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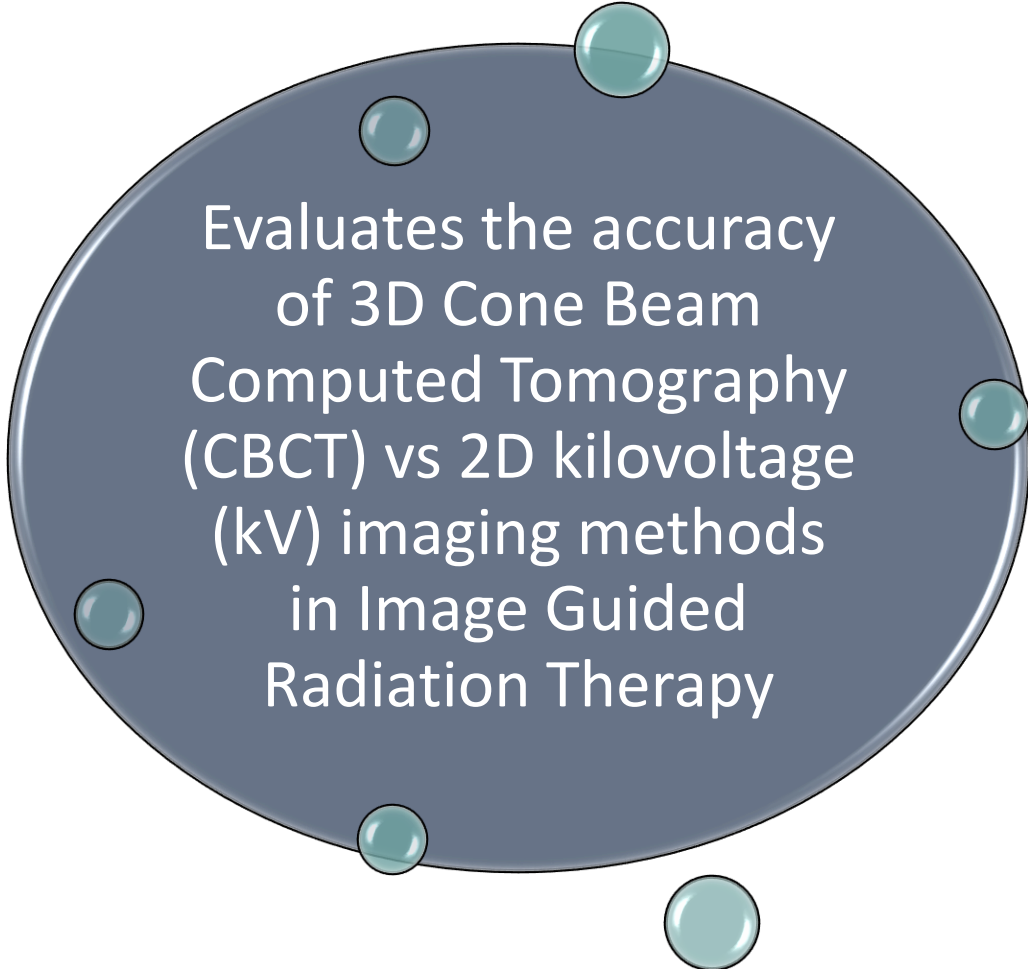
EVALUATING THE SET UP ERRORS AND PLANNING MARGINS OF LUNG AND CRANIAL TUMORS FOR PATIENTS UNDERGOING IMAGE GUIDED RADIOTHERAPY

