Cancer Care Ontario

Lung Module
Appendix C

UPDATED MAY 15TH, 2017

Ontario
Cancer Care Ontario

Disclaimer

- This learning module was created as a guideline to standardize and facilitate the education and training of lung IGRT.
- This information was compiled as a result of a province-wide initiative examining the current state of lung IGRT.
- This module is designed to be adjusted to include your centre's site specific policies and procedures, including tolerances and thresholds.
- This material is based on a guideline previously created by members of the Radiation Therapy Community of Practice (CoP) – IGRT Education Working Group, and adapted by the Lung IGRT Working Group under the Lung CoP.

Scope

- This training module pertains to specifically radical, non-SBRT lung cancer patients

Cross Sectional Anatomy

- Knowledge of thoracic cross-sectional anatomy is beneficial.

- https://www.rtog.org/CoreLab/ContouringAtlases/LungAtlas.aspx

Imaging Recommendation

- Daily kV CBCT
- Please follow your departmental procedure
- CBCT guidelines:
  - Optimize image quality and dose for the thorax
  - At minimum, include entire tumour volume and vertebrae at the same level
- Due to the challenges inherent to the thorax, it is recommended that there is a level of expertise required

IGRT Guidelines

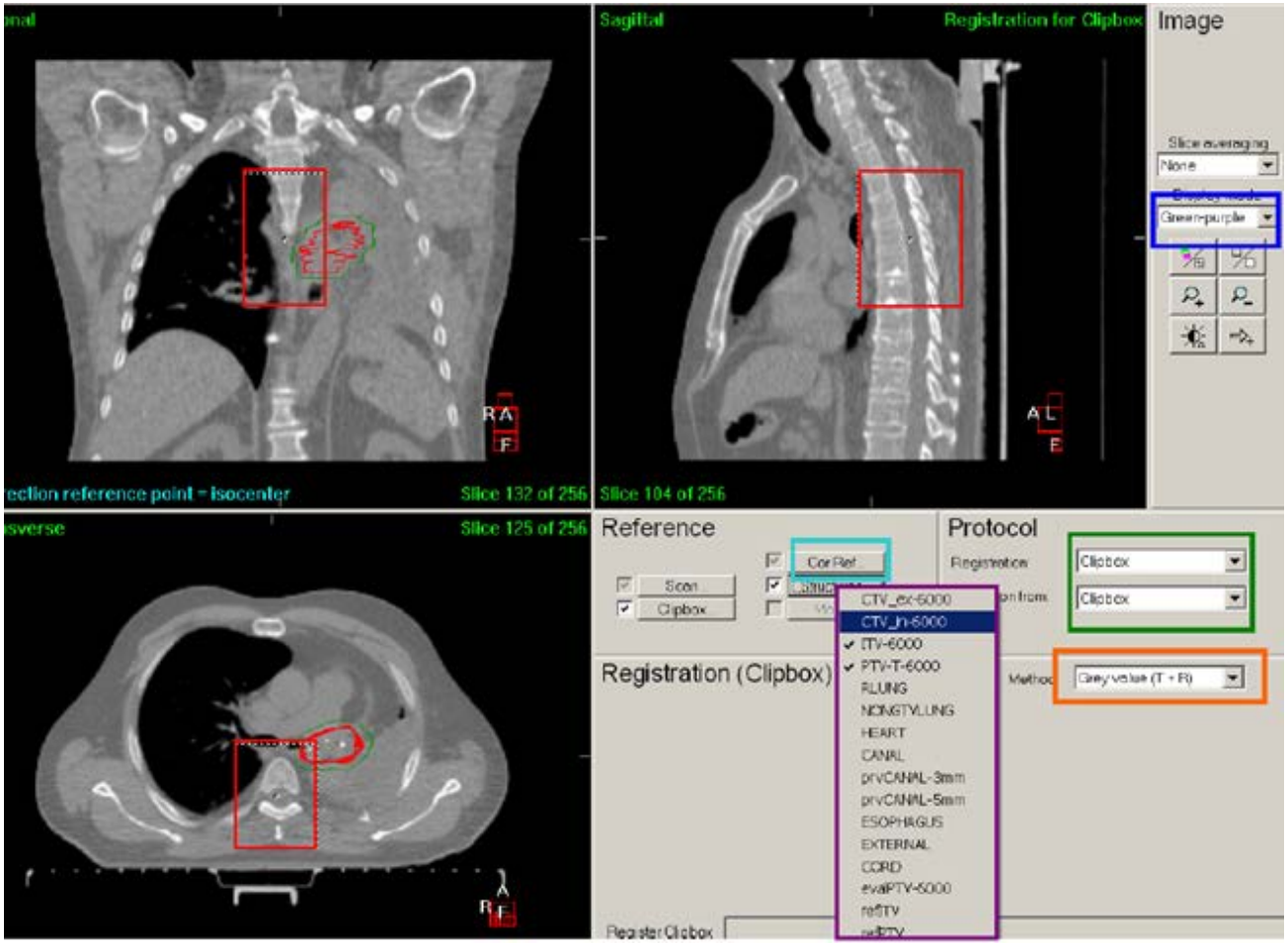
1. Bony match to spine
2. Ensure the visible mass is within the PTV
3. Evaluate spinal canal
4. Evaluate any OARs, if applicable

