# Radiology Terminology Essentials

A Comprehensive Guide for Students and Professionals in Medical Imaging

Dr. Alex Carter, MD, Radiology Consultant

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# About This eBook

**Discover the Language of Radiology!**

Unlock the world of medical imaging with *Radiology Terminology Essen- tials: A Comprehensive Guide for Students and Professionals in Medical Imaging*. This eBook is your go-to resource for mastering the critical termi- nology used in radiology, from X-rays to advanced radiotherapy techniques. Perfect for radiology students, technologists, and practicing professionals, this guide offers clear definitions, practical examples, and engaging expla- nations to enhance your understanding and boost your confidence in the field. Whether you’re preparing for exams, starting your career, or seek- ing a reliable reference for daily practice, this eBook is designed to help you excel. Download now and take the first step toward fluency in radiol- ogy terminology!

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1. *CONTENTS*

# Chapter 1 Introduction

Welcome to *Radiology Terminology Essentials*! If you’re a student stepping into the fascinating world of medical imaging or a professional looking to sharpen your knowledge, this eBook is crafted just for you. Radiology is a cornerstone of modern medicine, enabling clinicians to visualize the in- visible and diagnose conditions with precision. However, the specialized language of radiology can feel like a maze of technical terms and acronyms. This guide simplifies that journey, offering clear, concise, and engaging ex- planations of key terms used in diagnostic and therapeutic radiology.

Our goal is to make you feel confident navigating the terminology of X-rays, CT scans, radiotherapy, and more. Each chapter breaks down essential concepts with practical insights, ensuring you can apply this knowledge in classrooms, clinics, or board exams. Let’s dive into the language that powers medical imaging and helps save lives every day!

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8 *CHAPTER 1. INTRODUCTION*

# Chapter 2

**Foundational Radiology Terms**

Radiology relies on precise terminology to describe movements, techniques, and findings. This chapter covers the core terms that form the backbone of medical imaging.

## Abduction

The movement of a limb, such as an arm or leg, away from the body’s mid- line. For example, raising your arm sideways during a shoulder X-ray is abduction. Understanding this term helps technologists position patients correctly for clear images.

## Adduction

The opposite of abduction, adduction refers to moving a limb toward the body’s midline. For instance, bringing the arm back to the side during imag- ing. Accurate positioning using adduction ensures optimal visualization of structures like joints.

## Abreugrafia

A historical chest X-ray technique developed in the 1930s by Brazilian physi- cian Manuel de Abreu to detect asymptomatic tuberculosis. Using small films to reduce costs, this method is less common today but remains a mile- stone in radiology’s history.

## Abscess

A localized collection of pus caused by infection or inflammation, often vis- ible on imaging as a distinct mass. Radiologists identify abscesses in areas

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10 *CHAPTER 2. FOUNDATIONAL RADIOLOGY TERMS*

like the liver or lungs, aiding in diagnosis and treatment planning.

## American College of Radiology (ACR)

A leading professional organization in the US that sets standards for ra- diology practice, education, and safety. The ACR provides guidelines for imaging protocols and accreditation for facilities.

## Automatic Exposure Control (AEC)

A feature in modern mammography systems that automatically adjusts ra- diation exposure to optimize image quality. AEC ensures consistent results while minimizing patient radiation dose.

## Anteroposterior (AP)

A standard radiographic projection where the X-ray beam passes from the front (anterior) to the back (posterior) of the patient. Commonly used in chest or abdominal X-rays, AP views help assess structures in a frontal plane.

## Artifacts

Unwanted elements in an image, such as shadows or distortions, caused by patient movement, equipment issues, or foreign objects. Recognizing artifacts is crucial for ensuring diagnostic accuracy.

## Accession Number

A unique identifier assigned to each patient exam in a radiology information system (RIS) or hospital information system (HIS). It facilitates integration between RIS/HIS and PACS for efficient tracking and management.

## Incidence

A term used to identify each individual X-ray image taken during an exam, referring to the specific angle or projection used.

# Chapter 3

**Diagnostic Imaging Techniques**

This chapter explores terms related to the tools and methods used to create diagnostic images, from traditional X-rays to advanced modalities.

## Collimator

A device in X-ray and radiotherapy equipment that focuses radiation into a specific area, reducing scatter and protecting surrounding tissues. Proper collimation enhances image clarity and patient safety.

## Dacryocystography

A specialized X-ray exam using contrast to visualize the tear ducts, often used to diagnose blockages or infections. This term is critical for radiolo- gists working in head and neck imaging.

## Densitometry

A diagnostic imaging method, typically bone densitometry, that measures bone mineral density to diagnose conditions like osteoporosis. It uses low- dose X-rays, often focusing on the hip or spine.

## DICOM (Digital Imaging and Communica- tions in Medicine)

A global standard for storing, sharing, and viewing medical images. DICOM ensures compatibility across imaging systems, allowing seamless access to X-rays, CTs, and MRIs in hospitals worldwide.