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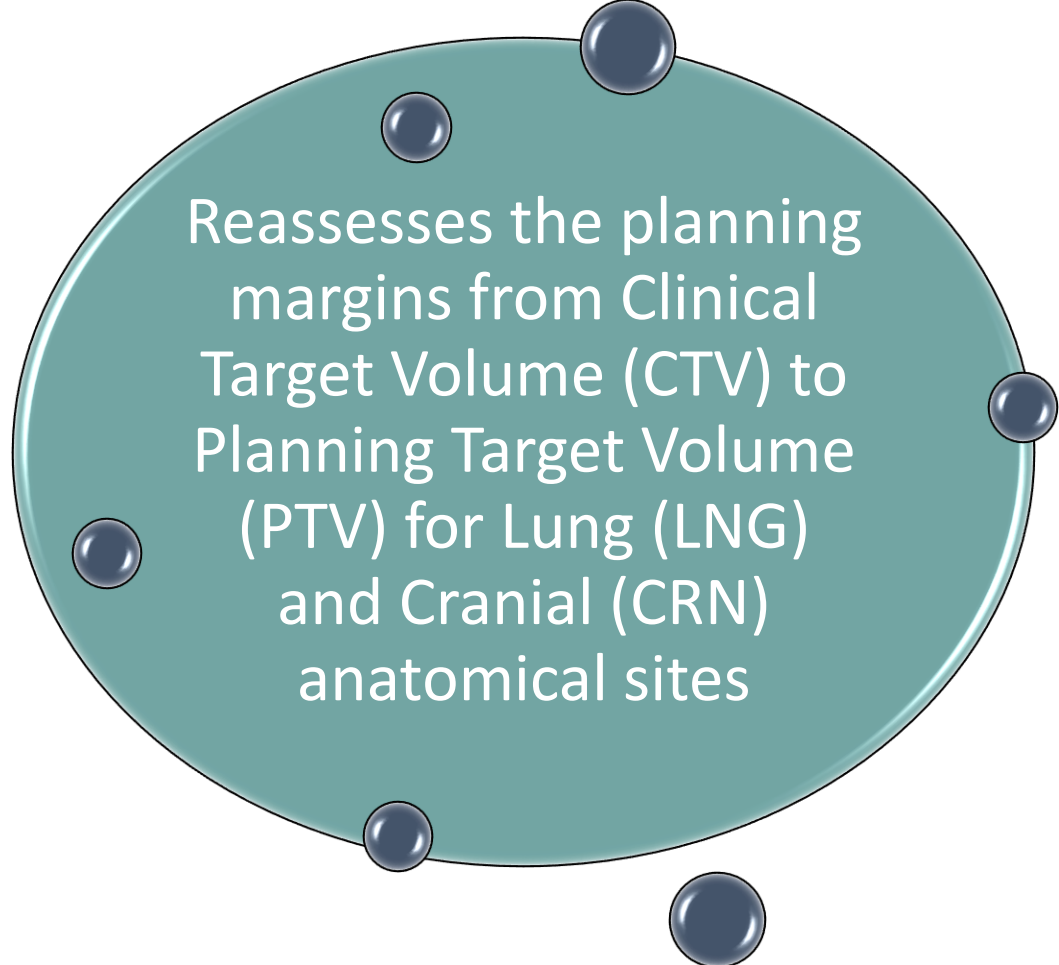
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1. Background-Aim