1. Bony match to spine

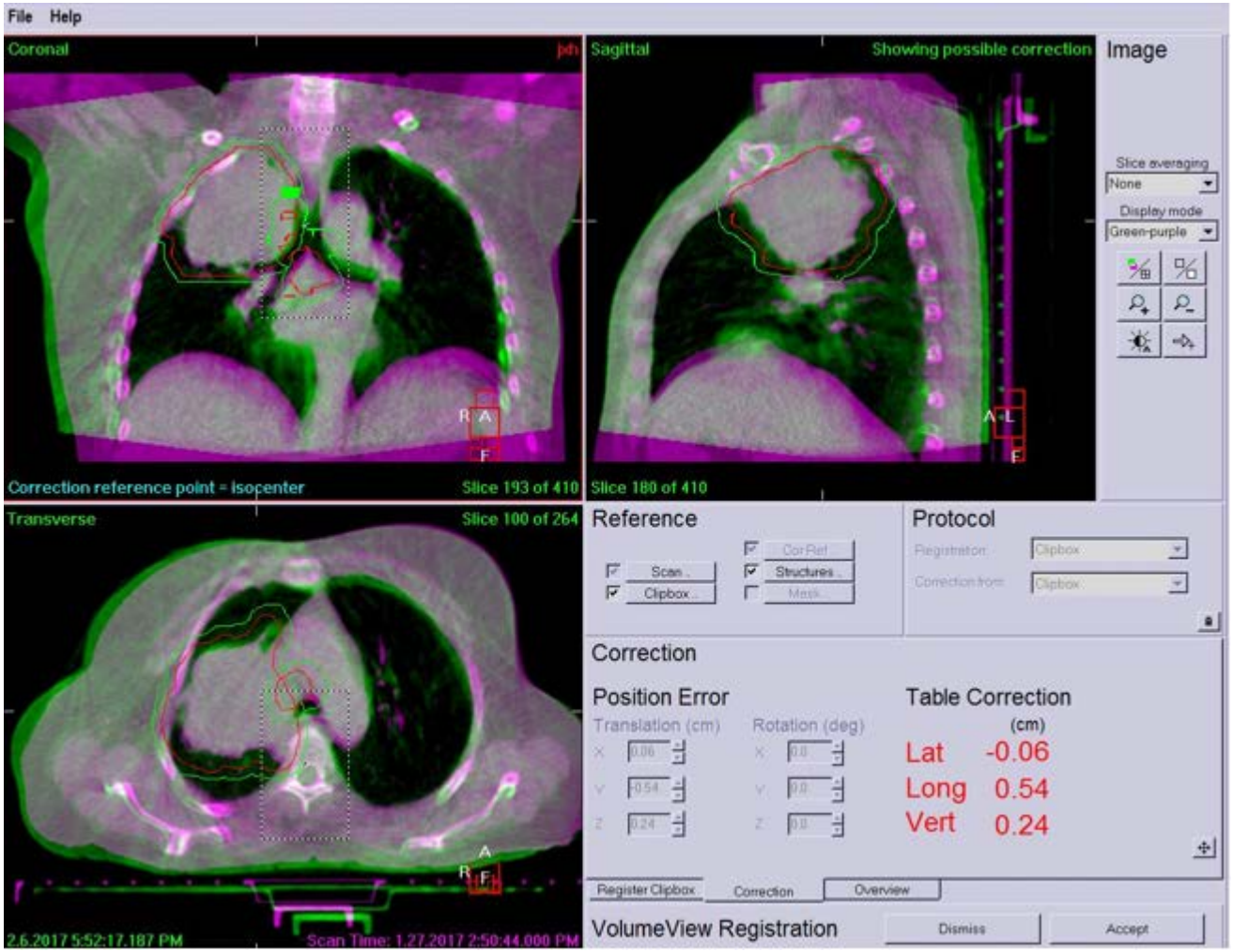
- Bony match to spine, first using automatic matching software (clipbox as per departmental policy), followed by manual adjustments

- Verify SUP/INF positioning (e.g. with carina, insertion of last rib, etc.)

Lung IGRT Clipbox



2. Ensure the visible mass is within the PTV

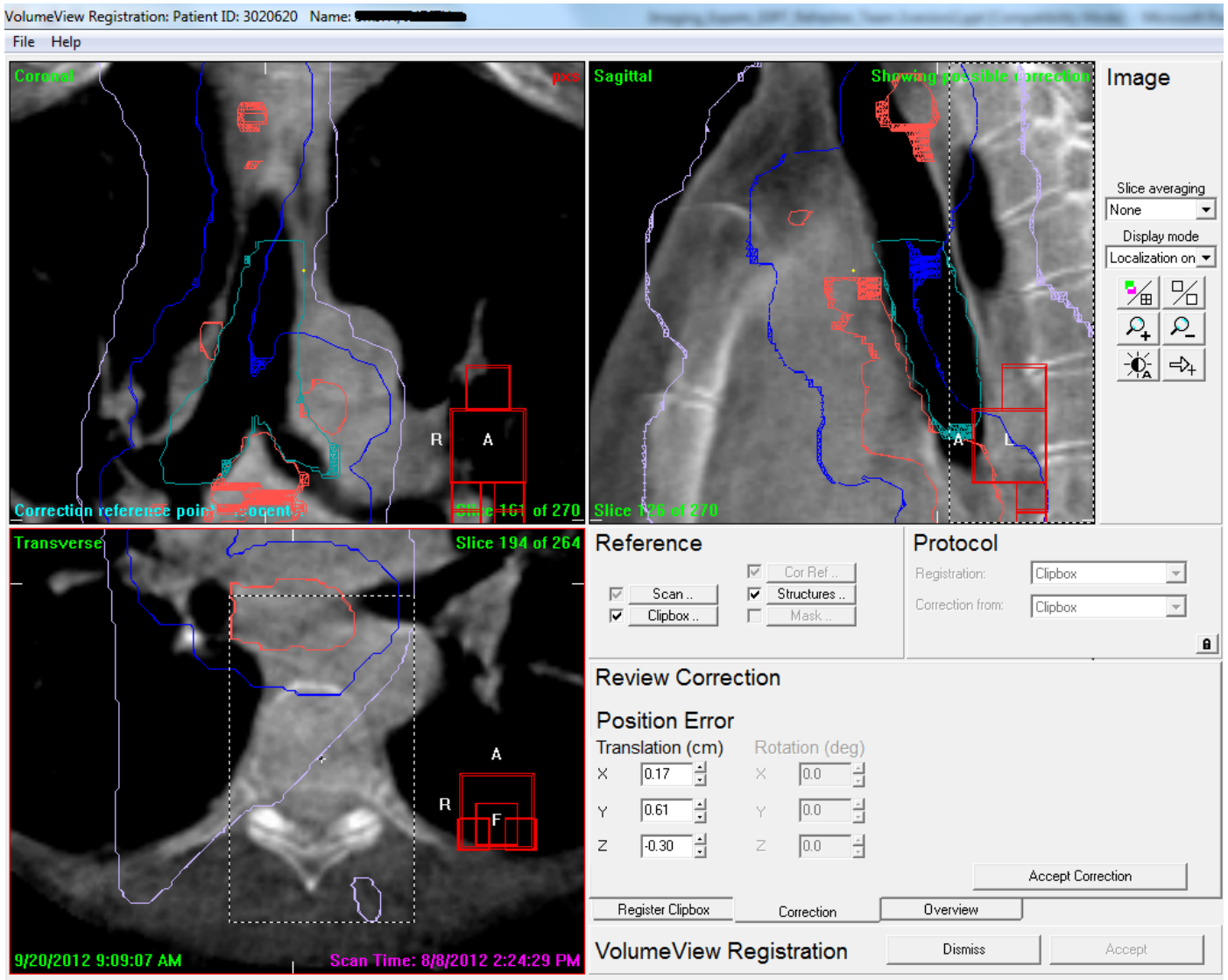


3. Evaluate spinal canal

- Where critical doses are close to the canal, additional evaluation may be required (isodose lines may be used to flag these situations).

