Occipital Mask Only Treatment: Occipital Mask vs Conventional Mask for Head & Neck Radiotherapy Treatment

By Kyle Noyce

Special Thanks to Jonathan Dadoun (le Havre)

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Acknowledgements & Bias Considerations

- Macromedics – Training and Equipment
- AlignRT – ROI and patient monitoring support
- Poole Hospital is a reference site for AlignRT

Poole Radiotherapy Department

- 2 Sites – Poole and Dorchester
- 3 Truebeams in Poole
- 1 Truebeam in Dorchester
- Began using AlignRT in 2021
- Tattooless in 2023
- AlignRT is used for all treatment except electron and H&N treatment

Closed Face Thermoplastic Mask

- ✓ Patient is well immobilized
- ✓ High reproducibility
- ✓ Proven to be effective

- X Claustrophobia and Anxiety
- X Refusal of treatment
- X Less effective as patient losses weight
- X Cutting wholes for patient comfort

Reference: Zentec, Thermoplastic Materials, CQ Medical

Introduction to DSPS-*Prominent®*

- **Double Shell Positioning System (DSPS)** Developed by MacroMedics
- Separate anterior facial mask and posterior occipital masks
- Highly accurate immobilisation

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Original Research Article

Setup and intra-fractional motion measurements using surface scanning in head and neck cancer radiotherapy– A feasibility study

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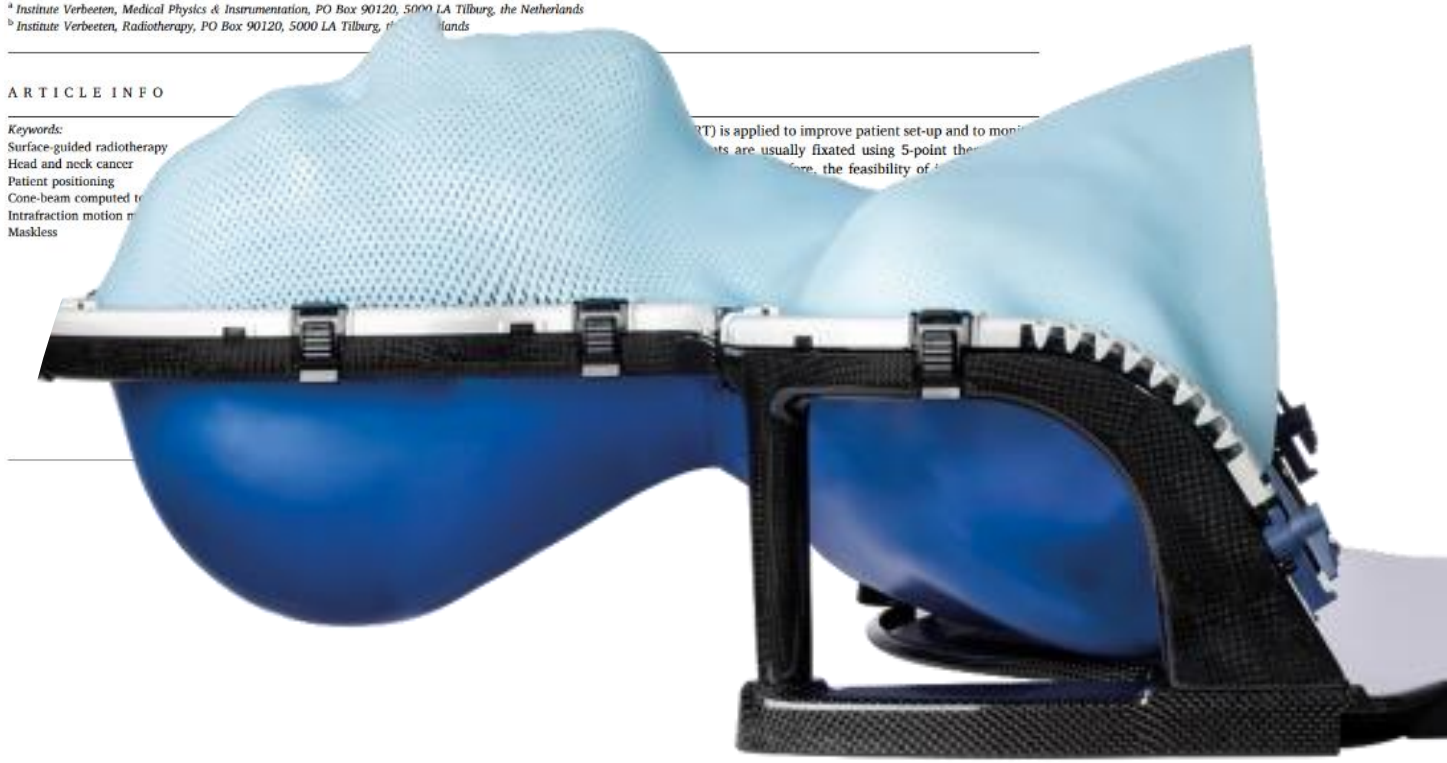