This study



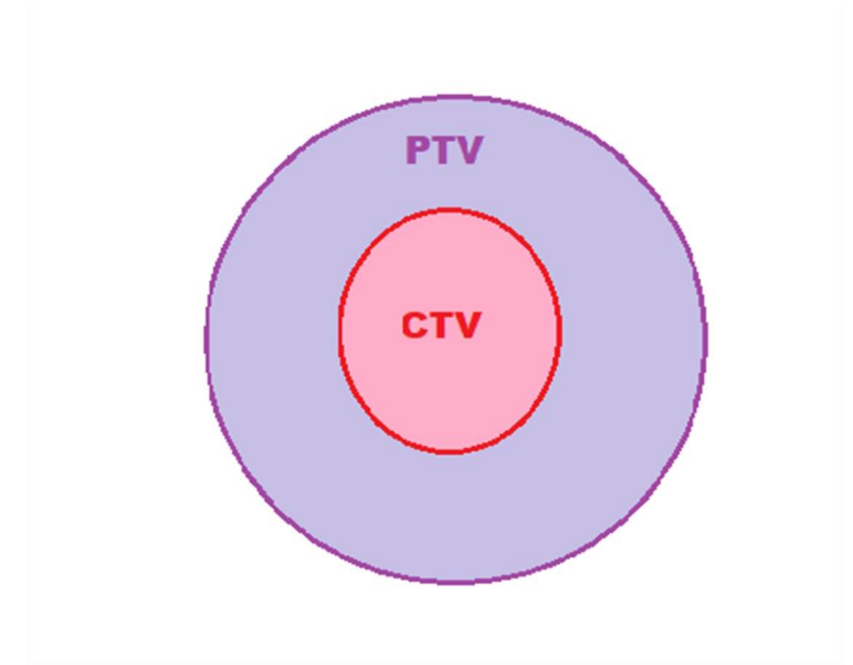
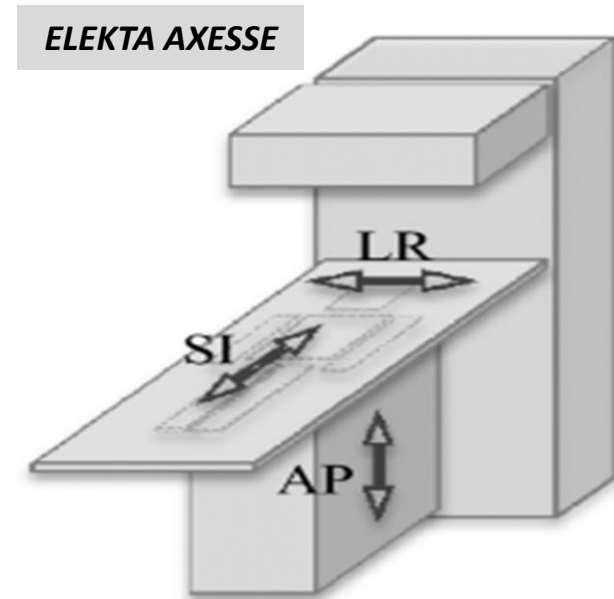
Evaluates the accuracy of 3D Cone Beam Computed Tomography (CBCT) vs 2D kilovoltage (kV) imaging methods in Image Guided Radiation Therapy



Reassesses the planning margins from Clinical Target Volume (CTV) to Planning Target Volume (PTV) for Lung (LNG) and Cranial (CRN) anatomical sites

2. Materials & Methods

- ❑ AHEPA University Hospital
- ❑ ELEKTA AXESSE
- ❑ 2 Anatomical Sites (LUNG, CRANIAL)
- ❑ 79 patients (45 LNG, 34 CRN)
- ❑ 2 Imaging Techniques (CBCT, 2DkV)



- Shifts in left-right (LR), superior-inferior (SI) and anterior-posterior (AP) directions were recorded using both imaging techniques.
- Consistency between methods was compared via statistical tests for positioning accuracy and dispersion.
- Significant shifts (>1mm) were analyzed, constructing dichotomous variables and examining clinical case occurrences and odds ratios.
- Setup errors for planning margins were calculated using the Van Herk equation $M=2.5\Sigma+0.7\sigma$.

3. Results

1

Significant differences were found between CBCT and kV methods in LNG shifts in LR and AP directions and in all three directions for CRN.

2

Clinically significant deviations ($>1\text{mm}$) between CBCT and kV methods for CRN in LR and SI directions, and for LNG only in AP direction.

3

CBCT yielded higher clinical case percentages for CRN in LR and lower in SI direction compared to kV. In AP direction, CBCT had higher percentages for LNG, while kV had higher for CRN.

3. Results

4

CBCT is more likely (up to 2.8 times) to produce clinically significant shifts than kV.

5

Examination day significantly impacted AP direction shifts for both methods: shifts were greater in days 1-3 than 8-28.

