WP4: Image Guidance in Particle Therapy

Image guidance is critical to achieve high-precision particle therapy. However, imaging equipment, procedures and clinical workflows vary substantially between particle therapy centres. Currently, there is a lack of standardisation for image-guided proton therapy (IGPT).

The aim of this working party is to gain insight into the current practice parameters of IGPT and to drive harmonisation through the establishment of body-site specific consensus guidelines.

Within WP4, five sub-working groups are currently active:
1. Brain and head-and-neck (H&N) (Dante Amelio, Iuliana Toma-Dasu)
2. Thorax (Alexandru Dasu, Petra Witt-Nyström)
3. Abdomen and pelvis (Markus Stock, Christoph Fuseli)
4. Extremities (Alessandra Bolsi, Juliette Thariat)
5. Cranio-spinal irradiation (CSI) (Petra Trnkova)

Within these sub-working groups, about 40 collaborators from almost all European particle therapy centres are represented. All imaging workflow stages are covered by a multidisciplinary team of radiation oncologists, medical physicists and radiation therapists. Recently, a radiologist joined the brain and H&N working group.

So far, three annual workshops have been organised. The most recent meeting took place over 21-22 February 2019 in Trento, Italy, and 21 colleagues from 10 European countries actively participated. Ten particle centres were represented; eight of which were in the process of treating patients. Nine participants were newcomers. The aims of the workshop were: (1) to work on the finalisation of a body-site specific survey to be sent out before the end of the year, and (2) to discuss ideas for future WP4-specific projects.

For the brain and H&N, and abdomen and pelvis, sub-working groups, all questions of the survey were reviewed and prioritised. The thorax group finalised its list of questions and worked on the restructuring and harmonisation of the format. The questions for the CSI sub-group require a careful last review by the collaborators. The part of the survey that concerns the extremities sub-group is in active progress.

Agreement was reached on how to proceed with the consensus guideline. Literature regarding IGPT for brain, breast and prostate treatment will be reviewed in the coming months. In parallel, the new survey will be sent out to all European particle therapy centres before the end of the year.

Several ideas were discussed for future WP4-specific projects. Among them were: the advantages and disadvantages of external and in-room patient positioning; the role of on-line imaging versus prior 4D-CT information; a comprehensive overview of setup accuracies for immobilisation tools; and end-to-end testing of imaging procedures. Agreement on a first WP4-specific project should be reached during the next workshop in 2020.

Furthermore, a need was identified to put together a wish list for vendors to be able to start a dialogue on solutions for body-site specific bottlenecks in current IGPT procedures and workflow steps.

The next WP4 workshop will take place on 5-6 March 2020 at MedAustron in Wiener Neustadt, Austria.