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12 *CHAPTER 3. DIAGNOSTIC IMAGING TECHNIQUES*

## Distortion

An alteration in the shape of anatomical structures on radiographic images, often due to improper positioning or equipment settings. Recognizing dis- tortion helps technologists adjust techniques for accurate results.

## Angiography

A diagnostic procedure using contrast dye and X-rays to visualize blood vessels. It’s essential for detecting blockages, aneurysms, or vascular ab- normalities in areas like the heart or brain.

## Computed Tomography (CT)

An imaging technique that uses X-rays to create detailed, cross-sectional images of the body. CT scans are vital for diagnosing conditions like tumors, fractures, or internal bleeding.

## Computed Radiography (CR)

A digital X-ray imaging process that uses phosphor plates sensitive to X- rays instead of traditional film. The plates are processed to display images on a computer screen, improving efficiency.

## Digital Radiography (DR)

A form of X-ray imaging where digital sensors replace traditional photo- graphic film, providing immediate image capture and enhanced quality.

## Digital Subtraction Angiography (DSA)

A technique used in interventional radiology to visualize blood vessels by subtracting background structures, enhancing clarity in dense bony areas.

## Multi Planar Reconstruction (MPR)

A technique that allows radiologists to view volumetric imaging data in dif- ferent planes (axial, coronal, sagittal) with customizable angles and thick- nesses, enhancing diagnostic accuracy.

*3.12. MAXIMUM INTENSITY PROJECTION (MIP)* 13

## Maximum Intensity Projection (MIP)

A reconstruction technique that highlights pixels with the highest radiation attenuation (CT) or signal intensity (MRI), used to emphasize structures like blood vessels.

## Minimum Intensity Projection (MINIP)

A reconstruction technique that highlights pixels with the lowest radiation attenuation (CT) or signal intensity (MRI), often used for structures like airways.

## Pixel

The smallest unit of a digital image, determining its resolution. Higher pixel counts result in sharper, more detailed images.

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# Chapter 4

**Advanced Radiology and Safety**

Radiology extends beyond diagnostics into therapeutic applications and safety protocols. This chapter covers terms related to advanced techniques and radiation protection.

## Linear Accelerator

A machine used in radiotherapy to deliver high-energy X-rays to destroy cancer cells. Unlike diagnostic X-rays, these beams target tumors with precision, sparing healthy tissue.

## Curimeter

A dose calibrator, named after Marie Curie, used in nuclear medicine to measure the activity of radioactive materials administered for diagnostic or therapeutic purposes. It’s essential for ensuring safe dosing.

## Dosimetry

The measurement and calculation of radiation doses absorbed by patients or staff. Dosimetry ensures compliance with safety standards and mini- mizes radiation risks.

## Dosimeter

A wearable device that monitors radiation exposure for radiology profes- sionals and students. Regular use of dosimeters is mandatory in the US to comply with occupational safety regulations.

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16 *CHAPTER 4. ADVANCED RADIOLOGY AND SAFETY*

## Scattering

Radiation that deviates from its original path due to interactions with tissue (Compton effect). Scattering can reduce image quality, so techniques like collimation are used to minimize it.

## ALARA Principle

An acronym for ”As Low As Reasonably Achievable,” a radiation safety prin- ciple aimed at minimizing exposure to patients and staff while maintaining diagnostic quality. ALARA guides all radiology practices.

## Contrast Medium

A substance, such as iodine or barium, administered to enhance the visibil- ity of specific structures during imaging. Contrast media are used in exams like CT scans or angiography to highlight organs or blood vessels.

## Computer-Aided Diagnosis (CAD)

A software tool that automatically detects anomalies in medical images using pattern recognition, assisting radiologists in making accurate diag- noses.

## Lossy Compression

A data compression method that reduces image file size by discarding some data, resulting in a loss of quality. It’s rarely used in medical imaging due to diagnostic requirements.

## Lossless Compression

A data compression method that reduces file size without losing any im- age data, ensuring no impact on diagnostic quality. It’s critical for medical image storage.

# Chapter 5

**Specialized Imaging Procedures**

This chapter delves into complex imaging exams that require specific ter- minology and expertise.

## Enema Opaque

A radiographic exam of the large intestine using barium contrast intro- duced via the rectum. It helps diagnose conditions like colon cancer or inflammatory bowel disease.

## Esophagography

An X-ray exam of the esophagus using barium contrast to evaluate swallow- ing issues or structural abnormalities. Radiologists interpret these images to guide treatment plans.

## Hemodynamics

A radiology subspecialty focused on real-time imaging of the circulatory system, often used in procedures like angiography to assess blood vessels.

## Hysterosalpingography

A radiographic exam of the uterus and fallopian tubes using iodinated con- trast, performed to investigate infertility or uterine abnormalities. It re- quires precise technique by a radiologist.

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18 *CHAPTER 5. SPECIALIZED IMAGING PROCEDURES*

## Hounsfield Unit (HU)

A measurement used in CT imaging to quantify tissue density. Each pixel in a CT image is assigned an HU value, helping radiologists differentiate between tissues like bone, muscle, or fat.

