

In the last few years, proton therapy systems (PTS) have become commercially available for routine clinical use. This development promises a new interest in conformal therapy and poses a challenge to a radiation oncology team to develop methods that ensure safe and efficacious use of this new technology.

The uses of protons for radiation therapy require greater expertise of all involved in their use: radiation oncologists, physicists, dosimetrists, therapists and supporting technical staff. The operation, control and quality assurance of PTS often involves a considerable degree of computerized control and data processing techniques. For all practical purposes, acquisition of such equipment requires making a choice between a limited numbers of commercially available FDA approved PTS. Nevertheless, the radiation oncology team that is ready to purchase a PTS is faced with the complex task of selecting the appropriate machine from those commercially available and developing a code of practice for its safe clinical use. The selection, installation, and clinical use of PTS involve:

1. development of the specifications of the proton therapy system, which should be based on;
  - a. a careful study of the clinical needs;
  - b. a careful study of technical and physical specifications of the commercially available equipment, including the technical and operational characteristics of the essential accessories;
  - c. available or needed physics or therapy staff, and available in-house technical support;
  - d. an analysis of the financial implications, including warranties and the possible need for maintenance contracts;
2. design and construction of the facilities to accommodate the selected PTS, including radiation shielding;
3. installation of the selected PTS; verification of radiation safety in the environment of the radiation facility;
4. acceptance testing of the installed equipment;
5. commissioning of the PTS for active clinical use;
6. training of the staff in the safe and efficacious use of the PTS;
7. development and application of a comprehensive quality assurance (QA) program.

The focus of presentations is to, a) describe the process of acceptance testing and clinical commissioning b) discuss the clinical workflow for different disease sites and c) describe strategies to optimize the utilization of the PTS.

Learning Objective:

1. understand the process of developing specifications,
2. learn acceptance test procedures
3. understand clinical commissioning of a PTS