

IMPROVING
THE ENTIRE RT WORKFLOW

SGRT: GAME CHANGER



Case Reports on Two Maskless Head and Neck Treatments with SGRT



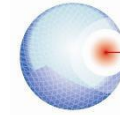
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Strahlenzentrum Hamburg MVZ



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Maskless treatment with SGRT

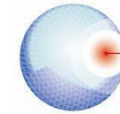
Our way to maskless treatments, and case reports

Rayk Nachtigall, medical physicist

Strahlenzentrum und CyberKnife Center Hamburg



Strahlencentrum Hamburg MVZ



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- „Strahlencentrum Hamburg MVZ“
- Gaining Experience
 - Physicist view
 - RTT view
- Case Reports
 - neck
 - whole brain

Strahlenzentrum Hamburg MVZ



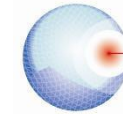
- Founded in 2007 (Prof. Dr. med. F. Fehlauser)
- 2 sites with 50 employees
 - Site Hamburg
2 Elekta linacs (Harmony Pro + Versa HD) 1 Cyberknife
 - Site Elmshorn
1 Harmony Pro
- 2021 installation AlignRT and Safe ID



Gaining experience



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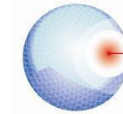
- 30th April 2021 go live – all indications
Thorax RT
 - 30th June 2021 markerless
Other malignant entities
 - August 2021 markerless
- 23rd November 2021 Markerless Award
- July 2024 Patient Centric H&N Center



Gaining experience



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- Since October 2022 head & neck
- Open mask
- Result of our experience,
and gain confidence for maskless



Gaining experience

Physicist view



- Thorax
 - Free breath 203 patients → 4000+ fractions
 - DIBH 76 patients → 1400+ fractions
- Abdomen/Pelvis
 - 40 patients → 920+ fractions
- Head & Neck (open mask)
 - 20 patients → 370+ fractions

Gaining experience

Physicist view



Thorax

$m_{99\%}(\text{FB}) = 2.73 \text{ mm}$
 $m_{99\%}(\text{DIBH}) = 1.45 \text{ mm}$

Abdomen/Pelvis

$m_{99\%} = 2.75 \text{ mm}$

Head & Neck

$m_{99\%} = 0.95 \text{ mm}$

- DIBH recommendation for all thoracic RT
- 2 mm safety margin is possible
- Open masks and SGRT more than sufficient

Gaining experience

RTT view



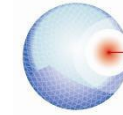
- Opening the masks
 - surface → high precision
 - no claustrophobia → more relaxed patients
- Daily routine
 - rotation corrections
 - shrinking the masks → 3-point masks are our gold standard
- Synergy
 - 10+ years CK treatments → maskless h&n with vacuum mould

Gaining experience

RTT view



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Gold Standard

- 3-point mask
can be any thermo-plastic
enlarge face opening while moulding
flap over chin
- no claustrophobia no nodding
no backing off
- positive patient feedback

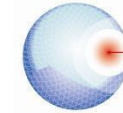


Gaining experience

RTT view



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Maskless Linac Treatments - ideas, expectations, second thoughts:

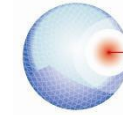
- vacuum mold - time consuming in preparation, more resources
- ROI: cerebral - face; h&n - face and part of thorax
- beamhold maybe unpractical - gantry blocking fov (VMAT)
- chin strap?
- high patient compliance
- maskless treatments are an exception

Case Report 1

neck



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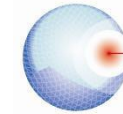
- 71 f
- C2-Th1
- 10x3Gy
- 8 CBCTs
- Shift to planning CT (lng/lat/vrt)
-0.33mm/0.38mm/-0.06mm

