Radiologic Guide to Orthopedic Devices

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To all those physicians, nurses, technologists, emergency medical technicians, paramedics, ambulance technicians, physical therapists, and other personnel who tirelessly treat and comfort patients with musculoskeletal injuries and deformities.

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Foreword

Lee F. Rogers

The title of this work, *Radiologic Guide to Orthopedic Devices*, is a bit misleading. While the book does indeed fully address the imaging of orthopedic devices, it also describes and illustrates other metallic objects, all forms of foreign bodies that may appear on radiographs. Dental metallic devices are also covered. Thus, in reality, the book is a complete treatise on the subject of imaging metallic objects that may be encountered in radiographs and other imaging of human anatomy.

Countless metallic devices are confronted in the intraoperative, postoperative, and follow-up imaging of orthopedic procedures. Simple generic descriptions such as pin, plate, rod, and screw are commonly used in radiology reports, but more precise terminology is preferred. Devices are best accurately identified by their proper names, i.e., Rush pin, dynamic compression plate, intramedullary rod, cortical screw, etc. Indefinite terminology should be avoided.

Admittedly it is hard, essentially impossible, to remember the correct designation of all but the most commonly encountered hardware. So where does one turn in search of the correct terminology for these devices? There has been no one single source for such information. The search was time-consuming. You had to look through multiple sources online and leaf through books, scientific journals, and the catalogs of the various companies that produced these devices. This problem is now solved by the publication of *Radiologic Guide to Orthopedic Devices* by Hunter, Taljanovic, and Wild. Their book is a veritable compendium, an altogether encyclopedic source on orthopedic devices. Radiographs and diagrams of the various devices are shown and identified by the appropriate terminology.

Two major components of the book are the Gallery of Orthopedic devices and the Glossary of definitions, abbreviations, and acronyms of medical device and procedure terminology.

The Gallery of Orthopedic Devices is designed as a quick reference to identify unfamiliar orthopedic devices found on radiologic examinations. The Gallery consists of radiographs with legends describing and naming the orthopedic device or devices shown for fracture fixation and joint arthroplasty. They are grouped by body region, i.e., upper extremity, lower extremity, neck, and spine. Generic names which apply to the device are found in the legend. To find the proper terminology for the device in question, you simply match up the findings on your radiograph with the appropriate image in the Gallery. It's quick and easy.

The extensive Glossary is a valuable resource of exceptionally useful information regarding terminology; definitions of abbreviations and acronyms used for medical devices and surgical procedures as well as explanations of the many colloquial terms and abbreviations that are frequently heard in conversations and regularly appear on requisitions for radiologic services. The Glossary is easy to use, comprehensive, practical, and highly informative.

A chapter is devoted to the complications of fracture fixation and joint arthroplasty with a review of the subjects and illustrations of various more common complications. Information regarding the imaging of such complications is otherwise difficult to come by and therefore this particular chapter is quite useful and represents a significant contribution to the literature.

Surprisingly, there is similarly an exceptional chapter devoted to the imaging of foreign bodies, another neglected subject in the medical and surgical literature. The chapter covers all forms of foreign bodies: foreign body injuries, foreign body ingestions, and foreign body insertions. The various foreign bodies are fully described and illustrated. Again, this is information that is otherwise hard to come by in a single source.

Metallic objects present problems for either computed tomography (CT) or magnetic resonance imaging (MRI). This important subject is thoroughly presented and illustrated. Metal creates characteristic artifacts and image distortions which, of course, compromise the quality of the examination. Characteristic CT and MRI artifacts are discussed and shown. Steps can be taken to minimize image degradation. Examination protocols for CT and MRI that significantly reduce artifacts and imaging distortions are found in the chapter references at the end of the text. In a separate Nuclear Medicine chapter, artifact and image distortions in Tech 99m bone scanning and FDG PET and PET/CT scans are described and shown.

Who is the audience for this work? Who might find the book useful in their everyday practice? If you are an orthopedic surgeon or a radiologist who performs and interprets musculoskeletal imaging, your practice would be facilitated

and enhanced by the presence and use of the *Radiologic Guide to Orthopedic Devices.* While primarily written for radiologists and orthopedic surgeons, emergency medicine physicians may also find this book of value in hospital emergency departments. The book would also be a useful reference in radiology and orthopedic billing services and medical insurance offices.