***NB. Do not shift based on isodose lines

3. Evaluate spinal canal

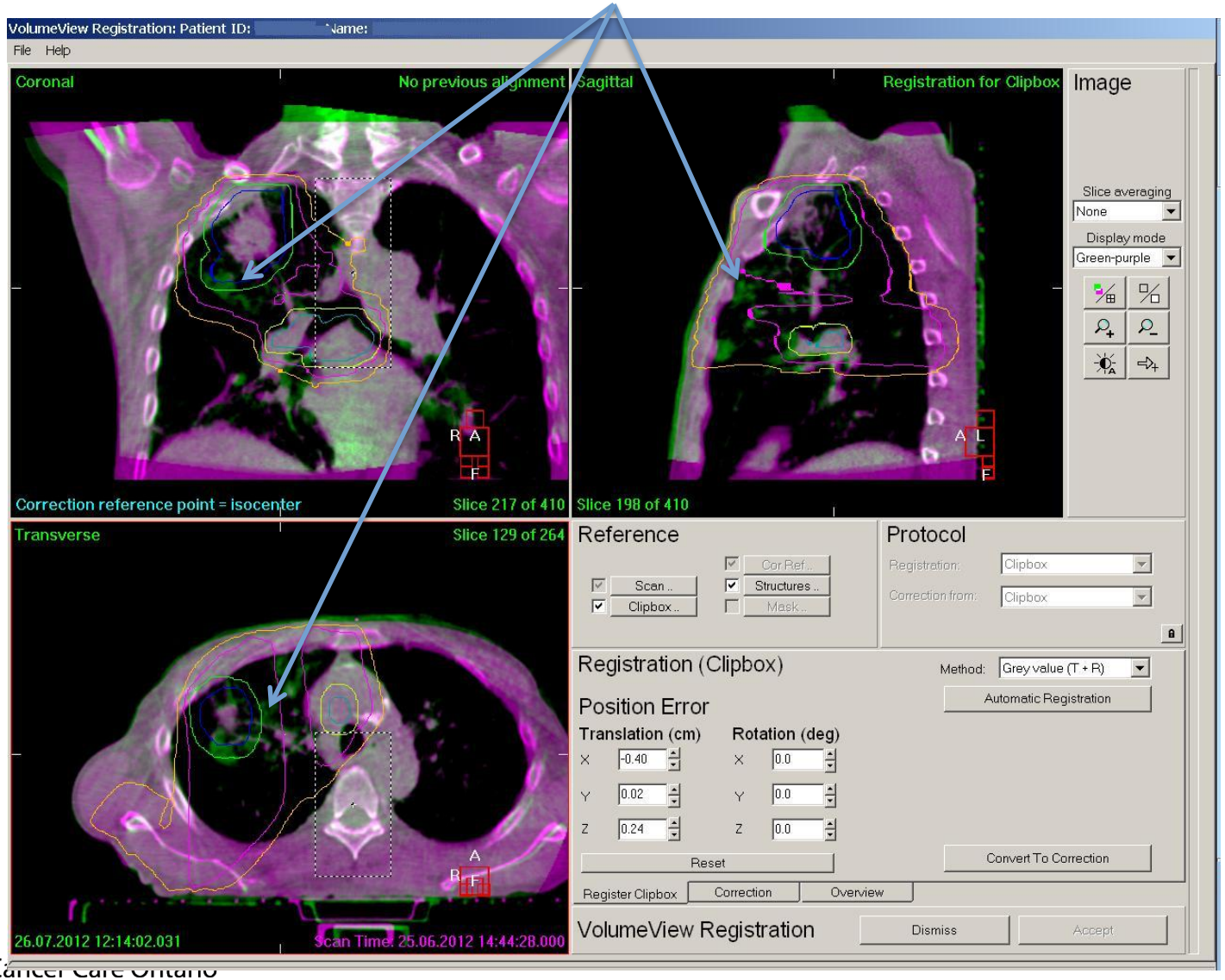


Scenarios you may encounter

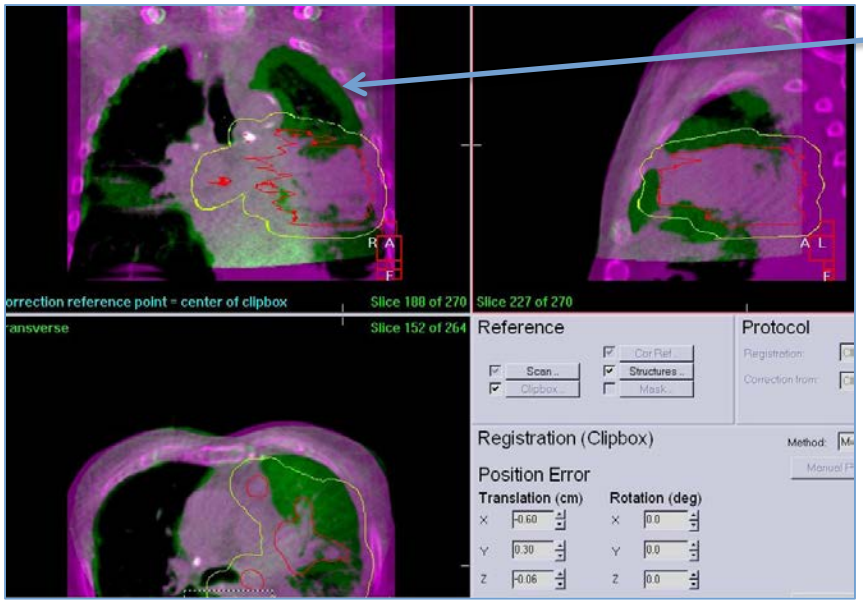
- Atelectasis (+/- fluid)
- Collapsed lung
- Re-inflated lung
- Growth of tumour
- Shrinkage of tumour
- Shift of tumour (i.e. target outside PTV)
- Poor tumour visibility (i.e. poor image quality)
- Pt rotation/roll/pitch
- Carina mis-match

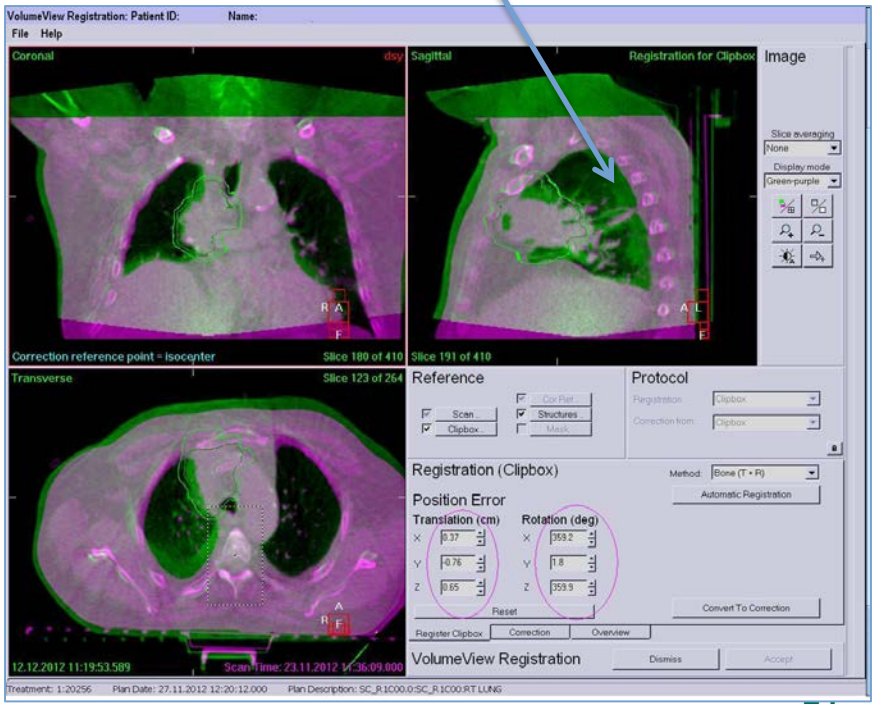
If you encounter any of the above situations while imaging, please consult with your multi-disciplinary team.

