

Purpose:To quantify the effect of changing imaging techniques and addition of filtration on the dose delivered to patient. The variation of dose with technique in kilovoltage beams is well understood in diagnostic radiology but is not commonly measured in therapeutic radiology. Occasionally, the beam techniques may be changed to improve image quality without proper attention given to patient dose. The bowtie filtration commonly added to the beam to improve image quality also affects the dose on surface and at depth.

Methods:The dose from Elekta XVI CBCT beam was measured in phantom. Measurements were made for the clinical presets and after changing the imaging techniques (mA and/or ms) as well as for beams with and without bowtie filter. The measurements were performed at 1 cm depth and at surface.

Results:The dose measurements exhibit a linear increase with the increase of mAs, as expected. There is a slight difference between changing the ms (keeping mA constant) and changing the mA (keeping ms constant). Addition of bowtie filter does not result in an appreciable change in the depth dose in shallow depths (< 1 cm) but reduces the overall dose at depth and skin by approximately 25%, providing the technique is not changed.

Conclusions:Variation of dose with technique and addition of filtration has been studied. Since the dose tracks the technique settings (mAs) linearly, techniques should not be changed to improve image quality without quantifying the image dose. Addition of filtration does reduce the dose but does not affect the depth dose at shallow depths. It should be noted that the "filtered" beams often have higher technique settings for the same cassette size in the clinical presets, so this dose reduction is not achieved by using these presets.