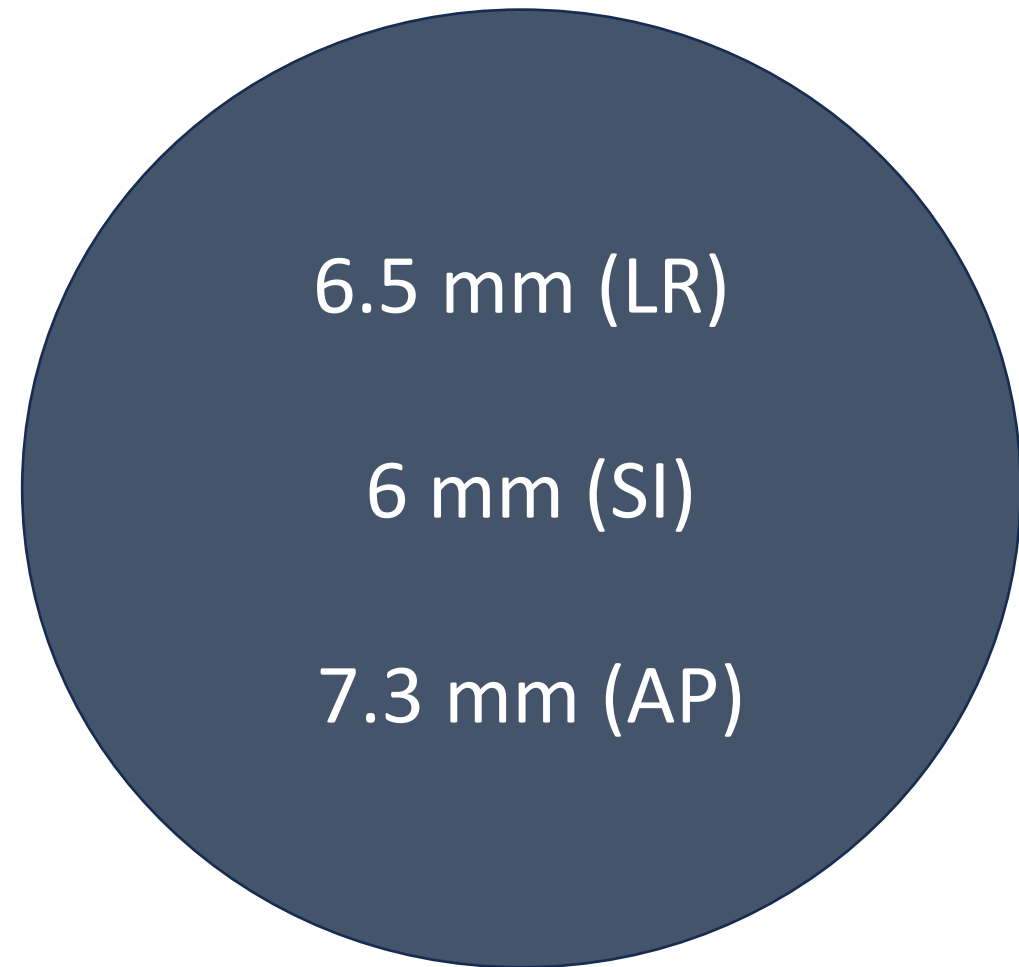
6

No significant differences were found between anatomical sites for both methods.

