Improved Beam Edge Conformity Using an MLC Shift Technique

With the use of a MLC with 1cm leaf resolution the treatment port can be somewhat shaped conformally although not as conformal as a custom cerrobend block. If the leaf design were made so that the leaf width were much smaller (i.e. - 5mm) then the amount of conformity to the tumor contour would be much greater. This can be achieved by two methods. The first method would be to design a new MLC with much smaller leaves. This would add significant complexity to the MLC design. Additional motors, drive trains, electronics, and control systems would be needed to support these added number of leaves. In addition, the amount of leakage would need to be considered because of the increased number of interleaf spaces. The second method for a higher resolution would be using the existing hardware and to divide the treatment port dose into segments as a fractional amount of the leaf width. In between each segment the field, with respect to the beam, would be translated, and the leaf positions would be adjusted to maintain the tumor volume. This is the approach that is being proposed by Siemens for High Definition Intensity (HDI).

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