.6 \pm 0.1$  mm when there was a problem to leaf motor.



## Conclusions

The picket fence test, originally used with radiographic film to check the reproducibility of leaf gap, is extended in this machine QA software tool, including checks for gap width and leaf positions. This tool can be used as a routine MLC QA check for mean leaf deviation, DLG, and absolute positions of the leaves.