Case Report 1

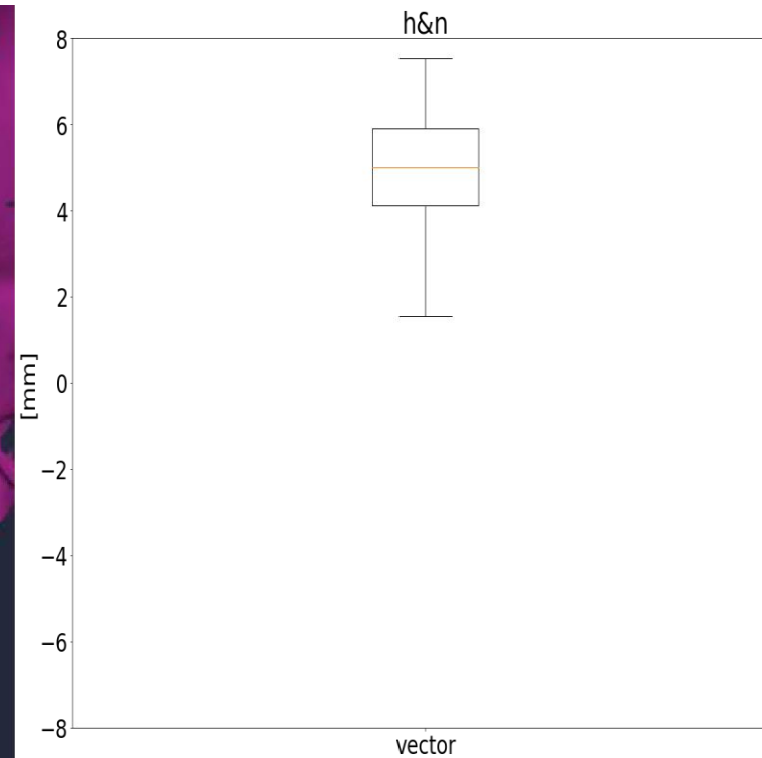
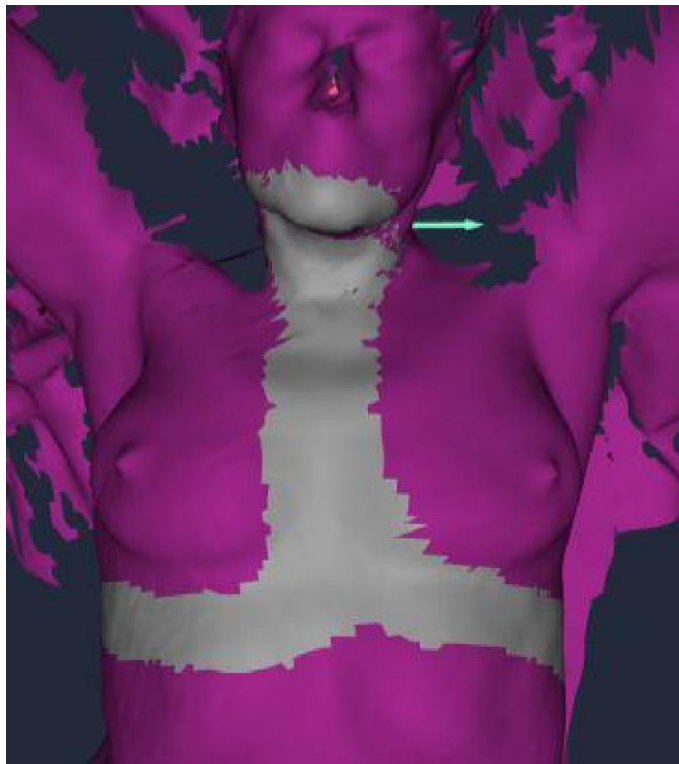
neck



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offset and deviation to planning CT

