Results: High gamma pass rates were achieved. The cCBCT-based doses resulted in 2%/2mm gamma pass rates between 89.4 and 96.4%, while the iCBCT-based doses resulted in gamma pass rates between 96.4 and 100%. The 1%/1mm gamma analysis yielded pass rates between 77.5 and 80.3% for the cCBCT images, while the iCBCT images provided pass rates between 90.7 and 98.7%. For all patients, the iCBCT images provided superior pass rates compared to the cCBCT images. The table below shows all gamma pass rates for the 5 patients.

<table>
<thead>
<tr>
<th>γ-criterion</th>
<th>Image</th>
<th>Pt 1</th>
<th>Pt 2</th>
<th>Pt 3</th>
<th>Pt 4</th>
<th>Pt 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2%/2mm</td>
<td>cCBCT</td>
<td>89.4</td>
<td>96.4</td>
<td>95.8</td>
<td>94.7</td>
<td>93.1</td>
</tr>
<tr>
<td></td>
<td>iCBCT</td>
<td>100%</td>
<td>98.4</td>
<td>99.9</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>1%/1mm</td>
<td>cCBCT</td>
<td>77.5</td>
<td>80.3</td>
<td>77.6</td>
<td>79.9</td>
<td>79.5</td>
</tr>
<tr>
<td></td>
<td>iCBCT</td>
<td>98.7</td>
<td>90.7</td>
<td>98.6</td>
<td>98.6</td>
<td>95.1</td>
</tr>
</tbody>
</table>

Conclusion: CBCT images can recover the image quality necessary for accurate dose calculations through comprehensive artefact corrections. While the iCBCT doses are accurate, further studies are required to determine how this result can be translated into clinical practice where the accurate dose calculation has potentials within adaptive radiotherapy and CBCT-based online planning. The present study is an important step towards the routine use of CBCT images for adaptive radiotherapy.

Proffered Papers: RTT 4: How to increase the knowledge for patients and staff

OC-0369
Video glasses to reduce claustrophobic anxiety in radiotherapy treatment
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2Brainspa, Institute for Biofeedback, Zutphen, The Netherlands

Purpose or Objective: To investigate whether video glasses can reduce the anxiety level in claustrophobic patients in radiotherapeutic treatment. Claustrophobic patients experience a high level of stress and discomfort which can hamper therapeutic procedures and possibly lead to non-optimal treatment. The influence of video glasses (Luna5, Cedexis Inc.) on stress level during radiotherapy was measured using the Beck Anxiety Inventory (BAI) and biometrical parameters.

Material and Methods: In radiotherapy, systems may be equipped with a tight bore (CT, Tomotherapy) and the patients are immobilized on the treatment couch. A mild to moderate level of anxiety due to claustrophobia occurs at 10% of the population, a more severe level occurs at 4%. The common method to deal with a claustrophobic patient is to spend time with the patient to simulate treatment or to prescribe a tranquilizer. The idea of the video glasses is to focus patient attention to a movie using images and sounds from nature (Beter door Beeld Inc.). Volunteers (n=15) underwent a simulation of a radiotherapy treatment on the Tomotherapy system. Each volunteer filled in the BAI form in advance, which estimates the severity of their anxiety, based on a past individual claustrophobic experience. Severe level of anxiety was present in 11 volunteers, moderate level was found in 4 volunteers. Each volunteer was exposed to 3 runs: one without glasses, one with and the third without to compare the effectiveness of the training. The volunteer was monitored continuously during each run using the Nexus-10 biofeedback system (MindMedia Inc.) to access the experienced level of anxiety more objectively. Results shown here are based on the detection of the high beta EEG wave.

Results: Reduced level of anxiety (based on the BAI score) was indicated by 13 out of 15 volunteers when using video glasses (see figure 1). This was confirmed by the observed trend in the ‘high beta’ brain wave amplitude. This brain signal is associated with stress level. The difference in mean amplitude of this wave between the run with and without video glasses is depicted in figure 2.

Conclusion: Using video glasses with an especially composed movie using images and sounds from nature during radiotherapy treatment, clearly lowers the level of anxiety of claustrophobic volunteers both subjectively based on the questionnaire as objectively by biometric measurements. Feedback of the volunteers overwhelmingly expressed a preference to undergo treatment with video glasses: “it was much easier to relax, never without glasses!”

