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Managing Patient Dose in Digital Radiology



<u>Icrp Publication 93 Managing Patient Dose In Digital</u> <u>Radiology</u>

Luis Lanca, Augusto Silva

Icrp Publication 93 Managing Patient Dose In Digital Radiology:

ICRP Publication 93 ICRP,2005-05-12 Digital techniques have the potential to improve the practice of radiology but they also risk the overuse of radiation The main advantages of digital imaging i e wide dynamic range post processing multiple viewing options and electronic transfer and archiving possibilities are clear but overexposures can occur without an adverse impact on image quality In conventional radiography excessive exposure produces a black film In digital systems good images are obtained for a large range of doses It is very easy to obtain and delete images with digital fluoroscopy systems and there may be a tendency to obtain more images than necessary In digital radiology higher patient dose usually means improved image quality so a tendency to use higher patient doses than necessary could occur Different medical imaging tasks require different levels of image quality and doses that have no additional benefit for the clinical purpose should be avoided Image quality can be compromised by inappropriate levels of data compression and or post processing techniques All these new challenges should be part of the optimisation process and should be included in clinical and technical protocols Local diagnostic reference levels should be re evaluated for digital imaging and patient dose parameters should be displayed at the operator console Frequent patient dose audits should occur when digital techniques are introduced Training in the management of image quality and patient dose in digital radiology is necessary Digital radiology will involve new regulations and invoke new challenges for practitioners As digital images are easier to obtain and transmit the justification criteria should be reinforced Commissioning of digital systems should involve clinical specialists medical physicists and radiographers to ensure that imaging capability and radiation dose management are integrated Quality control requires new procedures and protocols visualisation transmission and archiving of the images Digital Radiography Euclid Seeram, 2019-01-23 This is the second edition of a well received book that enriches the understanding of radiographers and radiologic technologists across the globe and is designed to meet the needs of courses units on radiographic imaging equipment procedures production and exposure The book also serves as a supplement for courses that address digital imaging techniques such as radiologic physics radiographic equipment and quality control In a broader sense the purpose of the book is to meet readers needs in connection with the change from film based imaging to film less or digital imaging today all radiographic imaging worldwide is based on digital imaging technologies. The book covers a wide range of topics to address the needs of members of various professional radiologic technology associations such as the American Society of Radiologic Technologists the Canadian Association of Medical Radiation Technologists the College of Radiographers in the UK and the Australian and New Zealand Societies for Radiographers Digital Imaging Systems for Plain Radiography Luis Lanca, Augusto Silva, 2012-10-25 Advances in digital technology led to the development of digital x ray detectors that are currently in wide use for projection radiography including Computed Radiography CR and Digital Radiography DR Digital Imaging Systems for Plain Radiography addresses the current technological methods available to medical imaging

professionals to ensure the optimization of the radiological process concerning image quality and reduction of patient exposure Based on extensive research by the authors and reference to the current literature the book addresses how exposure parameters influence the diagnostic quality in digital systems what the current acceptable radiation doses are for useful diagnostic images and at what level the dose could be reduced to maintain an accurate diagnosis The book is a valuable resource for both students learning the field and for imaging professionals to apply to their own practice while performing radiological examinations with digital systems

Radiation Protection In Diagnostic X-Ray Imaging,

Optimizing of Dose and Imaging Quality for Computer and Digital Radhiography (IIUM PRESS) Zubir Ahmad Shazli, Moey Soo Foon, 2021-04-01 Optimization of dose in radiographic examinations is essential since the utilization of x radiation is related to increased cancer risk The study s objective was to guide radiographers in ensuring best practices for common radiographic examinations of acceptable image quality in digital radiography while minimizing radiation doses that could result in harmful effects The study comprised of three phases The rst phase involved 90 respondents between 20 to 60 years of age and weighing between 60 80 kilograms for the following examinations anterior posterior AP abdomen AP or lateral lumbar sacral spine and posterior anterior PA chest examinations During this phase the radiographic examination s technical parameters for 30 radiographs for each examination were at the radiographers discretion Kerma X plus DAP dose area product meter was utilized to evaluate the entrance surface dose ESD while CALDose X 5 0 Monte Carlo was used to estimate the effective dose The experimental study utilized an anthropomorphic phantom PBU 50 and Leeds test object to compare the image quality The best parameters were adapted to the patient's AP thickness for the optimization study from the different technical parameters used in the experimental phase The Physics of Diagnostic Imaging Second Edition David Dowsett, Patrick A Kenny, R Eugene Johnston, 2006-04-28 Over recent years there has been a vast expansion in the variety of imaging techniques available and developments in machine specifications continue apace If radiologists and radiographers are to obtain optimal image quality while minimising exposure times a good understanding of the fundamentals of the radiological science underpinning diagnostic imaging is essential The second edition of this well received textbook continues to cover all technical aspects of diagnostic radiology and remains an ideal companion during examination preparation and beyond The content includes a review of basic science aspects of imaging followed by a detailed explanation of radiological sciences conventional x ray image formation and other imaging techniques The enormous technical advances in computed tomography including multislice acquisition and 3D image reconstruction digital imaging in the form of image plate and direct radiography magnetic resonance imaging colour flow imaging in ultrasound and positron radiopharmaceuticals in nuclear medicine are all considered here A chapter devoted to computers in radiology considers advances in radiology information systems and computer applications in image storage and communication systems The text concludes with a series of general topics relating to diagnostic imaging The content has been revised and updated