$5 \text{ mm} \pm 1 \text{ mm}$
 $\rightarrow m_{99\%} = 2.5 \text{ mm}$

Good agreement to $m_{99\%}(\text{FB})$

Case Report 2

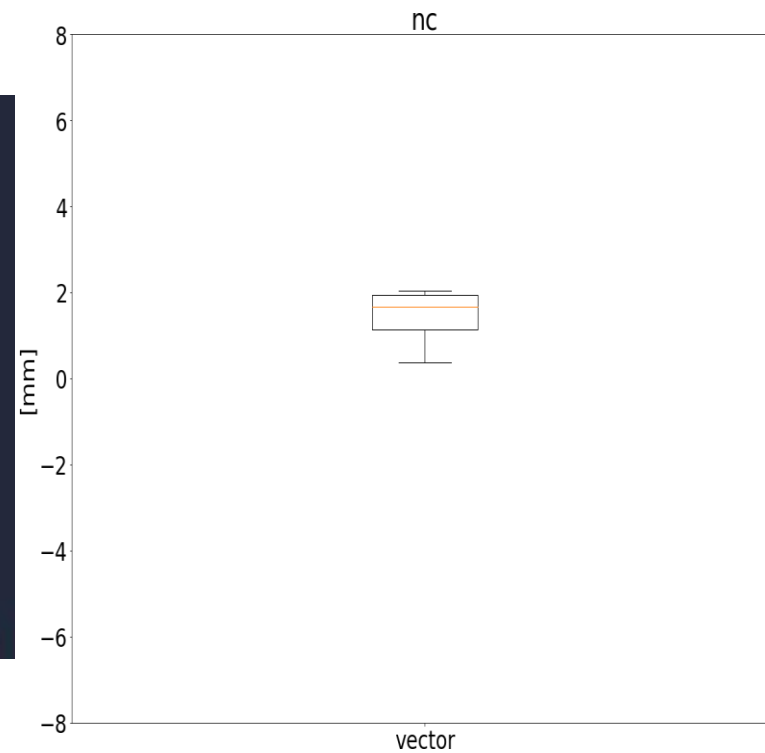
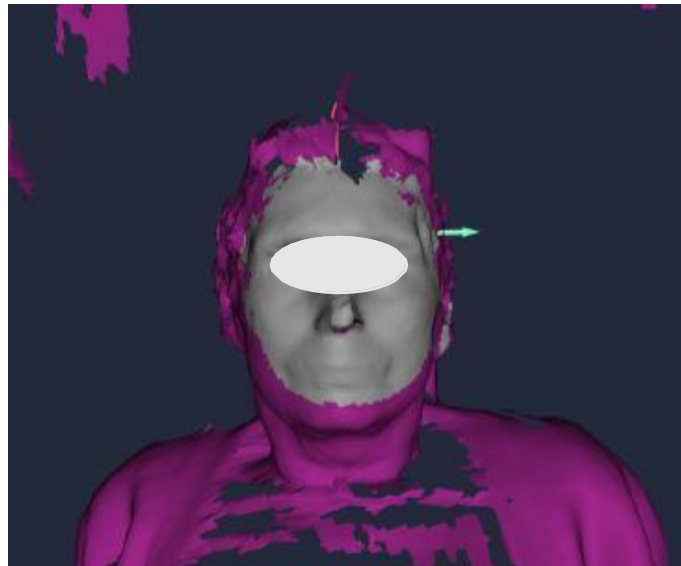
whole brain



- 66 f
- neurocranium
- 10x3Gy
- 4 CBCTs
- Shift to planning CT (lng/lat/vrt)
0.18mm/0.03mm/0.2mm

Case Report 2

whole brain



offset and deviation to planning CT

$1.5 \text{ mm} \pm 0.25 \text{ mm}$
 $\rightarrow m_{99\%} = 0.75 \text{ mm}$

Good agreement to $m_{99\%}(\text{h\&n})$

Conclusion



Physicist

- everything in good agreement \rightarrow q.e.d
- Let's establish a new standard!

