
Mise au point : Gestion d'un projet d'installation : besoins, contraintes, pré-requis

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Résumé

The market of particle therapy is still rapidly growing worldwide and this modality is now being considered as one modality of radiation therapy, in complementarity with other types of RT treatments.

However, the number of facilities and patient treated remains negligible compared to photon RT (less than 1 %) mainly due to the complexity and therefore overall costs of the particle (proton and moreover ion) facility. Due to the current technology employed and the size/costs, a particle therapy project cannot be managed like a standard radiation therapy project.

Nevertheless, from a medical physics point of view, many steps are common to any radiation therapy machine set-up and commissioning and the methodology and principles employed can therefore be adapted.

From a project management point of view, a proton project reaches another dimension, on several aspects :

- regarding the time frame, the standard duration is in years (2 to 3 years for one room) and not in months
- the overall cost is in tens of millions (more than 30) for one single room and can reach hundreds of million for ion therapy centers, to be compared to several millions for a X ray RT project. Furthermore, a specific building has to be built and the constraints in terms of engineering (power supply, cooling...) exceed by far the standard constraints and have an impact on the whole infrastructure of the hospital.
- the financial aspects and the clinical constraints put a much higher pressure on the starting and the ramp rate of the facility and have therefore to be carefully studied and guaranteed, especially from a staffing and training point of view.

On the medical physics side, however, the traditional steps remain more or less the same, although modified by the specificity of the particles : beam acceptance and QA, TPS commissioning, daily QA, patient positioning, uncertainties management and robust planning. Nevertheless, three aspects are emphasized when addressing particle therapy :

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- radiation protection and activation, as the nuclear interactions and neutron production rates are much more important

- treatment planning (beam modeling) and QA linked to inhomogeneities, motion and robust planning due to the required precision on the range of the clinical beams

- education and training as, up to now, particle therapy is not completely part of the background of the vast majority of medical physicists. Regarding this aspect, upstream education program far before the facility acceptance, is mandatory for clinical teams.

In conclusion, although industrial efforts and decades of treatment, a particle therapy facility is not a project like the others and the project management has to be adapted to this dimension. However, as it is no longer research centers but CE marked clinical machines, the methodology of x ray machines acceptance can be largely adapted.