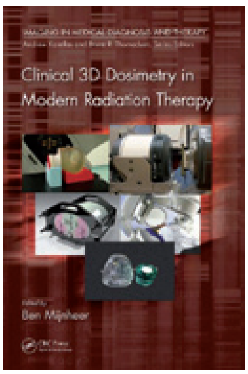
Novedades bibliográficas

Some comments on the publication of the book "Clinical 3D Dosimetry in Modern Radiation Therapy", edited by Ben Mijnheer*



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A lot has changed in radiation dosimetry since I started as a medical physicist, more than 30 years ago. It was the time period in which three-dimensional conformal radiotherapy (3DCRT) was introduced. The consequences with respect to dosimetric issues when starting with 3DCRT were abundant. The possibilities of the newly developed 3D treatment planning systems (TPSs) had to be well understood, while extensive sets of commissioning and validation measurements were required to ensure the safe use of 3DCRT techniques in the clinic. For all these activities, novel dosimetric approaches were developed, often based on the use of the same type of dosimeters as applied in conventional RT, but measurements were now required in many more points in multiple planes.

A lot of time was spent in determining detector characteristics and their accuracy and limitations, for using them for dose determinations in the clinic. At that time clinical dosimetry was largely based on point, 1D, and sometimes 2D methods, using mainly ionization chambers, TLDs and radiographic films. Not many books on clinical dosimetry were available, and it was realized that sharing knowledge and experience from medical physicists, often working alone in small hospitals, was a prerequisite for ensuring the safe and accurate delivery of the prescribed dose of new treatment techniques. For that reason several organizations, including ESTRO, started with organizing courses in which clinical dosimetry was an important part of it. One of the first presentations I gave on this topic, was during the Summer School on Medical Physics in 1992 (the Columbus Quincentennial) in a conference center near the Monastery of Santa María de la Rábida, not far from Huelva. There was even an exam at the end of the course, where the main problem was not the lack of knowledge of physics but a language problem; the examination questions were in English, which took a lot of time for some of the students to understand and to answer.

Later, with the introduction of IMRT and VMAT, numerous other new possibilities for creating complex treatment plans became available. All these new treatment modalities needed, however, additional efforts in assessing the accuracy of the various steps in the radiotherapy process. These major recent advances in the field demanded innovative direct 3D, semi-3D, or even 4D (i.e. including the time variation) dosimetric tools to accurately characterize and validate hard- and software, and to determine and verify patient- and organ-specific doses. The difference compared to the situation when 3DCRT was introduced was that the start of IMRT and VMAT was accompanied by the publication of several reports dealing with dosimetric issues related to their clinical implementation. Also various training courses were organized how to perform QA of these advanced techniques. Already at a very early stage in using IMRT clinically, we had in 2001 a well-attended (despite the American 9-11 events just before it) ESTRO pre-meeting course on IMRT verification in the Monastery of Santa María de las Cuevas (Monastery of the Cartuja), in Seville. Later ESTRO, together with the SEFM, organized many more courses on QA of 3DCRT and IMRT, including several courses on *in vivo* dosimetry in the beautiful buildings of the Hospital de la Santa Creu i de Sant Pau in Barcelona.

However, information on clinical 3D dosimetry in modern radiotherapy is scattered over many places in the literature, including review articles and conference proceedings. When I was asked about four years ago to edit a book about 3D dosimetry, and after consulting several colleagues, I came to the conclusion that there was really a need for such a book. It could provide valuable guidance to those involved in the design and implementation of new treatment technology and its application in modern radiation therapy. Such a book could be unique in the sense that it summarizes the state-of-the-art of the required and achieved accuracy, types of instrumentation, various methods, and clinical applications of 3D dosimetry in modern radiation therapy. It should in addition discuss some pre-clinical applications of 3D dosimetry, such as for small animal irradiations, synchroton radiation therapy, and MRI-

* The url address of the book is: https://www.crcpress.com/Clinical-3D-Dosimetry-in-Modern-Radiation-Therapy/Mijnheer/p/book/9781482252217

guided radiotherapy. The book should enable readers to select the most suitable dosimetry techniques needed to determine very accurately the 3D dose distributions involved in modern radiotherapy, based on numerical data, examples, and case studies provided.

The resulting book “Clinical 3D Dosimetry in Modern Radiation Therapy” has 26 chapters and is divided into five sections dealing with various aspects related to clinical 3D dosimetry. After summarizing the main topics discussed in the different chapters in this book, in the “Introduction” the clinical need for accurate 3D dosimetry is elucidated from different points of view. In the second section on “Instrumentation”, experts in the use of the many different types of dosimeters describe the specific application of these detectors for 0D (using point detectors) to 4D dosimetry. The emphasis is on the clinical application of these detectors with a brief overview of their unique characteristics of importance for 3D dosimetry. In the third section on “Measurement and computation” various 3D and 4D dosimetry methods required for special treatment techniques, both already routinely applied or at the developmental stage, are described. In the fourth section of the book on “Clinical applications” a range of 3D dosimetry methods are extensively discussed for a large variety of disease sites and treatment techniques including IMRT, VMAT, brachytherapy and proton/carbon ion therapy. In the final section 3D dosimetry techniques used for emerging technological developments in the field of radiotherapy are introduced.

The book provides a comprehensive overview of many aspects related to clinical 3D dosimetry, which medical physicists, and medical physicists in training may consult for implementation in their daily clinical work. In addition the book is intended to provide state-of-the-art information on dosimetry methods for basic scientists and other researchers working on the development of new radiation detectors or dosimetry techniques. The book offers ample theoretical and practical information necessary for newcomers in the field to get started with radiotherapy physics. Some chapters of the book are also suitable for supporting education of radiation oncologists, residents, RTTs, and students and trainees. Modern radiotherapy can only be performed in an optimal way if all members of the RT team are aware of the possibilities and limitations of the equipment they are using. I therefore sincerely hope that the information provided in this book could be distributed to as many potentially interested people as possible; the book deserves it. I am therefore grateful for this opportunity to share the information on the publication of the book by the SEFM.

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