

Accident and Emergency Radiology
X-ray interpretation

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Contents

Preface	vi
1. Interpretation of accident and emergency films: Basic principles	1
2. Chest	9
3. Abdomen	21
4. Shoulder	39
5. Elbow and forearm	47
6. Wrist and hand	61
7. Skull and facial bones	75
8. Cervical spine	89
9. Thoracolumbar spine	99
10. Pelvis and hip	109
11. Knee	119
12. Ankle and foot	129
13. Foreign bodies	141
14. Paediatric trauma	147
<i>With contributions from J Hughes and P Bhakoo</i>	
Index	159

Preface

An accident and emergency attachment usually occurs early in a junior doctor's training. The combination of little formal training in the interpretation of radiographs, limited clinical experience, suboptimal anatomical knowledge, the stressful casualty environment and the litigious climate we practise under can make this a harrowing experience.

While the presence of a fracture is often evident clinically, a radiological assessment is essential to define the nature and extent of the injury as well as any associated soft tissue injuries. However, more importantly, radiography is necessary to diagnose unsuspected fractures and exclude bone injuries.

While radiological modalities have made huge technological advances in recent years, plain films remain the bread and butter in the initial assessment of the acutely injured patient. It is for these reasons that a sound grasp of emergency X-rays is essential. The interpretation of films requires a thorough and systematic approach. The purpose of this book is to show how a systematic analysis of accident and emergency radiographs allows the correct diagnosis to be derived while minimising errors.

This book is aimed at accident and emergency doctors, surgical, medical and radiology specialist registrars and medical students. This lavishly illustrated pocket sized book facilitates instant consultation when faced with an X-ray. At the start of each chapter there is a description of the relevant anatomy followed by a quick and easy yet detailed systematic approach to all types of X-rays likely to be encountered in the accident and emergency department. The book is illustrated with easy to follow line diagrams as well as fully annotated illustrative examples and is divided into concise chapters covering a particular region or problem. In addition to providing a systematic approach to the interpretation of the X-ray, tables provide instant access to lists and there are useful tips and hints in avoiding mistakes. There is also a list of key points at the end of each chapter. We hope this book will make the emergency film less daunting and so improve patient management

*We thank our wives and children for their
unwavering continued support*

Interpretation of accident and emergency films: Basic principles

Description of fractures

Fractures of the long bones in adults are described using universally accepted conventions.

Fractures may be divided into **open** (the fracture is in communication with the external environment via a skin defect) and **closed** (the overlying skin is intact). These are usually diagnosed clinically but radiological signs such as gas in the soft tissues may be seen in open fractures.

A fracture may be **complete** (involving both cortices) or **incomplete** (when the fracture does not extend across the whole bone, e.g. greenstick fractures in children, see *Chapter 14*).

The site of the fracture should be described in terms of whether it is proximal, middle or distal along the bone shaft.

Types of fractures include **comminuted**, more than two separate fragments; **intra-articular**, involving the articular surface; and **impacted**, one fragment is driven into the other (*Figure 1.1*).

A fracture can be described as **transverse** (at 90 degrees to the long axis of the bone), **oblique** (at an angle of less than 90 degrees to the long axis) or **spiral** (curving along the bone shaft) (*Figure 1.1*).

Displacement of the distal fracture fragments is described relative to the proximal fragment. Displacement may be either anterior/posterior or medial/lateral (*Figure 1.2*).

Angulation describes the direction of tilt of the distal fracture fragment relative the proximal fragment (*Figure 1.2*).

Rotation of the fracture fragments may be described when the joints above and below the fracture are included on the film. The fracture may be internally or externally rotated.

An **avulsion** fracture refers to the separation of a bone fragment at the