Atelectasia



Collapsed Lung/Fluid in Lungs





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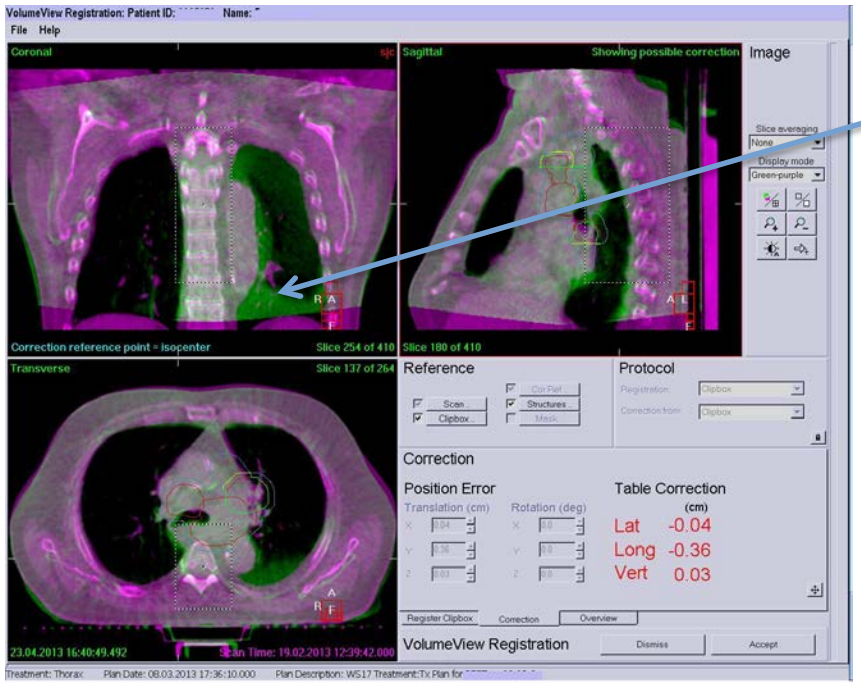
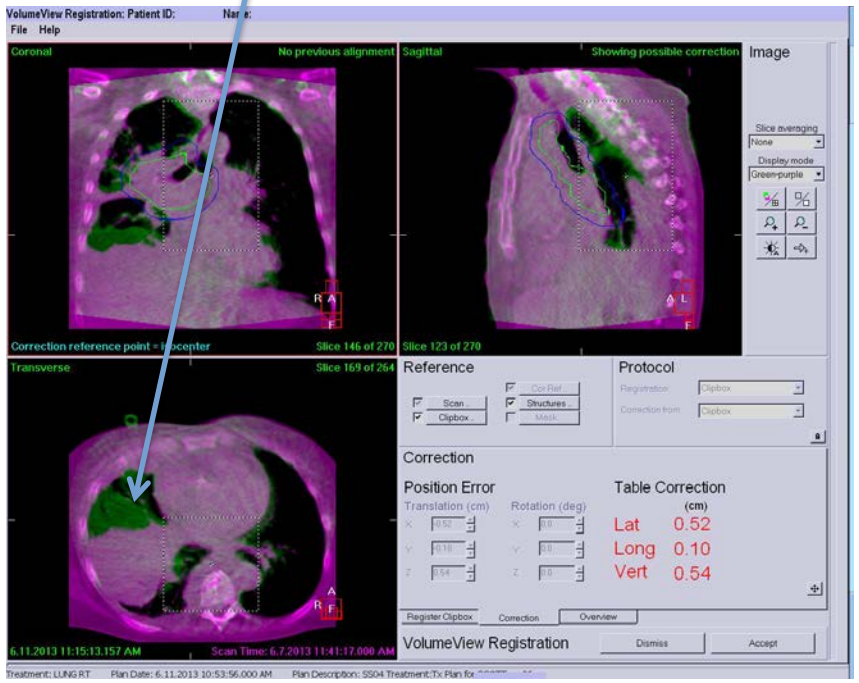
Collapsed Lung/Fluid in Lungs