throughout to ensure it remains in line with the Fellowship of the Royal College of Radiologists FRCR examination while European and American perspectives on technology guidelines and regulations ensure international relevance Protection in Medical Imaging and Radiation Oncology Richard J. Vetter, Magdalena S. Stoeva, 2016-01-05 Radiation Protection in Medical Imaging and Radiation Oncology focuses on the professional operational and regulatory aspects of radiation protection Advances in radiation medicine have resulted in new modalities and procedures some of which have significant potential to cause serious harm Examples include radiologic procedures that require ve and Protection part - 2 Mr. Rohit Manglik, 2024-01-15 EduGorilla Publication is a trusted name in the education sector committed to empowering learners with high quality study materials and resources Specializing in competitive exams and academic support EduGorilla provides comprehensive and well structured content tailored to meet the needs of students across various streams and levels A Comprehensive Guide to Radiographic Sciences and Technology Euclid Seeram, 2021-04-06 A Comprehensive Guide to Radiographic Sciences and Technology is a concise review of radiographic physics and imaging perfect for students preparing for certification examinations such as the American Registry for Radiologic Technologists ARRT Aligned with the core radiographic science components of the current American Society of Radiologic Technologists ASRT curriculum this up to date resource covers topics including radiation production and characteristics imaging equipment digital image acquisition and display radiation protection basic principles of computed tomography and quality control The guide begins with an overview of the radiographic sciences and technology followed by detailed descriptions of the major components of digital radiographic imaging systems Subsequent sections discuss the essential aspects of diagnostic radiography and computed tomography including basic physics imaging modalities digital image processing quality control imaging informatics and basic concepts of radiobiology and radiation protection Throughout the book concise chapters summarise the critical knowledge required for effective and efficient imaging of the patient while emphasising the important yet commonly misunderstood relationship between radiation dose and image quality Written by an internationally recognised expert in the field this invaluable reference and guide Provides easy access to basic physics techniques equipment and safety quidelines for radiographic imaging Reflects the educational requirements of the American Society of Radiologic Technologists ASRT the Canadian Association of Medical Radiation Technologists CAMRT the College of Radiographers CoR and other radiography societies and associations worldwide Offers a range of pedagogical tools such as chapter outlines key term definitions bulleted lists practical examples and links to current references and additional resources Includes charts diagrams photographs and x ray images A Comprehensive Guide to Radiographic Sciences and Technology is required reading for students in programs using ionizing radiation those preparing for the ARRT and other global radiography certification exams and practising technologists wanting to refresh their knowledge Radiological Safety and Quality Lawrence Lau, Kwan-Hoong Ng, 2013-11-22 This book is the product of a unique collaboration by experts