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DSPS-*Prominent*® Occipital Mask Treatment

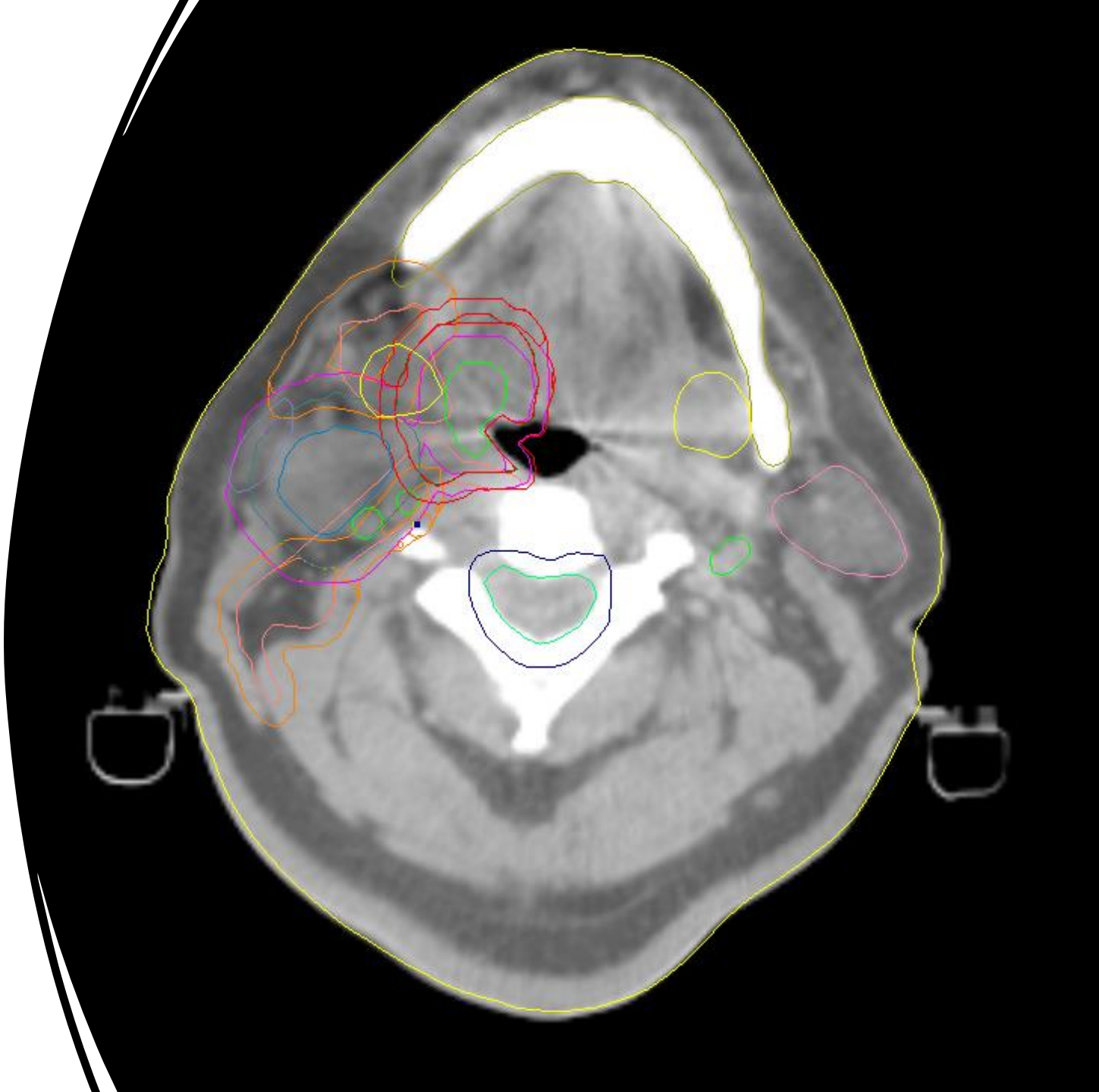
- Potential Benefits –
  - Significant reduction in patient anxiety and claustrophobia
  - Treating patient who would otherwise refuse
  - AlignRT to set up the patient
  - AlignRT to monitor the patient during treatment