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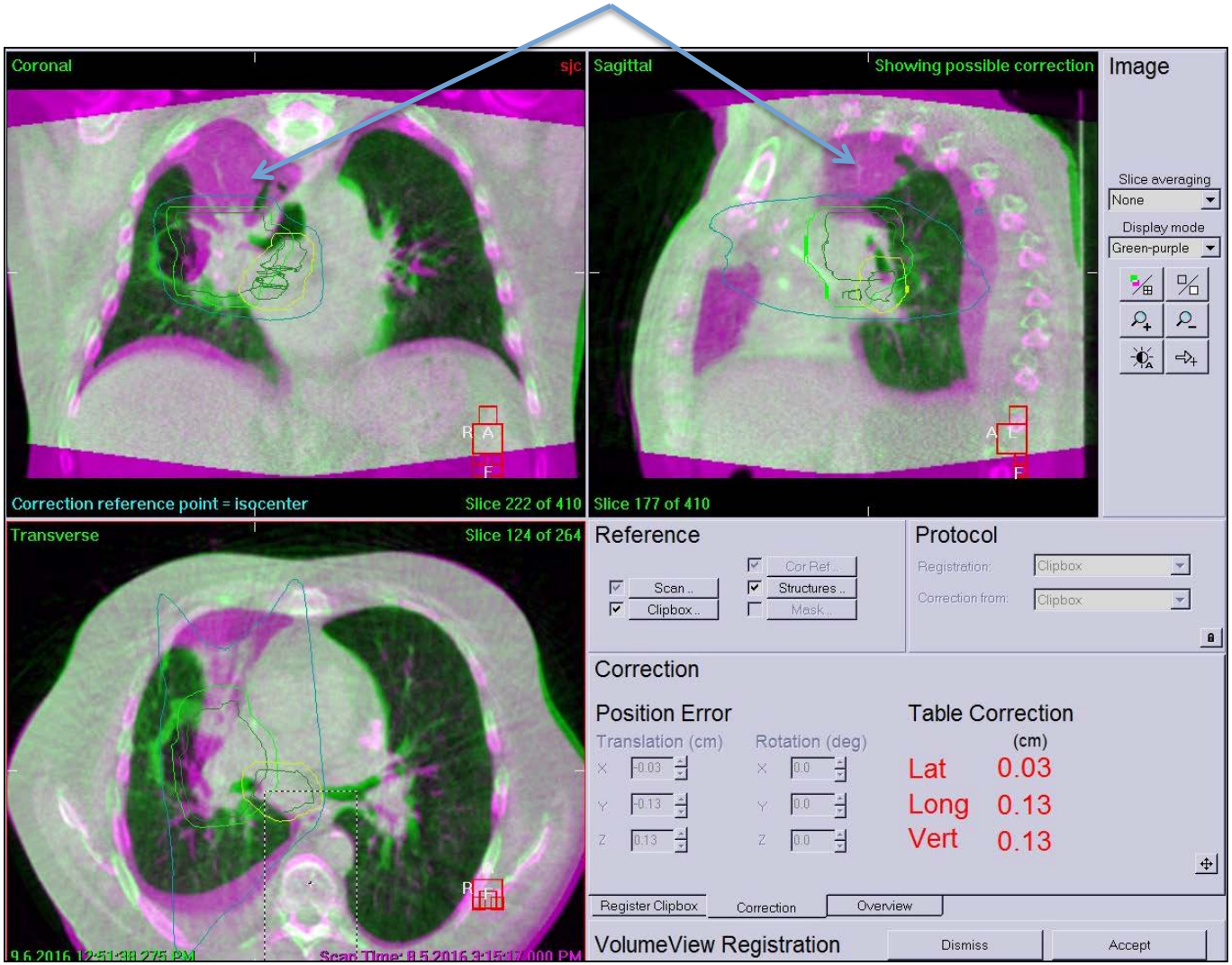
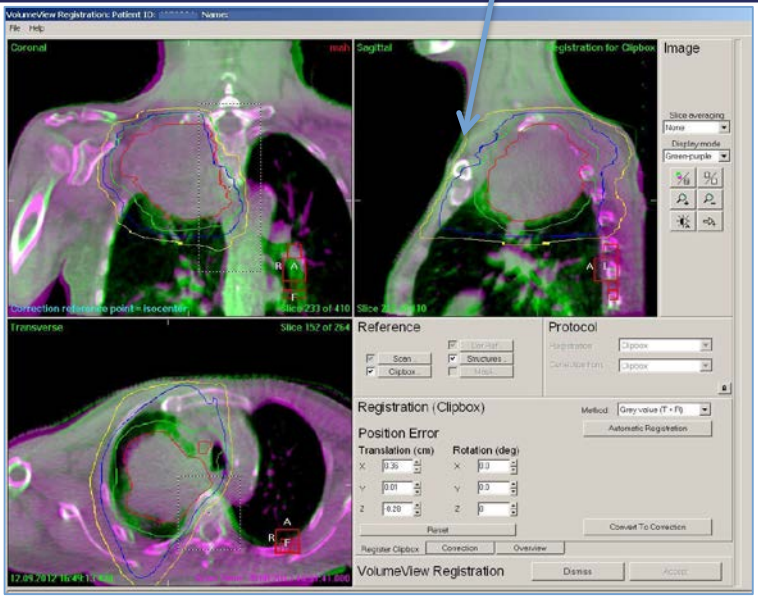
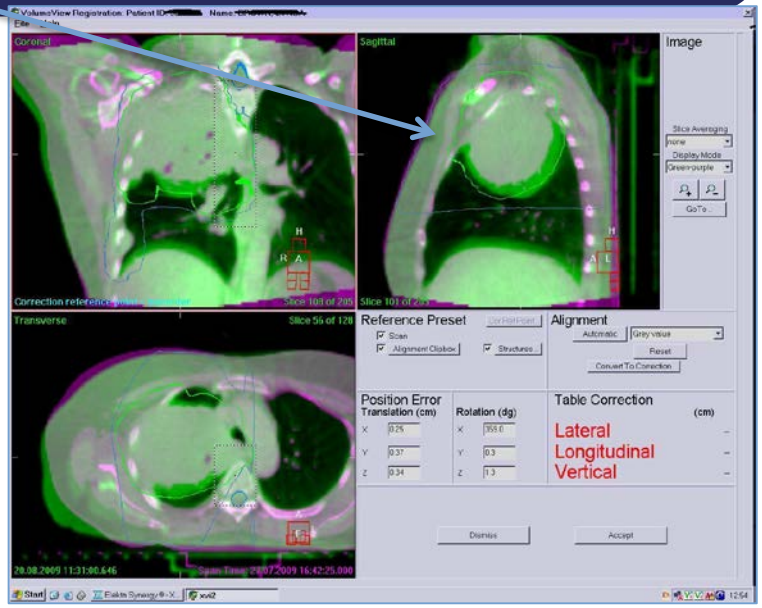
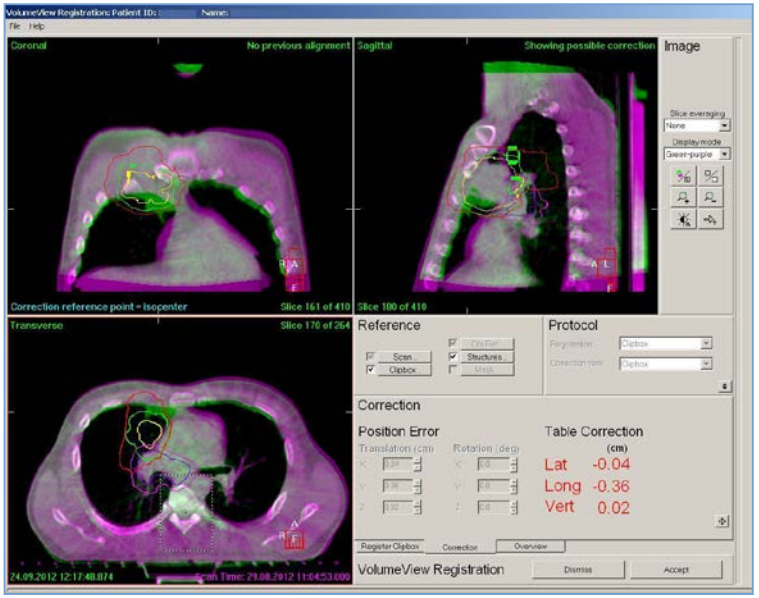
Re-Inflated Lung