from leading international regional and national agencies and professional organizations discussing on the current hot issue on the judicious use and safety of radiation in radiology There have been several cases involving radiation overexposure that have received international attention Strategies and solutions to guide readers how to maximize the benefits and minimize the risks when using radiation in medicine are covered World Congress on Medical Physics and Biomedical Engineering September 7 - 12, 2009 Munich, Germany Olaf Dössel, Wolfgang C. Schlegel, 2010-01-01 Present Your Research to the World The World Congress 2009 on Medical Physics and Biomedical Engineering the triennial scientific meeting of the IUPESM is the world's leading forum for presenting the results of current scientific work in health related physics and technologies to an international audience With more than 2 800 presentations it will be the biggest conference in the fields of Medical Physics and Biomedical Engineering in 2009 Medical physics biomedical engineering and bioengineering have been driving forces of innovation and progress in medicine and healthcare over the past two decades As new key technologies arise with significant potential to open new options in diagnostics and therapeutics it is a multidisciplinary task to evaluate their benefit for medicine and healthcare with respect to the quality of performance and therapeutic output Covering key aspects such as information and communication technologies micro and nanosystems optics and biotechnology the congress will serve as an inter and multidisciplinary platform that brings together people from basic research R D industry and medical application to discuss these issues As a major event for science medicine and technology the congress provides a comprehensive overview and in depth first hand information on new developments advanced technologies and current and future applications With this Final Program we would like to give you an overview of the dimension of the congress and invite you to join us in Munich Olaf D ssel Congress President Wolfgang C Optically Stimulated Luminescence Eduardo G. Yukihara, Stephen W. S. McKeever.2011-02-16 Optically stimulated luminescence has developed into one of the leading optical techniques for the measurement and detection of ionizing radiation This text covers in a readable manner advanced modern applications of the technique how it can play a useful role in different areas of dosimetry and how to approach the challenges presented when working with optically stimulated luminescence The six chapters are as follows Introduction including a short history of OSL and details of successful applications Theory and Practical Aspects Personal Dosimetry Space Dosimetry Medical Dosimetry Other Applications and Concepts including retrospective and accident dosimetry environmental monitoring and UV dosimetry Throughout the book the underlying theory is discussed on an as needed basis for a complete understanding of the phenomena but with an emphasis of the practical applications of the technique The authors also give background information and relevant key references on each method inviting the reader to explore deeper into the subject independently Postgraduates researchers and those involved with radiation dosimetry will find this book particularly useful The material is both relevant and accessible for both specialists and those new to the field therefore is fundamental to any academic interested in modern advances of the subject **World Congress of Medical Physics and Biomedical Engineering**

2006 Sun I. Kim, Tae S. Suh, 2007-07-05 These proceedings of the World Congress 2006 the fourteenth conference in this series offer a strong scientific program covering a wide range of issues and challenges which are currently present in Medical physics and Biomedical Engineering About 2 500 peer reviewed contributions are presented in a six volume book comprising 25 tracks joint conferences and symposia and including invited contributions from well known researchers in this Grainger & Allison's Diagnostic Radiology E-Book Andy Adam, Adrian K. Dixon, Jonathan H Gillard, Cornelia field Schaefer-Prokop, Ronald G. Grainger, 2014-06-16 Long recognized as the standard general reference in the field this completely revised edition of Grainger and Allison's Diagnostic Radiology provides all the information that a trainee needs to master to successfully take their professional certification examinations as well as providing the practicing radiologist with a refresher on topics that may have been forgotten Organized along an organ and systems basis this resource covers all diagnostic imaging modalities in an integrated correlative fashion and focuses on those topics that really matter to a trainee radiologist in the initial years of training the latest edition continues the fine tradition set by its predecessors help young radiologists to prepare for their examinations and continue to be a source of information to be dipped in and out of senior radiologists will also find the book useful Reviewed by RAD Magazine March 2015 I am sure the current edition will be successful and help young radiologists to prepare for their examinations and continue to be a source of information to be dipped in and out of Reviewed by RAD Magazine March 2015 Master the field and prepare for certification or recertification with a succinct comprehensive account of the entire spectrum of imaging modalities and their clinical applications Effectively apply the latest techniques and approaches with complete updates throughout including 4 new sections Abdominal Imaging The Spine Oncological Imaging and Interventional Radiology and 28 brand new chapters Gain the fresh perspective of two new editors Jonathan Gillard and Cornelia Schaefer Prokop eight new section editors Michael Maher Andrew Grainger Philip O Connor Rolf Jager Vicky Goh Catherine Owens Anna Maria Belli Michael Lee and 135 new contributors Stay current with the latest developments in imaging techniques such as CT MR ultrasound and coverage of hot topics such as Image guided biopsy and ablation techniques and Functional and molecular imaging Solve even your toughest diagnostic challenges with guidance from nearly 4 000 outstanding illustrations Quickly grasp the fundamentals you need to know through a more concise streamlined format Access the full text online at Expert Consult *X-Ray Imaging Systems for Biomedical* Engineering Technology Euclid Seeram, 2023-11-27 This book addresses X Ray Imaging Systems intended for biomedical engineering technology students and practitioners and deals with the major technical components of x ray imaging modalities These modalities include film based imaging digital radiography and computed tomography Furthermore principles and concepts essential to the understanding of how these modalities function will be described These include fundamental radiation physics imaging informatics quality control and radiation protection considerations X Ray Imaging Systems for Biomedical Engineering Technology An Essential Guide is intended for biomedical engineering technologists who