Occipital Mask Only

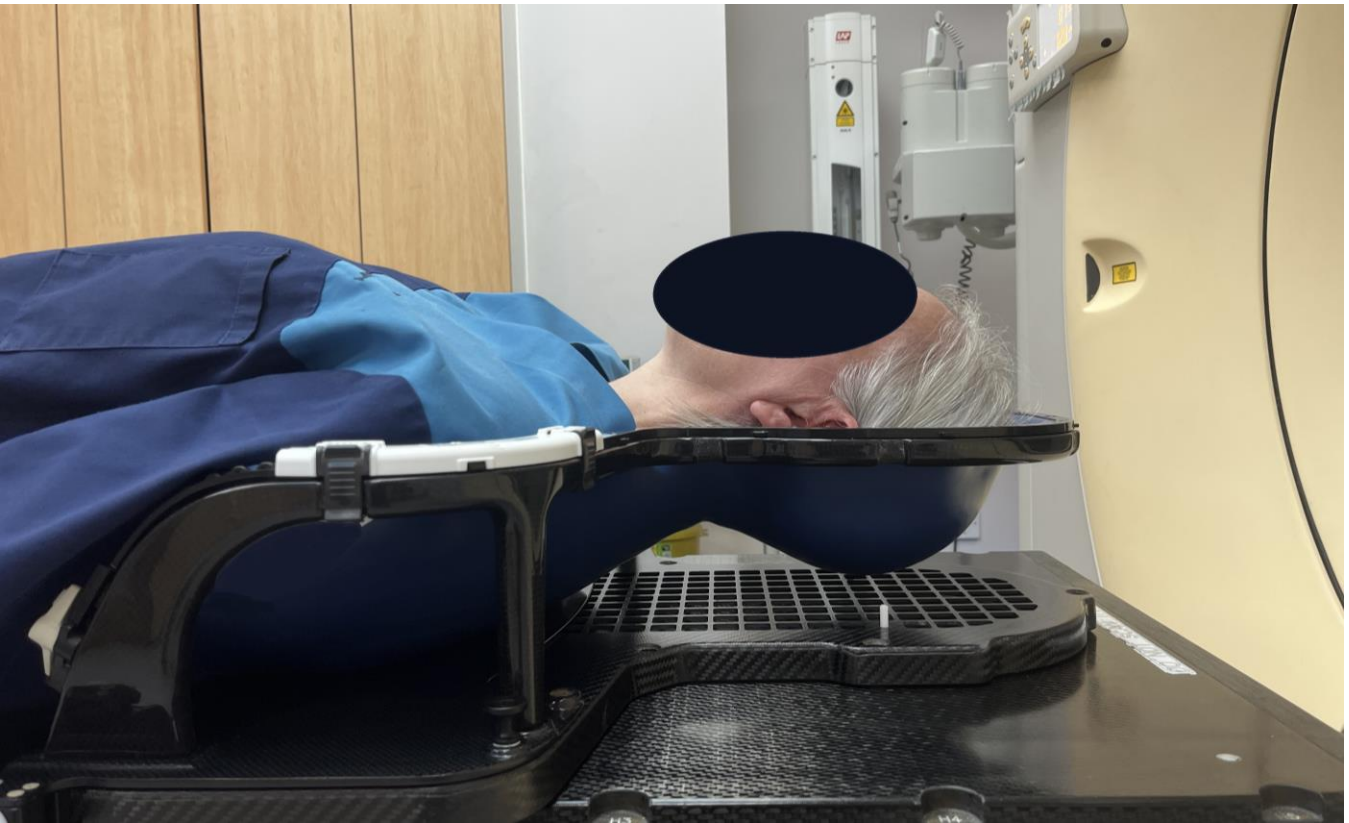
- Does it enable a better patient experience?
- Does the mask safely immobilise the patient for treatment?
- Can AlignRT detect if the patient moves during treatment?