Growth of Tumour







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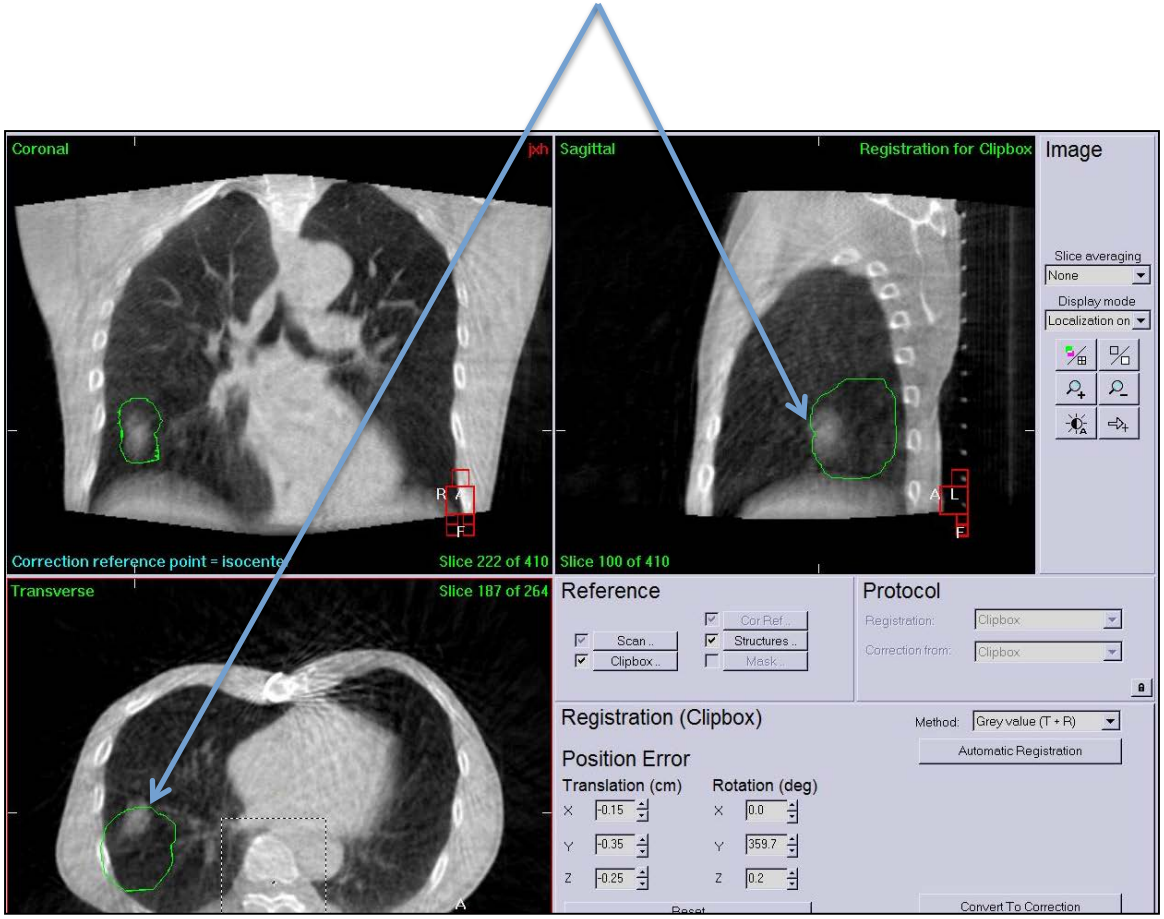
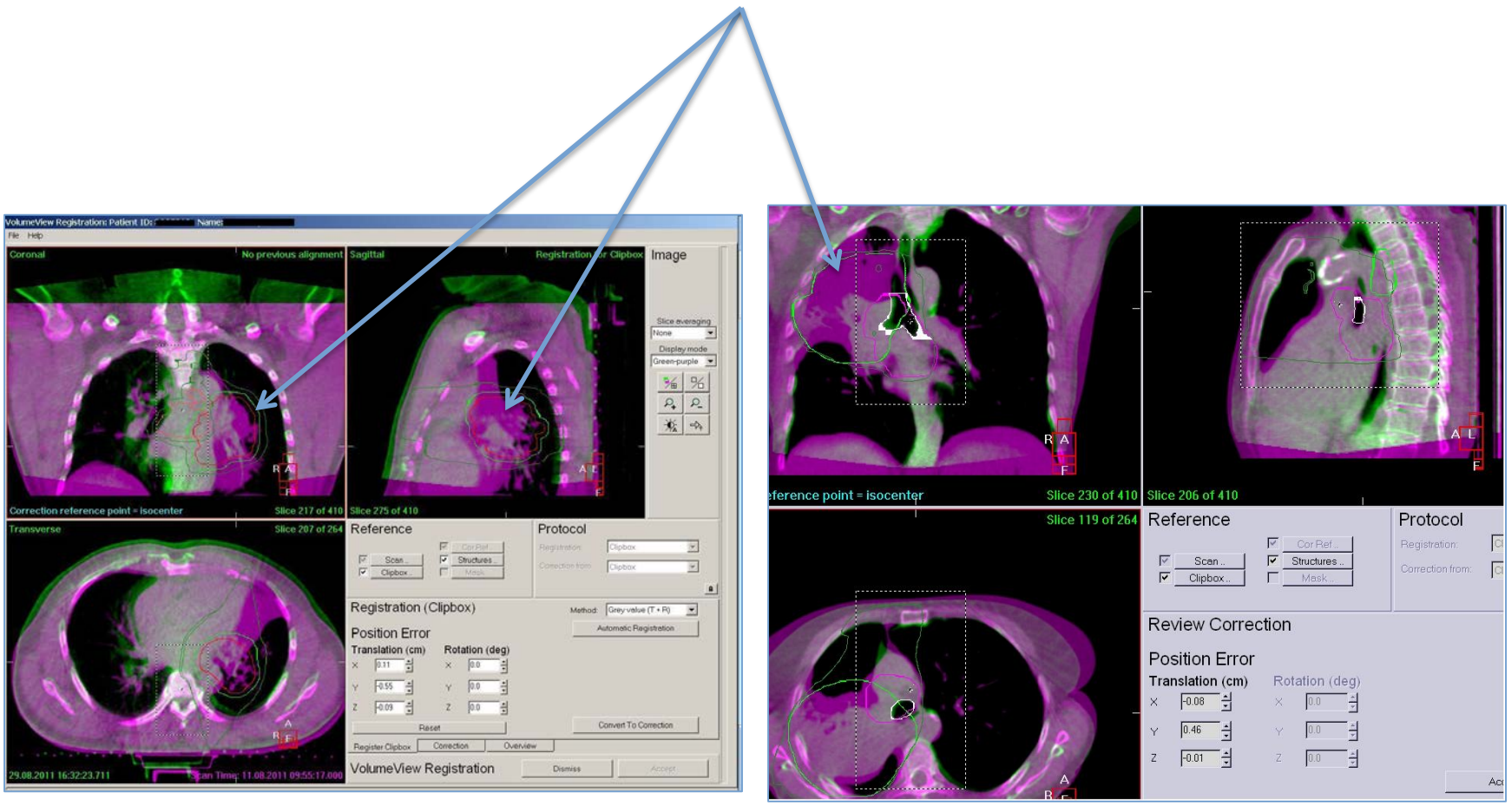
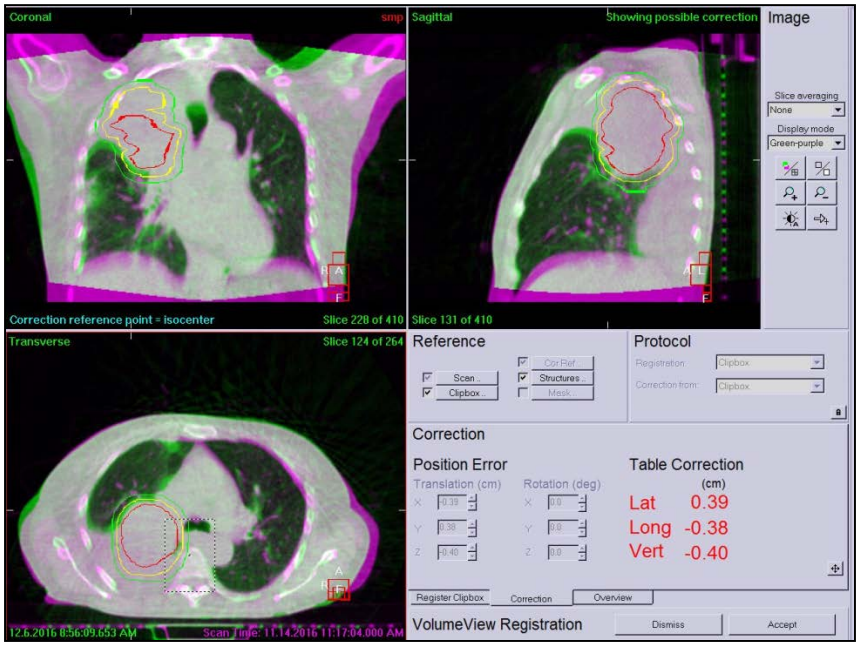
Mass Outside of PTV

