MRI Atlas
Orthopedics and Neurosurgery
The Spine

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Foreword by
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Translated by Bettina Herwig

With 524 Figures in 575 Separate Illustrations

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Foreword

Though a fairly recent development in the field of radiology, MRI has successfully established itself in the spectrum of imaging modalities. Insights into the body that, until recently, were inconceivable and that have paved the way for devising new diagnostic and therapeutic options have been made possible by the constant improvement in spatial and anatomic detail resolution and advances in data processing that include improved image reconstruction algorithms. On the other hand, the amount of image information now obtainable with state-of-the-art MR scanners makes it ever more important to provide guidance for radiologists, orthopedic surgeons, traumatologists, and other interested specialists, so that they can find their way through the plethora of details. This is the intention of the atlas presented here: it is a practically oriented guide offering a concise overview of the important aspects of normal spinal anatomy and pathology, MR findings in spinal disease and the postoperative spine as well as therapeutic and surgical approaches. Such a guide is especially important for the spine with its unique and complex anatomic structure and function. The rigorous and uniform organization of the book is the work of a group of dedicated authors from different specialties who offer the reader a systematic overview based on their own vast experience and skills.

An invaluable asset of this book is its concise presentation of important interdisciplinary aspects in dealing with spinal disorders. With its unique format, this atlas guides readers through the fundamentals of spinal anatomy and disease states to better establish diagnostic strategies and surgical management.

In the interest of high-quality patient care, our hope is that many readers will find this atlas a vital source of information in the diagnosis and treatment of their patients.

Professor Dr. med. Dr. h.c. Karl-Jürgen Wolf
Berlin, June 2006

Preface

Magnetic resonance imaging is a computer-assisted diagnostic tool that is well established for numerous indications involving the skeleton and its associated structures. Soon after its clinical introduction in the early 1980's, it became apparent that the application of MRI in the evaluation of normal and abnormal conditions yields widely varying qualitative and quantitative results for different anatomic regions of the locomotor system. The most common indications for MRI in this area are diseases and injuries of the spine and joints, in particular the knee. The significance of MRI for these two skeletal areas is reflected by the fact that knee MRI has largely replaced invasive techniques such as diagnostic arthrography and arthroscopy, while spinal MRI has assumed an important place in therapeutic decision-making, especially in surgical planning.

Inspired by the great interest that the MRI atlas of the knee created in 2003, we decided to compile a similar atlas for the spine. Like its predecessor, the MRI atlas of the spine is the result of interdisciplinary cooperation. Many disorders and injuries of the spine and associated structures are treated by orthopedic surgeons, traumatologists, and neurosurgeons alike, while others are predominantly treated in just one of these specialties. Thus, the decision was made to have orthopedic surgeons/traumatologists, MRI radiologists, and neurosurgeons jointly write this atlas in order to comprehensively discuss all aspects of spinal MRI, particularly its benefits and limitations. As always with such a complex field, the choice of conditions (e.g. tumors or vascular malformations) had to be limited. This may appear arbitrary to some readers, but our selection was necessary to illustrate the role of MRI in exemplary cases and to avoid exceeding the scope of this atlas by including rare diseases.

The presentation of the material should help the reader to quickly identify the most important spinal structures on MR images as a basis for rapidly and efficiently detecting abnormal changes and differentiating them from the normal appearance. Thus, as with the MRI atlas of the knee, the focus is again on the presentation of a carefully selected series of images ranging from the normal appearance to abnormal changes combined with concise information on specific MR sequences and parameters as well as pitfalls. Basic background information on anatomy and pathophysiology is presented here, and the clinical significance of MR findings is discussed in relation to the individual spinal diseases and injuries.

The authors hope that our cooperative approach to spinal MRI successfully reconciles the different aspects of our specialties for a unified approach that enables our readers to make the most effective use of MR findings in treating their patients with spinal disorders.

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The Authors
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