OC-0370
The influence of virtual training on pelvic radiotherapy education for the multidisciplinary team
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Purpose or Objective: Radiotherapy accelerates rapidly and ongoing training is essential to maintain and develop knowledge. A virtual reality environment is one way to provide training. This study aims to demonstrate how a training package for advanced prostate and cervix radiotherapy can be implemented effectively in a multi-disciplinary setting using a virtual reality environment.

Material and Methods: The training package consists of a virtual reality training tool (visual demonstration) and workbooks (self filled questions). Each training tutorial is delivered by a senior radiographer and includes identification of pelvic anatomy, review of different radiotherapy treatment planning and delivery techniques (conformal, static field intensity modulated radiotherapy and volumetric modulated radiotherapy), image guided treatment scenarios and radiotherapy related side effects. The trainees were asked to complete pre and post tutorial questionnaires by grading their knowledge from 1 not confident at all, to 10 being exceptionally confident. These were devised to assess the effectiveness of the training.
package in terms of the trainees’ knowledge and decision-making skills in advanced prostate and cervix radiotherapy. An evaluation of the session was also completed.

**Results:** The session was presented to 20 attendees comprising of 14 radiographers, 4 physicists and 2 clinical oncologists. In general, all attendees found the session useful and appropriate for their level of experience. All would recommend the training package to their peers.

The results of the pre and post tutorial questionnaires were summarised in table 1 below. Using Wilcoxon signed rank test, significant improvements in scoring were found in all questions (p<0.05).

**Question** | Pre-tutorial score | Post- tutorial score | P value
---|---|---|---
How confident are you at identifying pelvic anatomy on CT | Median= 7 | Median= 8 | <0.05
How confident are you to decide if a patient is suitable to treat with image matching decision making for prostate and cervix patients using images, DWH and organ at risk tolerance dose information | Median= 6 | Median= 8 | <0.05

Please rate your knowledge of planning for prostate and cervix patients when looking at rapid ARC, IMRT and conventional plans.

**Conclusion:** Our analysis of the data suggests the virtual reality teaching tool can enhance learning, influence decision making, improve knowledge and understanding of cervix and prostate radiotherapy for radiographers, physicists and clinicians. To this effect, further training sessions will be held and evaluated with the multidisciplinary team.

**OC-0371** Introduction of a consultant radiographer to stereotactic radiotherapy service

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**Purpose or Objective:** The role of a radiotherapy consultant radiographer has been proposed by the government in the United Kingdom with the aim to take advantage of the competencies of radiographers in driving forward the implementation of protocol-based care. With the increasing demand for Stereotactic Radiosurgery and Radiotherapy (SRS/SRT), our institution has appointed a consultant radiographer to lead the service since 2014. This study aims to investigate the impact of a consultant radiographer on the SRS/SRT service.

**Material and Methods:** A consultant radiographer is defined as someone with the appropriate education and training who is able to provide clinical leadership within a specialism, bringing strategic direction, innovation and influence through practice, research and education to the post. It is acknowledged that the role of a consultant radiographer was introduced to enhance our SRS/SRT service delivery and hence improve patient outcomes by increasing capacity and patient throughput. This helps the service to meet national and cancer targets.

A retrospective review of SRS/SRT patients who were treated in 2013, 2014 and 2015 at our institution was carried out to determine the interval between decision to treat and treatment start dates (INT). Kruskal-Wallis ANOVA was performed to test for any significant difference in INT across the three years.

**Results:** Between January 2013 and September 2015, 229 patients were included in the study and the descriptive statistics were summarised in the table below.

<table>
<thead>
<tr>
<th>Year</th>
<th>2013 (Jan - Sept)</th>
<th>2014 (Jan - Sept)</th>
<th>2015 (Jan - Sept)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients treated</td>
<td>66</td>
<td>74</td>
<td>89</td>
</tr>
<tr>
<td>Mean INT (days)</td>
<td>39.4</td>
<td>28.6</td>
<td>22.0</td>
</tr>
</tbody>
</table>

A significant difference (p<0.05) was found in INT between 2013, 2014 and 2015. The mean INT in 2015 is shortened to nearly half of that in 2013.

**Conclusion:** This analysis suggests that intervals between decision to treat and treatment start dates of our SRS/SRT patients have been shortened since the consultant radiographer was appointed. The post holder has streamlined the patient pathways that still deliver high quality services but in more resourceful and innovative ways including radiographer led target volume delineations and consent.