## Magnetic Resonance Imaging (MRI)

A non-invasive imaging technique using magnetic fields and radio waves to produce detailed images of organs and tissues. MRI is critical for evaluat- ing soft tissues, such as the brain or joints.

## Ultrasound

An imaging method using high-frequency sound waves to visualize internal structures, such as fetuses or organs. Ultrasound is safe, non-invasive, and widely used in diagnostics.

## Electrocardiogram (ECG)

A test that records the heart’s electrical activity using electrodes, often used in conjunction with imaging to assess cardiac function.

## Endoscopy

A procedure using a flexible tube with a camera to visualize internal organs, such as the stomach, aiding in the diagnosis of gastrointestinal conditions.

## Medicine Nuclear

A medical specialty using small amounts of radioactive materials for diag- nostic or therapeutic purposes, such as imaging tumors or thyroid function.

## PET/CT (Positron Emission Tomography/Comput Tomography)

An advanced imaging technique combining PET and CT to produce detailed images of metabolic activity and anatomy, used for cancer staging and neu- rological evaluation.

*5.12. TIME OF ECHO (TE)* 19

## Time of Echo (TE)

A parameter in MRI sequences that affects image contrast, influencing the visualization of tissues in T1 or T2-weighted images.

## Time of Repetition (TR)

A parameter in MRI sequences that determines the time between succes- sive pulse sequences, impacting image contrast and acquisition time.

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# Chapter 6

**Radiology Systems and Technology**

This chapter introduces terms related to the digital systems and software that support modern radiology practices, enhancing efficiency and accu- racy.

## Picture Archiving and Communication Sys- tem (PACS)

A software system for storing, retrieving, and sharing medical images se- curely. PACS streamlines workflows, reduces costs, and improves access to images across healthcare facilities.

## Radiology Information System (RIS)

A software platform for managing radiology records, scheduling, and billing. Often integrated with PACS, RIS enhances workflow efficiency and data se- curity.

## Hospital Information System (HIS)

A comprehensive system managing medical, administrative, financial, and legal operations in hospitals, including integration with radiology systems.

## Health Level Seven (HL7)

A set of international standards for exchanging medical information be- tween systems, ensuring interoperability in healthcare settings.

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22 *CHAPTER 6. RADIOLOGY SYSTEMS AND TECHNOLOGY*

## DICOM Client

A device, such as a workstation or imaging equipment, that communicates using the DICOM protocol to send or receive medical images.

## DICOM Header

Metadata embedded in DICOM images containing details like patient in- formation, exam date, and equipment settings, ensuring traceability and compatibility.

## DICOM Print

A DICOM protocol for sending images to specialized printers, ensuring high-quality hard copies for medical records.

## DICOM Store

A DICOM protocol for transmitting and storing images on a server, enabling centralized management of medical imaging data.

## Server DICOM

A device that receives and stores DICOM images via the DICOM Store pro- tocol, serving as a central repository for imaging data.

## Application Entity Title (AET)

A unique identifier for DICOM-compatible equipment on a network, facili- tating communication between devices.

## Instance Availability Notification (IAN)

A DICOM protocol for notifying systems about the availability or updates of imaging data, ensuring timely access.

## Worklist

A digital list of scheduled exams for specific imaging equipment, stream- lining workflows by providing patient and exam details to technologists.

*6.13. WINDOW WIDTH (WW)* 23

## Window Width (WW)

A setting in image display that adjusts the range of Hounsfield Units visible, affecting image contrast in CT or MRI.

## Window Level (WL)

A setting that adjusts the center of the visible Hounsfield Unit range, con- trolling image brightness in CT or MRI.

## Region of Interest (ROI)

A specific area in an image selected for analysis, such as measuring tissue density in Hounsfield Units.

## Direct Volume Rendering (DVR)

A visualization technique for rendering large volumetric datasets in PACS, enhancing 3D image interpretation.

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# Chapter 7

**Continuing Your Radiology Journey**

Mastering radiology terminology is just the beginning. This chapter offers tips for students and professionals to deepen their expertise.

## Lifelong Learning

Stay updated with resources like the American College of Radiology (ACR) website, Radiographics journal, and Radiopaedia. These platforms offer case studies, articles, and continuing education credits.

## Practical Application

Apply these terms in clinical settings by practicing patient positioning, un- derstanding equipment settings, and interpreting images under supervi- sion. Hands-on experience solidifies your knowledge.

## Certification and Career Growth

In the US, certification through the American Registry of Radiologic Tech- nologists (ARRT) is essential for technologists. Radiologists pursue board certification via the American Board of Radiology (ABR). Explore subspe- cialties like interventional radiology or nuclear medicine to advance your career.

## Contributing to the Field

Share your knowledge by contributing to glossaries, teaching peers, or pub- lishing case studies. Collaboration strengthens the radiology community

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and improves patient care.