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# Technical Innovations & Patient Support in Radiation Oncology

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## Editorial

### Introduction to: Surface Guided Radiotherapy (SGRT)



This special issue focuses on Surface Guided Radiotherapy (SGRT). In 1979 Velkey et al. presents for the first time about nonmetric cameras that are used to obtain surface contours of a human with an accuracy of 1–2 mm [1]. SGRT as we know it now was introduced in radiotherapy around the turn of the millennium [2] and the past years it was implemented more and more in the radiotherapy clinic. According to Al-Hallaq et al. SGRT covers the entire workflow from setup to the end of treatment, providing images that are easier and faster to interpret [3]. Haraldsson et al. analysed the data of 696 patients and found a significant difference in residual error between surface scanning and positioning with in-room lasers. Concerning the efficiency gains they found that surface scanning significantly reduced patient on-couch time compared to MVCT. Both gains were found for all treatment sites [4]. Mannerberg et al. confirmed this for the positioning of prostate cancer patients. SGRT provided faster and a more accurate patient positioning compared to the conventional 3-point localization setup [5].

In literature it was described that it is not only a positioning tool, but it is becoming an integral component of the future radiotherapy (RT) workflow. Above a smoother workflow, improvement of functionality and efficiency it gains safety [6]. Freislederer et al. describes SGRT as a four eyes principle [7], and Al-Hallaq et al. states that SGRT is functioning as an “independent observer” in the room [3]. It appeared that SGRT is able to reduce treatment-related errors [3]. As wrong isocentre and wrong accessories are responsible for the majority (77%) of errors in the radiotherapy treatment it appeared that 21% of these errors could have been prevented with SGRT. However, SGRT itself was identified as a contributing source of error as well. Suboptimal integration of SGRT into the RT workflow such as manual handling and preparation of data are prone to errors [3]. With SGRT routine habits need to be unlearned [6]. For example adopt SGRT in place of simple 3-point marks. In these modern times patients are better able to raise their voice, and as was investigated by Probst et al. it appears that permanent tattoos may impact patients’ wellbeing and are seen as a negative visible reminder to their illness [8]. Several authors investigated that with SGRT no tattoos are needed [6,9] which could be a next step in improving the radiation treatment for the patient.

As stated above, SGRT has the potential to have a large impact on improving quality and safety of radiation treatments but IGRT is still the gold standard for position verification. SGRT can complement other imaging modalities without adding radiation dose [3]. A next step in patient position verification was described by Mannerberg et al., they state that SGRT can be considered as an additional safety component for target sites where daily images are not acquired [5]. And Gonzales-Sanchis et al. verified by IGRT that breast surface positioning determined with SGRT was correlated with surgical clips in the tumour bed

[9]. Further investigation is needed if in specific radiation treatments IGRT can be omitted.

Another positive component of SGRT was described by Mannerberg et al., although not thoroughly investigated they found that SGRT improved the physical work environment. The latter aims at less lifting of the patient into the correct position [5]. It seems that no studies have been performed concerning the physical aspect of patient positioning for Radiation Therapists, but is certainly worthwhile investigating.

Finally, it appears that an organization, when implementing SGRT in daily clinic, needs to allocate time and resources in all professions to fully integrate this new technology. Introduction of one clinical application at a time is another option [6]. But one needs to realise that it is an entire different workflow and state of mind for the radiation therapy employees.

With all this gained insight it seems that SGRT moves the patient positioning to a next level. However, still further research is needed to get more information about the pros and cons of SGRT in clinical practice. This special issue dedicated to this topic adds knowledge. It brings forward that the clinical implementation is an evolutionary process and the specific studies show the benefits of SGRT in daily clinic.

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