provide technical advice and services relating to digital radiography and CT departments not only in hospitals but in private facilities as well Students in radiological technology programs may also find this to be a useful resource Allison's Diagnostic Radiology: Paediatric Imaging Catherine Owens, Jonathan H Gillard, 2015-11-24 The 8 chapters in this book have been selected from the contents of the Paediatric Imaging section in Grainger Allison's Diagnostic Radiology 6e These organ specific chapters provide a succinct up to date overview of current imaging techniques and their clinical applications in daily practice and it is hoped that with this concise format the user will quickly grasp the fundamentals they need to know Throughout these chapters the relative merits of different imaging investigations are described variations are discussed and recent imaging advances are detailed **Cancer Imaging** M. A. Hayat, 2007-10-25 With cancer related deaths projected to rise to 10 3 million people by 2020 the need to prevent diagnose and cure cancer is greater than ever Cancer Imaging presents readers with the most up to date imaging instrumentation general and diagnostic applications for various cancers with an emphasis on lung and breast carcinomas the two major worldwide malignancy types This book discusses the various imaging techniques used to locate and diagnose tumors including ultrasound X ray color Doppler sonography PET CT PET CT MRI SPECT diffusion tensor imaging dynamic infrared imaging and magnetic resonance spectroscopy It also details strategies for imaging cancer emphasizing the importance of the use of this technology for clinical diagnosis Imaging techniques that predict the malignant potential of cancers response to chemotherapy and other treatments recurrence and prognosis are also detailed Concentrates on the application of imaging technology to the diagnosis and prognosis of lung and breast carcinomas the two major worldwide malignancies Addresses the relationship between radiation dose and image quality Discusses the role of molecular imaging in identifying changes for the emergence and progression of cancer at the cellular and or molecular levels African Perspectives on Ethics for Healthcare Professionals Nico Nortjé, Willem A. Hoffmann, Jo-Celene De Jongh, 2018-10-24 This book focuses on ethical issues faced by a variety of healthcare practitioners across the Anglophone African continent This important resource contains in depth discussions of the most salient current ethical issues by experts in various healthcare fields Each profession is described from both an African and a South African perspective and thus contributes to dialogue and critical thinking around African ethics and decision making In this way the book provides readers with an understanding of the ethical issues at hand in various professions including the practical implications of the ethical issues and how to address those effectively This is a beneficial resource for all those involved in the various healthcare professions addressed in this book including undergraduate students lecturers researchers and practitioners across the continent Simply put with the dynamic changes and challenges in healthcare across the globe and in Africa this is an indispensable resource for healthcare practitioners Comprehensive Brachytherapy Jack Venselaar, Ali S. Meigooni, Dimos Baltas, Peter J. Hoskin, 2012-11-08 Modern brachytherapy is one of the most important oncological treatment modalities requiring an integrated approach that utilizes new technologies advanced

clinical imaging facilities and a thorough understanding of the radiobiological effects on different tissues the principles of physics dosimetry techniques and protocols and clinical expertise A complete overview of the field Comprehensive Brachytherapy Physical and Clinical Aspects is a landmark publication presenting a detailed account of the underlying physics design and implementation of the techniques along with practical guidance for practitioners Bridging the gap between research and application this single source brings together the technological basis radiation dosimetry quality assurance and fundamentals of brachytherapy In addition it presents discussion of the most recent clinical practice in brachytherapy including prostate gynecology breast and other clinical treatment sites Along with exploring new clinical protocols it discusses major advances in imaging robotics dosimetry Monte Carlo based dose calculation and optimization

Comparative Interpretation of CT and Standard Radiography of the Chest Emmanuel E. Coche, Benoit Ghaye, Johan de Mey, Philippe Duyck, 2011-01-18 Standard radiography of the chest remains one of the most widely used imaging modalities but it can be difficult to interpret The possibility of producing cross sectional reformatted 2D and 3D images with CT makes this technique an ideal tool for reinterpreting standard radiography of the chest The aim of this book is to provide a comprehensive overview of chest radiography interpretation by means of a side by side comparison between chest radiographs and CT images Introductory chapters address the indications for and difficulties of chest radiography as well as the technical and practical aspects of CT reconstruction and image comparison Thereafter the radiographic and CT presentations of both anatomical variants and a wide range of diseases and disorders are illustrated and discussed by renowned experts in thoracic imaging The book is complemented by online extra material which provides many further educational examples

This book delves into Icrp Publication 93 Managing Patient Dose In Digital Radiology. Icrp Publication 93 Managing Patient Dose In Digital Radiology is a vital topic that needs to be grasped by everyone, ranging from students and scholars to the general public. The book will furnish comprehensive and in-depth insights into Icrp Publication 93 Managing Patient Dose In Digital Radiology, encompassing both the fundamentals and more intricate discussions.

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