3. Results

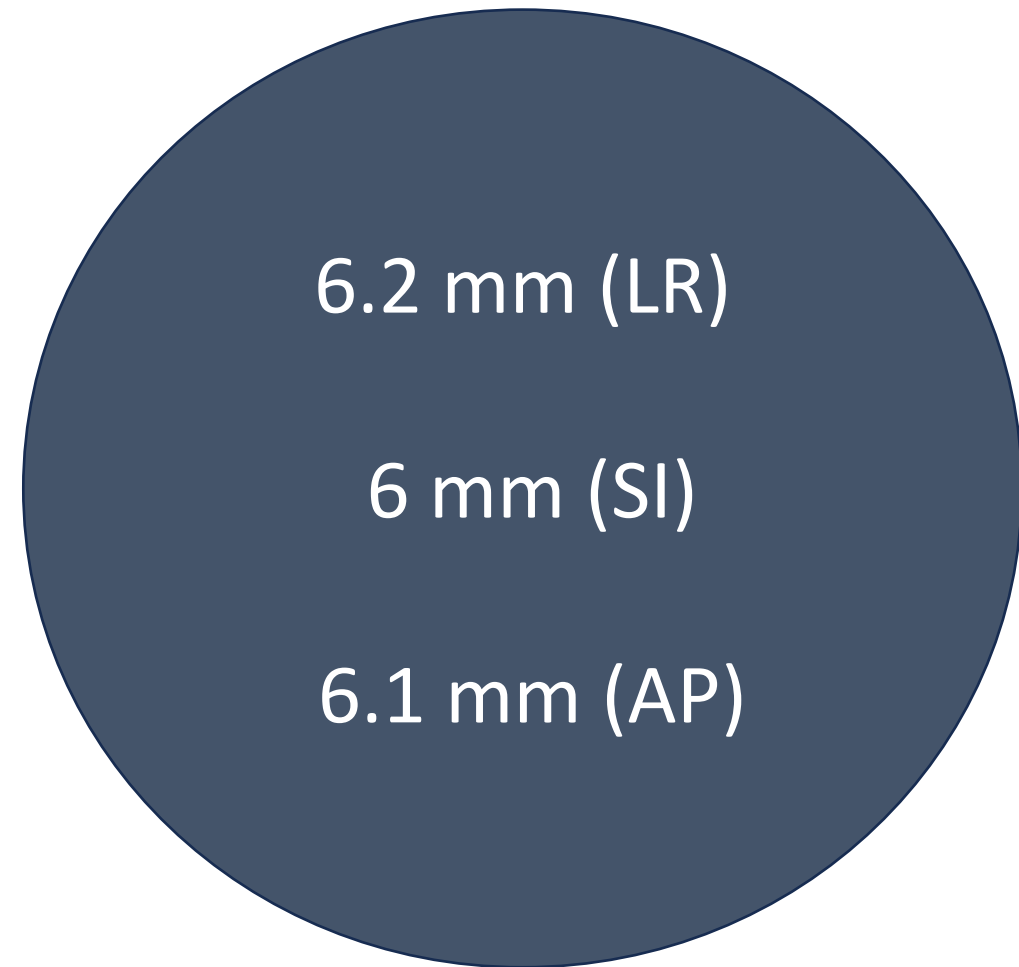
LUNG SET-UP MARGINS

2DkV



VS

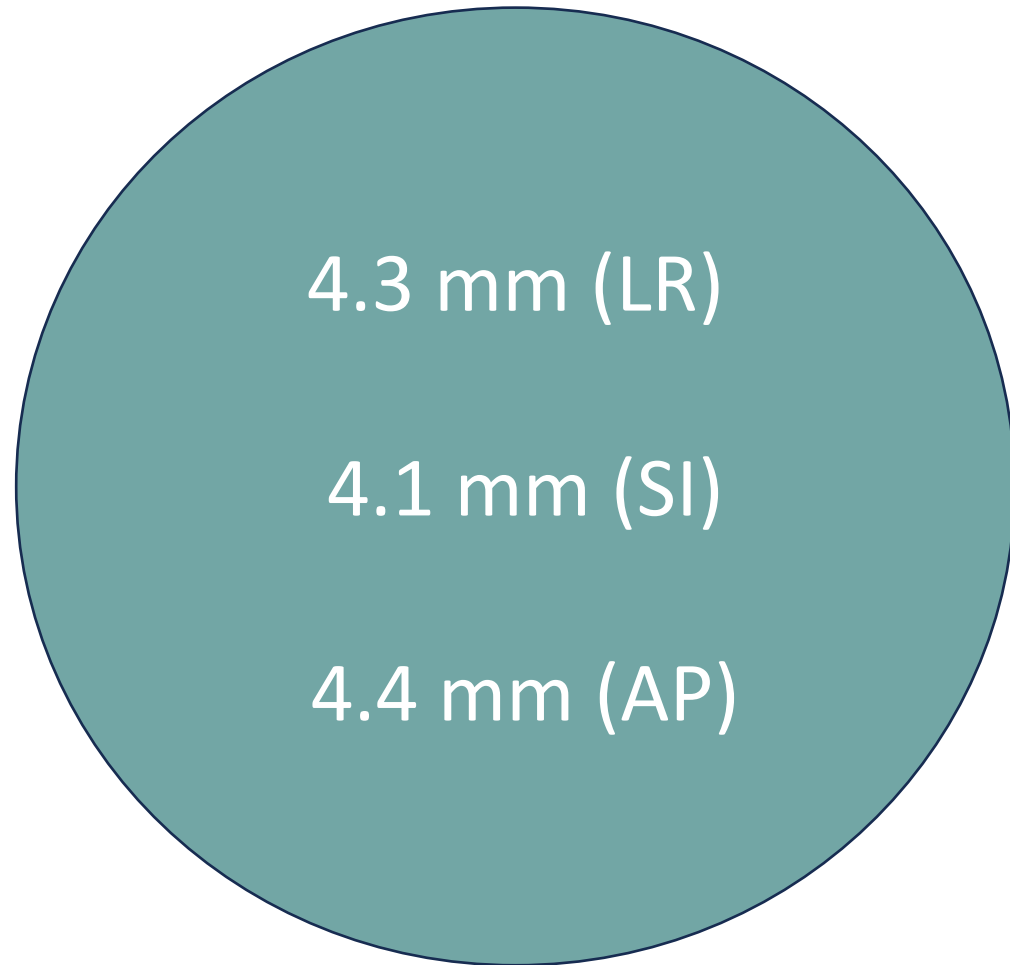
3D-CBCT



3. Results

