

PRINCIPLES OF BONE X-RAY DIAGNOSIS



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I am also particularly indebted to Dr. A. D. Thomson of the Middlesex Hospital and Lecturer in Pathology to the D.M.R. course, for his advice on the pathological matter in this book, and for his contribution to the pathological descriptions incorporated into the text.

I wish to thank Dr. A. G. Stansfeld and Dr. R. J. R. Cureton of the Department of Pathology, St. Bartholomew's Hospital, for reviewing the histological material of the cases illustrated, and when necessary reporting again on the sections of many of the cases, particularly the bone tumours and developmental defects. Some of the cases were first seen in the 1935-1945 period, and it was felt essential to check the histological diagnoses made at the time in the light of recent advances in bone pathology, particularly to confirm and grade the cases of osteoclastoma, and separate them from the variants, and to review those cases labelled "Ewing's" tumour.

I wish to thank Dr. G. DuBoulay of St. Bartholomew's Hospital for contributing the material, much of it original, for the section on "A translucent area in the vault of the skull". and Dr. J. H. Middlemiss of Bristol for his contribution on Madura foot.

The illustrations are reproduced from radiographs of patients passing through the x-ray departments of St. Bartholomew's Hospital and the Brompton Hospital with the exception of Fig. 47 (Thiemann's disease) kindly sent to me from Perth, Australia, by Dr. R. D. McKellar-Hall and Dr. A. L. Frazer, and Fig. 153 (hydatid cyst) sent to me from South Africa by Dr. A. S. Kimmel.

The illustrations are from photographs prepared from the original radiographs by D. F. Kemp in the photographic department of the Institute of Diseases of the Chest, the Brompton Hospital.

The references given are only a faint indication of my debt to the work of others. Most of the references are key ones which themselves refer to the work of others on that particular subject.

LONDON, 1960

GEORGE SIMON

INTRODUCTION

THE VALUE of grouping the x-ray material according to the type of x-ray shadow rather than the clinical disease label was established in *Principles of Chest X-ray Diagnosis* (Simon; 1956), and a similar method has been followed in this book. In a radiograph of the chest, changes in the pulmonary vessel pattern and the position of the interlobar fissures, mediastinal contents or diaphragm singly or together form important aids to the diagnosis, and in a radiograph of a bone a parallel consideration is the balance between absorption, sclerosis and periosteal new bone. A study of this balance, together with the size, shape and position of the lesion, in any given case may help to reduce the list of possibilities to a less formidable number, or to indicate the need for biochemical, endocrine, histological, haematological or bacterial investigations which might not otherwise be done, and which might lead to the correct diagnosis, or even to give the correct diagnosis out of hand before it could be established clinically.

The amount of material available for the book was found to be very large and, in spite of a very generous allocation of illustrations by the publishers, it has not been possible to include a radiograph to illustrate every condition described. The objective has been to select examples which illustrate the principles of bone x-ray diagnosis rather than to make a complete catalogue of all the conditions referred to. This also accounts for the mixture of common conditions and rarities.

When possible the radiographs have been reproduced full size or even slightly enlarged, and to this end large lesions in large bones have been avoided if alternative radiographs showing similar conditions in bones of smaller surface area have been available. For this reason and because of difficulties in satisfactorily reproducing the radiographs, no skull lesions are shown.

Limitations of space and numbers of illustrations forbade the inclusion of certain specialized investigations such as arteriography in the differential diagnosis of malignant bone tumours from relatively innocent conditions, and arthrography either by air or by opaque-contrast media. Nor has there been space to illustrate the appearances seen after the many orthopaedic operative procedures commonly practised.

The various biochemical and haematological values quoted throughout the book, especially in the captions to figures, are all from the Department of Pathology, St. Bartholomew's Hospital. The lists of normal values drawn up by that department appear on pages 167-8 for reference.

DEFINITION OF TERMS

The meaning of certain words used in this book are defined below.

Decalcification

Synonyms.—Deossification, bone resorption, bone absorption, increased radiotranslucency

The term decalcification is used in this book in the radiological sense only, implying that a part of the bone shadow is rendered less radio-opaque or is invisible. It does not mean halisteresis and does not preclude the simultaneous removal of other elements than calcium. It describes neither the mechanism nor the inciting cause of the calcium loss, and is meant only as a descriptive term for the x-ray appearances. It is a term in general use, and no objection to it was raised by Cooke (1955) so long as it was understood that it did not mean simple halisteresis. It seems preferable to the term deossification. It is often the result of resorption, a process defined by McLean (1956) as “putting into solution of a complicated structure in such a fashion that it disappears, its end products entering the blood stream.” This process is possibly brought about by something the osteoclasts do. The rôle of the osteoclasts in the removal of the matrix, collagen fibrils and calcium phosphorus complex crystals in day-to-day remodelling and in pathological bone removal is discussed by Pritchard (1956) and Hancox (1956).

Erosion

Circumscribed area of bone resorption. May be from infection, neoplasm or pressure.

E.S.R.

Erythrocyte sedimentation rate. All figures are for 1 hour (Westergren).

Hodgkin's disease

Synonyms.—Lymphadenoma; lymphoid follicular reticulosis; lymphogranuloma

Periostitis

Radiographic descriptive term to indicate shadow adjacent to the cortex suggesting periosteal new bone. Shadow the same whether the result of inflammation from infection, a haematoma or neoplastic cellular deposits.

Rose-Waaler test

Synonym.—S.C.A.T.

A positive Rose-Waaler test regardless of whether it was done as a sheep cell agglutination test or a modification with polystyrene latex.

Sclerosis

Descriptive term for increase of bone density whatever the cause.

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