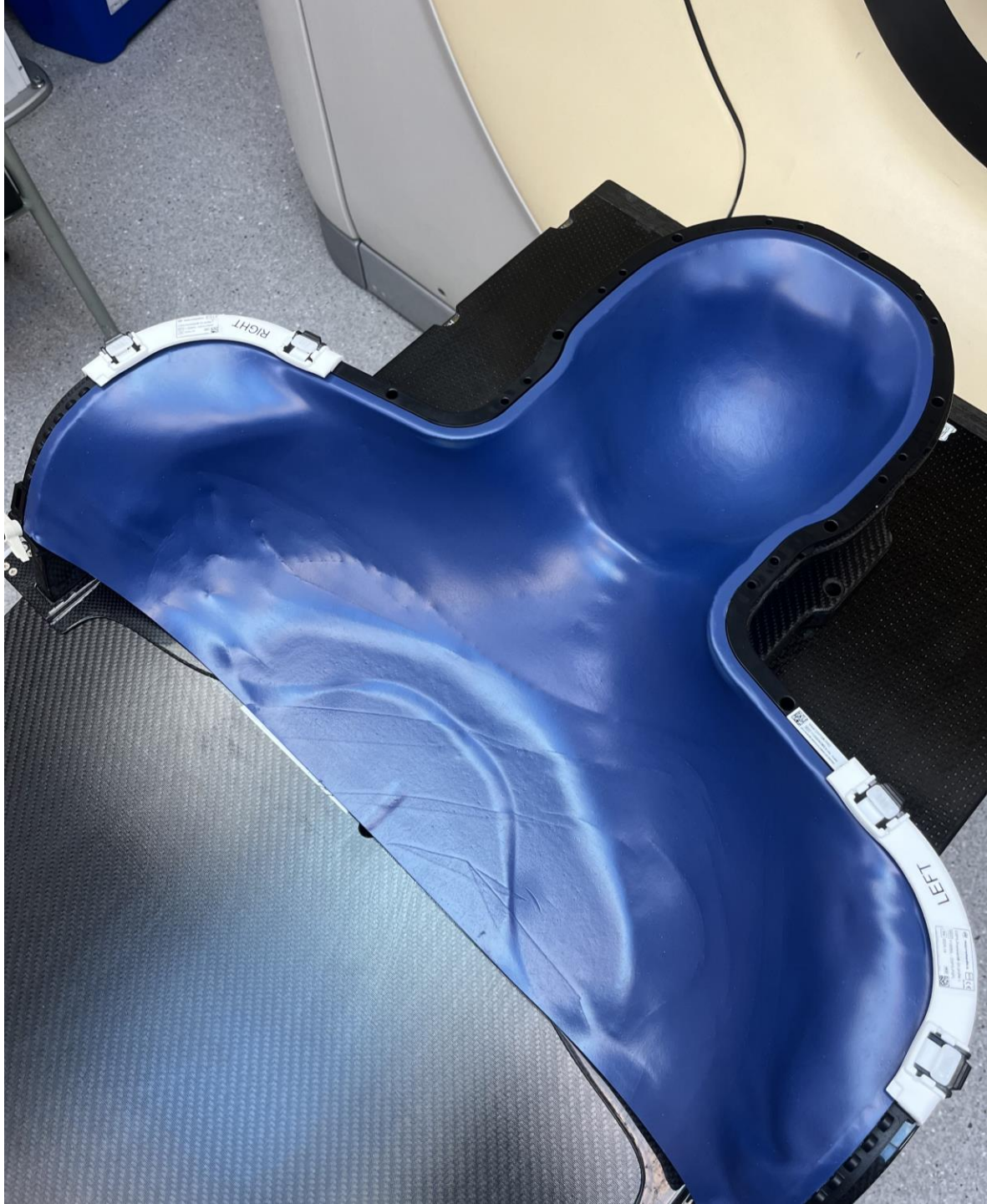
Implementation

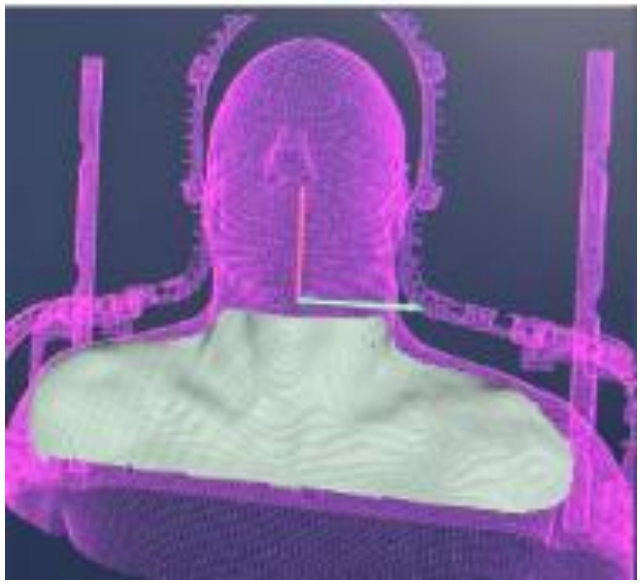
- Daily CBCT + Post CBCT Day 1 and weekly
- 25 Closed Face H&N patients
- 25 Occipital Mask patients
- Specific criteria e.g. No bolus.
- Patient experience surveys



