Radiography of the Dog and Cat

Guide to Making and Interpreting Radiographs
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To my father, Dr. Karl C. Muhlbauer, whose uncommon good sense and enduring example continue to inspire me personally and professionally. He was a lifelong teacher, author of several educational textbooks, and a man to whom obstacles were only momentary distractions. We had many great adventures together, and I felt his presence quite often during the creation of this book.

Mike Muhlbauer

To Dr. Robert E. Lewis, who introduced me to this wonderful diagnostic tool we call radiology. Not only did he open the door to the most interesting playground in veterinary medicine, but as a mentor through veterinary school as well as my initial radiology training, he imparted a simple, straightforward method and thinking processes that have had a profound influence on my professional life, teaching philosophy, and general outlook. I owe any meaningful concepts that I have to his guidance.

Steve Kneller
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About the Companion Website

This book is accompanied by a companion website:
www.wiley.com/go/muhlbauerradiography

The website includes:

- Review questions
- A positioning guide
- Powerpoints of all figures from the book for downloading
- A PDF of the Glossary from the book for downloading
The authors gratefully acknowledge the pioneering work by Drs. Jerry Owens and Darryl Biery in their wonderful book *Radiographic Interpretation for the Small Animal Clinician*. Their use of conceptual illustrations and concise descriptions provided the reader with a practical reference and valuable understanding of radiographic findings in various diseases and disorders. It is upon the foundation laid by such an important work that we are able to build and advance practical understanding in veterinary radiology. Many thanks to Drs. Jerry and Darryl for their inspirational vision.
Introduction

The purpose of radiography is to lessen uncertainty.

When you perform a radiographic examination, you usually have a question that needs to be answered. There was a reason you made the radiographs. To help you and other veterinary personnel, from student to specialist, get the answers to those questions, we have created this guide that we hope will be a valuable reference for you.

The volume of material appropriate for a guide to radiography is extensive and must be organized in a useful and practical format. In some learning or clinical situations, all that is needed is a simple checklist to avoid overlooking radiographic findings. At other times, more in-depth information is required about a particular disease, disorder, or radiographic finding. We determined that presenting the material in a linear fashion would bore some folks and overwhelm others. Therefore, we decided on the following layout:

I. We begin with “Interpretation of Radiographs.” In this section, the reader is encouraged to list all of the abnormalities in size, shape, opacity, margination, position, number, and function as seen on radiographs, without regard to specific etiology.

Many clinicians tend to see what they want on a radiograph, whether it is there or not.

It is well known that preconceived expectations are notorious for inventing or overlooking radiographic abnormalities. Valuable information often is available, if one is willing to deliberately and systematically review the images. This first chapter is divided into musculoskeletal, thoracic, and abdominal sections, each with checklists for evaluating radiographs and descriptions of radiographic findings.

History is not necessary to read radiographs, but it is necessary to interpret radiographs.

Once the radiographic findings have been recognized, the radiographs are reviewed a second time in light of pertinent clinical and laboratory findings and a prioritized list of differential diagnoses is created. In this chapter are listed the most common diseases expected to cause the observed abnormalities. Detailed lists of differential diagnoses are provided in chapters 4 through 6.

Half the magic of a radiologist is having quality radiographs on which we can see things.

II. The second chapter is “Making Quality Radiographs.” (A radiography guide is of little value if you are not working with high-quality images.) In this section, you will find illustrations and detailed descriptions of proper patient positioning in veterinary radiography. There is also a review of basic information regarding the production and use of medical x-rays and the various types of imaging receptors (detectors) currently available. Both analog (film) and digital systems are addressed, and helpful tips are provided regarding use and care of radiography equipment. At the end of that chapter is a detailed outline which addresses complete radiographic interpretation.

III. The third chapter thoroughly describes contrast radiography, including types of contrast agents and more than 25 contrast procedures with indications, contraindications, complications, techniques, dosages, pitfalls, and radiographic findings.

You must know normal to recognize abnormal.

IV–VI. The next three chapters, “Musculoskeletal,” “Thorax,” and “Abdomen,” provide more information and greater detail regarding each major part of the body. Each chapter begins with a section titled “Normal Radiographic Anatomy,” describing basic, unique, and sometimes confusing radiographic appearances of numerous structures.

Many different diseases present with similar radiographic findings.

The next section in each of these three chapters is titled “Diseases and Disorders,” presenting clinical correlations, radiographic findings, and differential diagnoses for many conditions. The final section in each chapter provides exhaustive lists of differential diagnoses for many radiographic findings and diseases.