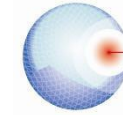
RTT

- amazed by the achievable precision \rightarrow almost negligible rotation errors
- confident with the 3-point masks as gold standard
- maskless RTs will be exceptions

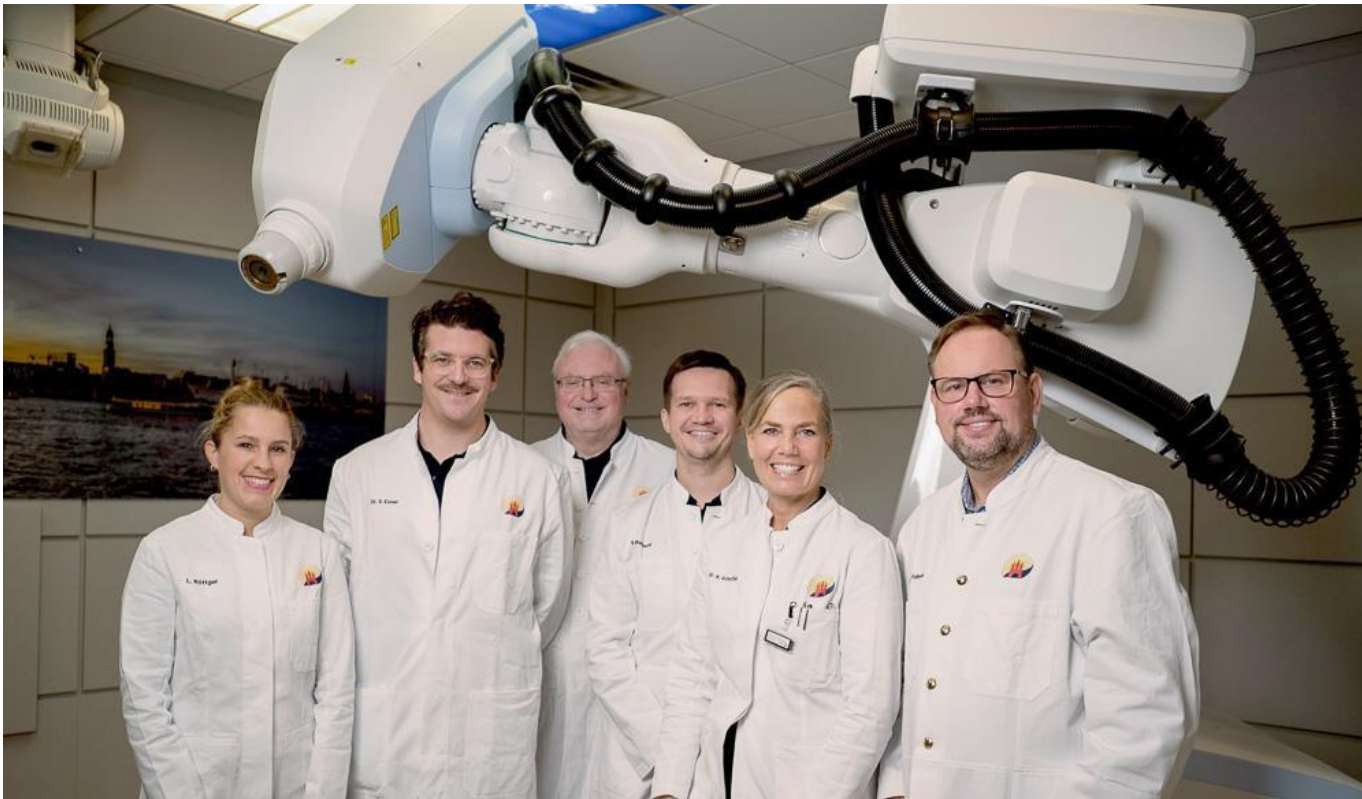
Thank you!



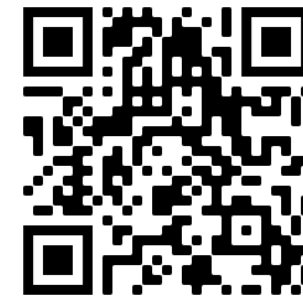
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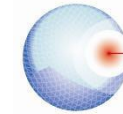
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You're invited to visit us in Hamburg



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