Occipital Mask and Cradle







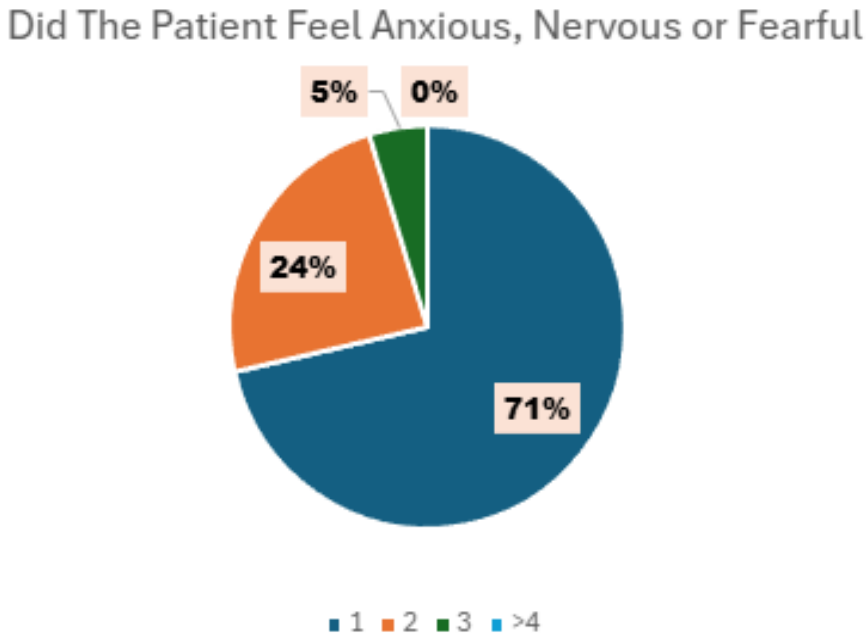
ROI Examples

- Treatment ROI

- Shoulder Positioning Set up ROI

Patient Comfort & Experience

- 71% No anxiety, nervous or fearful about using the mask
- 100% of patients agreed or strongly agreed that they found the mask comfortable.
- 90% of patient disagrees or strongly disagreed about experiencing claustrophobia in the mask.
- 76% of patient agreed or strong agreed that they found the mask relaxing.



Pre-treatment CBCT measurement

Clinical Accuracy – Inter-fractional Movement

Closed Face Mask - Inter-fraction Shift (n=25)				
	Mag: Individual Mean Error		Mag: Individual Random Errors	
(cm/deg)	Translation	Rotation	Translation	Rotation
Mean	0.39	1.41	0.32	0.98
max	0.67	2.59	0.52	1.47

Occipital Mask - Inter-fraction Shift (n=15)				
	Mag: Individual Mean Error		Mag: Individual Random Errors	
(cm/deg)	Translation	Rotation	Translation	Rotation
Mean	0.33	1.88	0.27	1.41
max	0.57	2.92	0.40	2.22

Post-treatment CBCT measurement

Clinical Accuracy – Intra-fractional Movement

Closed Face - Average Intra-fraction Shift (n=25)								
(cm/deg)	Vrt	Lng	Lat	Mag	Rot	Pitch	Roll	Mag
Mean	0.04	0.02	0.02	0.15	0.12	0.22	0.02	0.87
max	0.30	0.12	0.17	0.35	1.25	1.40	0.73	2.35

Occipital - Average Intra-fraction Shift (n=15)								
(cm/deg)	Vrt	Lng	Lat	Mag	Rot	Pitch	Roll	Mag
Mean	0.02	0.01	0.08	0.21	0.03	-0.04	-0.01	1.21
max	0.15	0.13	0.22	0.34	0.45	0.65	0.73	2.09

La Havre CBCT data (CTV to PTV margin 4mm)

Clinical Accuracy – Intra-fractional and Interfractional Movement

Occipital - Average Inter-fraction Shift						
(cm/deg)	Vrt	Lng	Lat	Rot	Pitch	Roll
Mean	0.25	0.2	0.12	0.63	0.76	0.87

Occipital - Average Intra-fraction Shift						
(cm/deg)	Vrt	Lng	Lat	Rot	Pitch	Roll
Mean	0.13	0.08	0.08	0.32	0.48	0.51
max	0.37	0.31	0.24	1.10	2.1	1.8

Limitations

Treatment

- Longer set up times
- Additional training and experience
- Specific Equipment
- Cost

Pre-Treatment

- Artificial patient selection
- Additional Training

Benefits

- Patient questionnaires showed positive experience
- Inter and Intra-fraction variability is well within tolerance and comparable with closed mask
- Reduced patient anxiety

"It is quite comfortable and unlike the other one I was shown not at all claustrophobic and as my face is swollen it is a much better option"

"Feel secure but no restricted. Nothing covering my face so not claustrophobia. Very relieved to be using this mask."

"I felt securely enveloped by the mask"

Future Developments

- Opportunity for other centres
- Further cohorts of patients.
- Patients with bolus

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Questions?

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