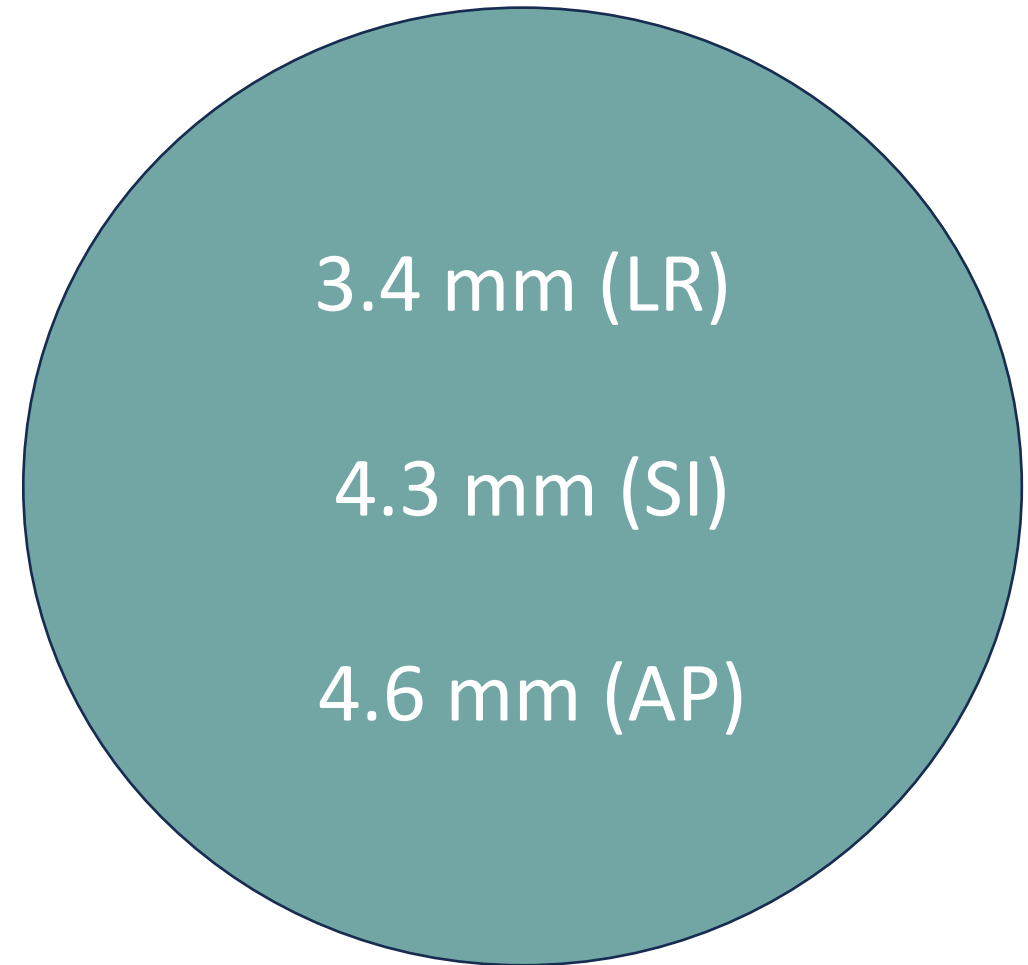
CRANIAL SET-UP MARGINS

2DkV

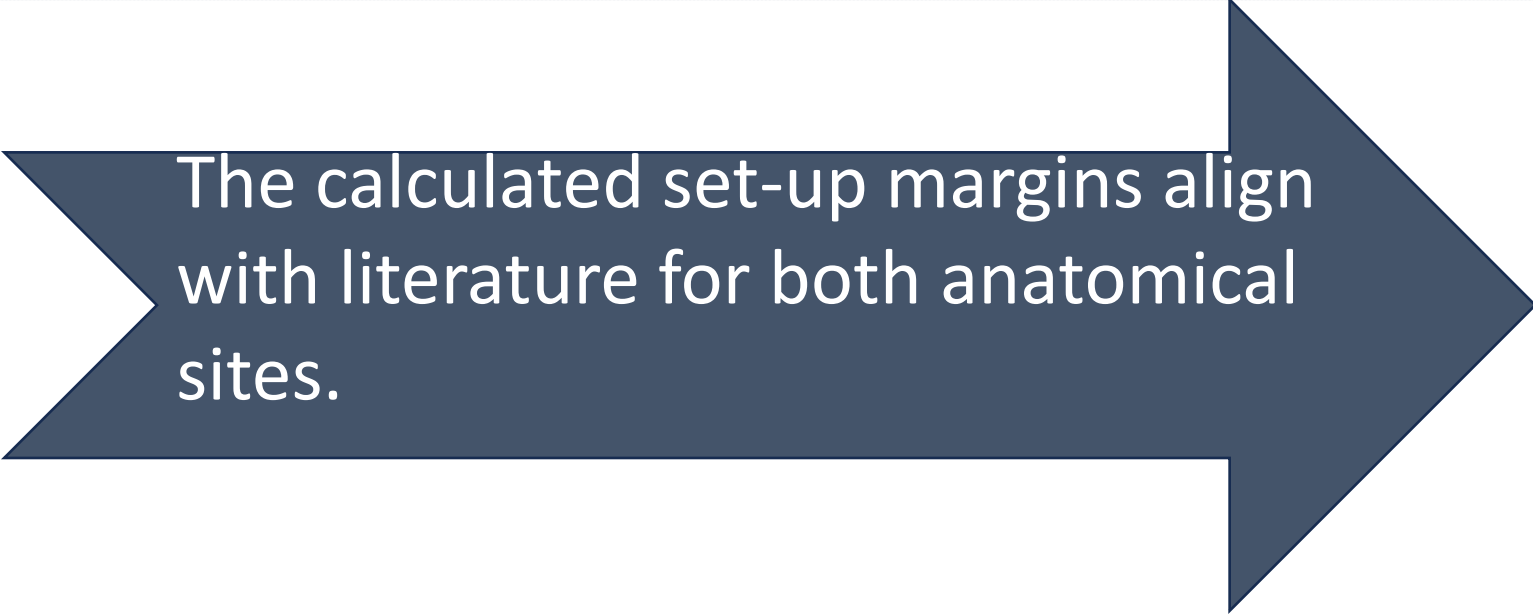


VS

3D-CBCT



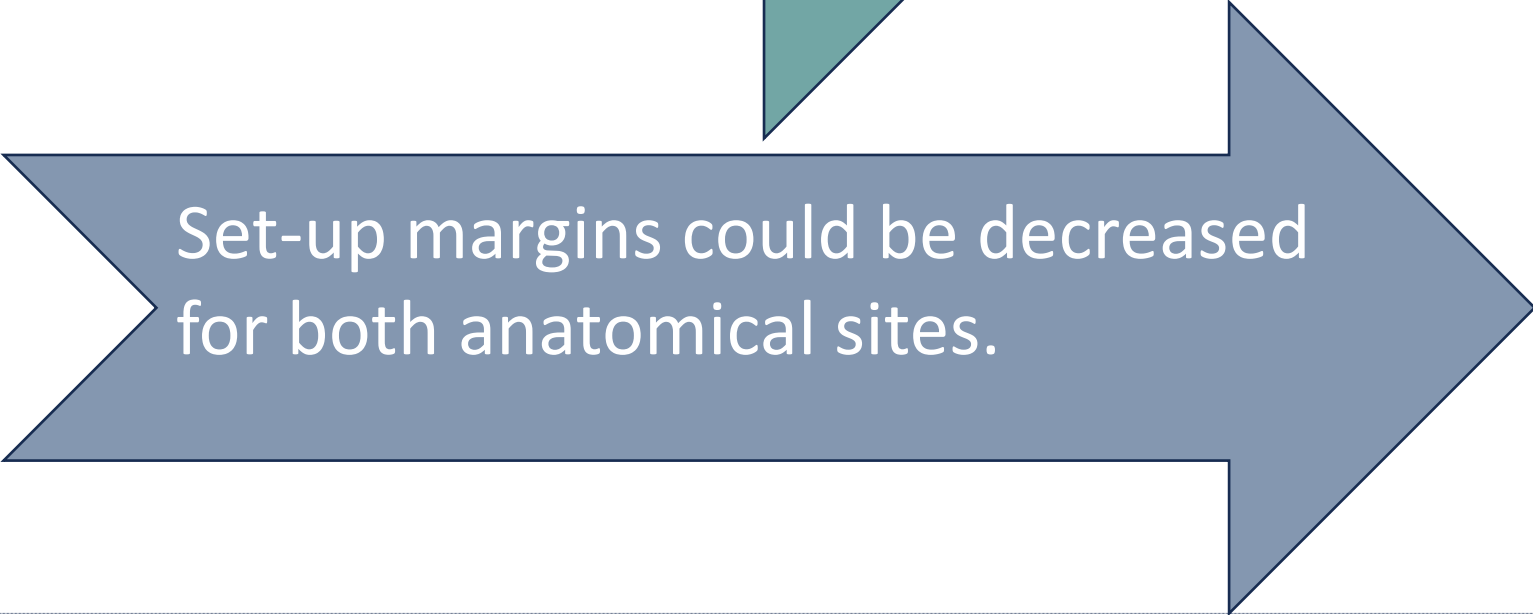
4. Conclusions



The calculated set-up margins align with literature for both anatomical sites.



Differences in shifts between CBCT and kV is higher for LNG.



Set-up margins could be decreased for both anatomical sites.

5. References

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