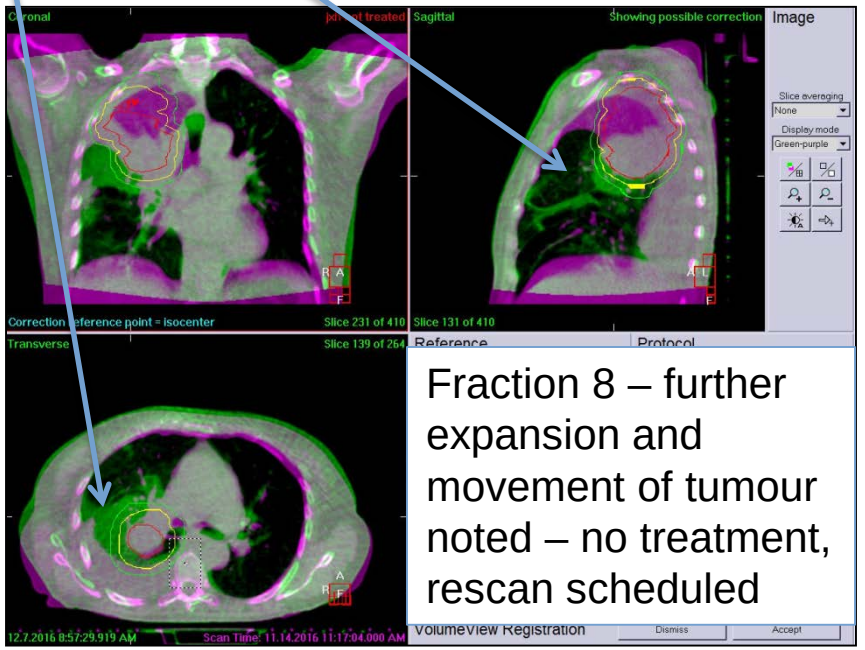


Shrinkage of Tumour



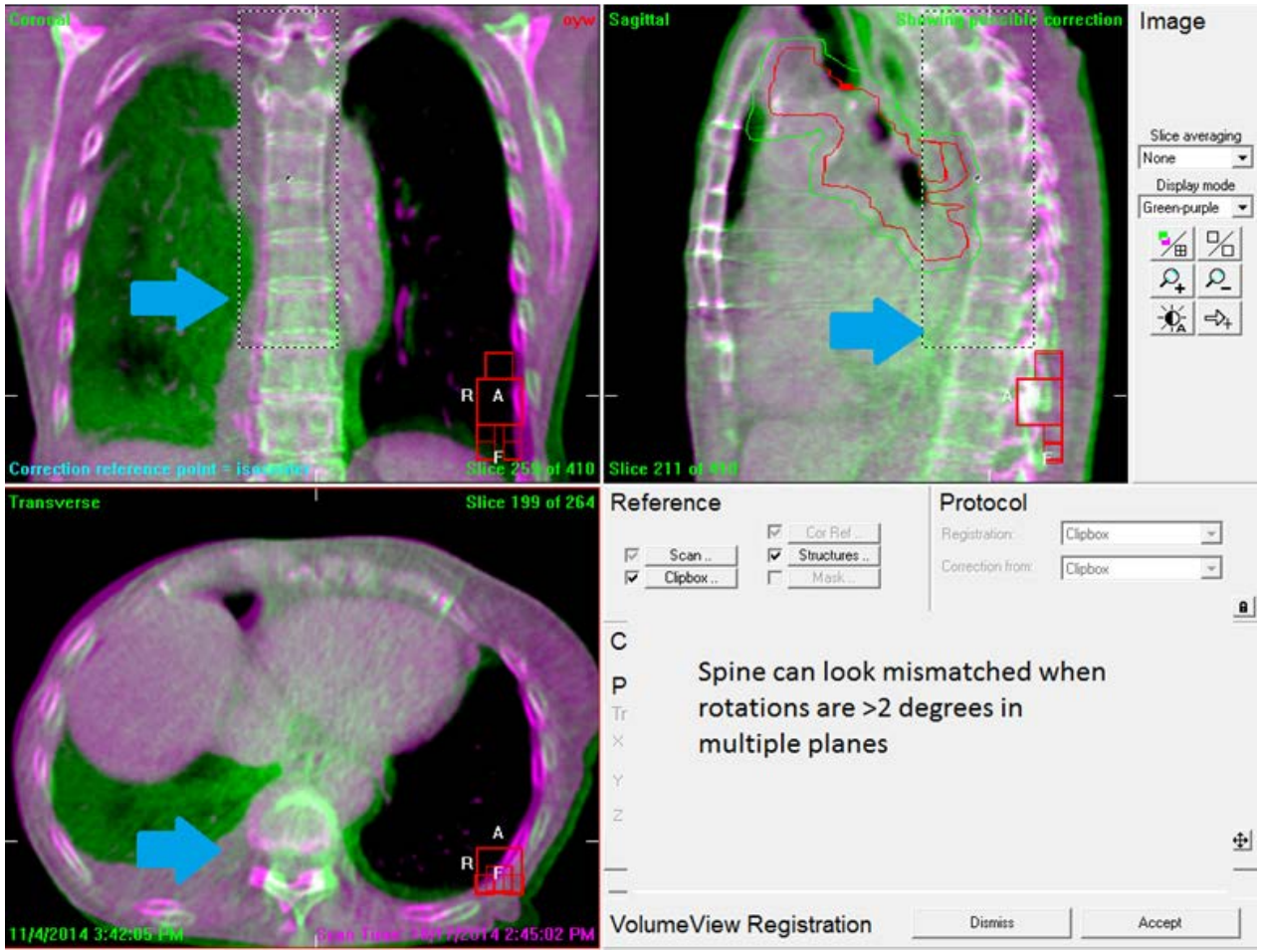
Shift of Tumour



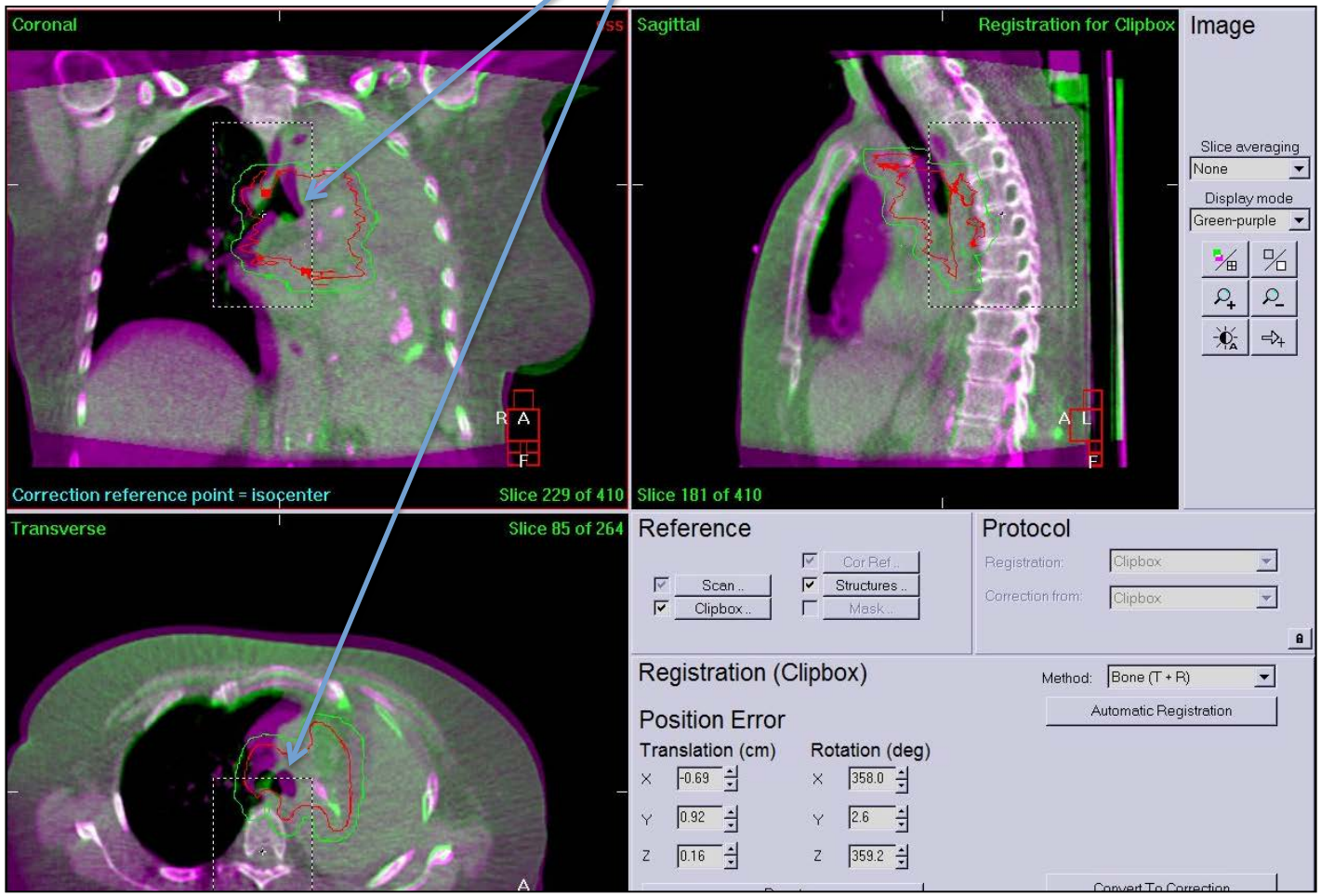


Fraction 8 – further expansion and movement of tumour noted – no treatment, rescan scheduled

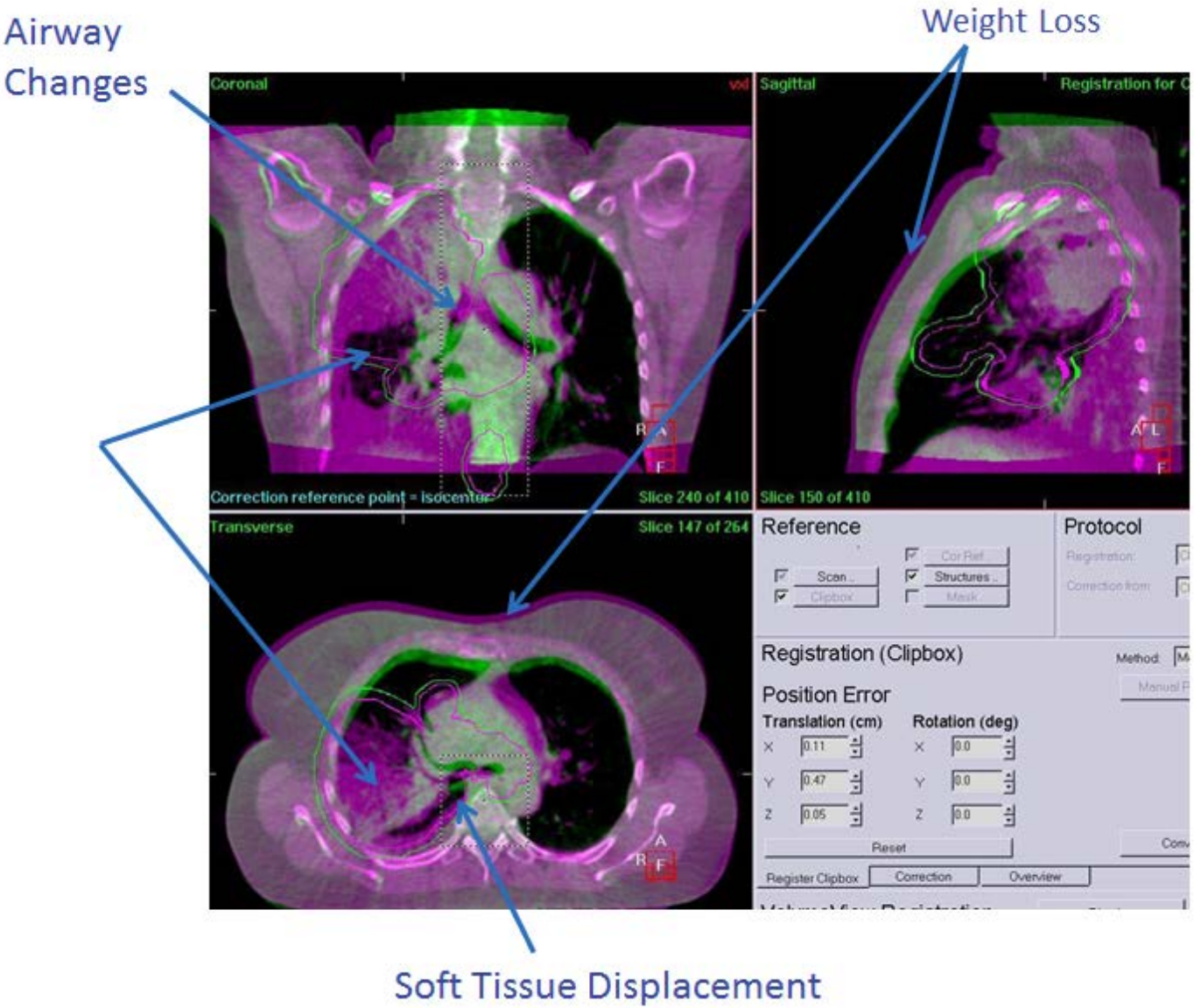
Patient Rotation/Roll/Pitch



Carina Mis-Match



Multiple Issues



Troubleshooting

- **Large Rotations:** adjust patient's body, and note tattoo displacement for future setup replication
- **Large Displacements:** resetup required?
- **Neck Rotations (Apical Lesions/Nodal Targets):** move patient up/down bed, add padding under head/neck
- **Clavicle Displacement:** adjust patient's arm
- **Weight Loss:** check depths/tolerance, notify RO+physics+planner
- **Target Changes:** notify RO
- **Non-Target Changes:** if PTV coverage is OK, proceed with treatment; if not, call RO to unit – call RO immediately for large effusions or gross lung changes
- Some tips:
  - Ensure clipbox is around spine (do not include ribs/tumour as they do not represent a stable part of anatomy, and results will not provide troubleshooting clues)
  - Avoid manual tweaking unless OK'd by RO
  - Notify RO of changes – the earlier the better