This work is an outstanding contribution to a long-neglected subject in the orthopedic and radiologic literature. Drs. Hunter, Taljanovic, and Wild, and their associate authors, Drs. Choudhary, Gurman, Light, Kuo, and Melville, are to be commended for their efforts.

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Acknowledgments

The successful completion of a book is the result of multiple, usually unselfish contributions from many persons, most of whom do not receive the recognition or thanks they justly deserve.

In this short section I hope to recognize and thank many who have contributed so much to the completion of this work and apologize to those whom I have inadvertently overlooked.

First, I need to thank the Co-editors Mihra S. Taljanovic and Jason R. Wild, whose expertise, time, and effort were requisite for the construction and completion of this work. Any omissions or significant errors herein are my own. I also need to acknowledge and thank the authors whose work is found in Hunter T.B., Bragg D.G., eds., *Radiologic Guide to Medical Devices and Foreign bodies*. St Louis, MO: Mosby–Year Book, 1994. That book was the stimulus for the present book, and much of the material in that book – images, glossary, and orthopedic treatment discussion – was extracted, updated, and corrected, where necessary, for the present work. Every effort was made to provide full credit and proper citation for any previous work used. Every effort was made to obtain proper permission for use of images previously published in print or electronically. I own the full copyright to the *Radiologic Guide to Medical Devices and Foreign Bodies*.

I need to specifically thank the chapter authors for this book – Gagandeep Choudhary, Pablo Gurman, Philip Kuo, Rick Light, and David Melville. They provided splendid chapters in a timely fashion and helped correct my editorial errors. They even remained friendly toward me despite periodic badgering to turn in their manuscripts or answer questions from the publisher. What counts most is the high quality of their work, which I believe is unique and not found anywhere else.

Any chapter errors or omissions are mine. I should note there is very little reward for being a chapter author for a scientific work. Academia hardly recognizes this effort when considering promotion and tenure, and there is certainly no financial reward for such an undertaking. The reward for writing a chapter is the pleasure one feels for contributing to scientific knowledge and understanding and for helping one's friend or colleague (the editor) in constructing a book.

I have to thank the webmasters and authors of the hundreds of websites I used in obtaining information and references for the book. I did my best to properly cite and acknowledge such information throughout the book. I profusely apologize for any omission in this regard.

This entire manuscript concerns medical apparatus, specifically that dealing with orthopedic disease and treatment. Medical device manufacturers actually produce the devices which save lives and help alleviate pain and suffering. Caring physicians, nurses, and other important healthcare providers are literally at the patient's bedside, and medical researchers constantly expand our scope of knowledge. Both of these groups are requisite for the advancement of medicine. However, the benefits of modern medicine would be of no use to any of us if pharmaceuticals and medical devices were not designed, tested, manufactured, evaluated for safety, and put on the market by medical device manufacturers and pharmaceutical companies. Their important role in our well-being should be acknowledged. In addition, many manufacturers graciously gave me permission to display images of their products. This was usually the result of a local manufacturer's representative taking a great deal of time and effort to acknowledge my request for images and permission and going out of his or her way to get that permission for me. These professionals certainly deserve my thanks.

Finally, I need to acknowledge and thank to my fullest Nicole Liberty and Amy Jennings. Nicole, who is a web design and application consultant, provided the template and structure for the websites (www.MedApparatus.com and www.OrthoApparatus.com) which are associated with the book. She tutored me on the nuances of computer programs used to construct the website and the accompanying images for the website and book. She is a superb internet technology specialist with extensive experience and a good sense of humor and extreme patience when teaching an elderly editor new tricks.

Amy Jennings, Administrative Assistant in the Department of Medical Imaging at the University of Arizona, literally put together the book you see before you. Like Nicole, she kept her sense of humor and patience when dealing with an elderly book editor. She was a godsend to me. Without her invaluable help, the book would not have been in a useful form for submission to Cambridge University Press. What you see is also the hard work of many at Cambridge who took the Word files for the book and put them into a printed and electronic form I hope will delight and enlighten the reader.

Tim B. Hunter