

ESSENTIALS
OF
ORTHOPEDICS

PHILIP
WILES

SECOND



CHURCHILL

Essentials of ORTHOPÆDICS

By

PHILIP WILES

M.S. (Lond.), F.R.C.S. (Eng.), F.A.C.S.

*Senior Orthopædic Surgeon, The Middlesex Hospital, London, and
King Edward Memorial Hospital, Ealing.*

Lecturer in Orthopædic Surgery, The University of London.

President, The British Orthopædic Association.

FORMERLY

Hunterian Professor, Royal College of Surgeons of England.

President, Orthopædic Section, Royal Society of Medicine.

President, Orthopædic Section, British Medical Association.

Examiner in Surgery, University of London.

Examiner, Diploma of Physical Medicine.

Honorary Orthopædic Surgeon, Royal Surrey County Hospital.

Honorary Assistant Surgeon, Queen's Hospital for Children.

*Brigadier, Consultant Surgeon (Orthopædics), Middle East Force,
and Persia and Iraq Force.*

*Consultant Surgeon, Eastern Command, India, and 12th
Army S.E.A.C.*

SECOND EDITION

With 7 Colour Plates and 393 Text Figures

LONDON

J. & A. CHURCHILL LTD.

104 GLOUCESTER PLACE, W.1

*Reprinted
1956*

<i>First Edition</i>	...	...	<i>1949</i>
<i>Reprinted</i>	...	...	<i>1951</i>
<i>Second Edition</i>	...	...	<i>1955</i>
<i>Reprinted</i>	...	...	<i>1956</i>

*This book may not be reproduced by any
means, in whole or in part, without the
permission of the Publishers.*

Printed in Great Britain.

PREFACE TO THE SECOND EDITION

ORTHOPÆDIC SURGERY progresses slowly and it was only after beginning to prepare a second edition that I appreciated the extent of the change that has taken place during the five years since the first edition was published. Revision has, therefore, taken longer than was anticipated.

As before, I have tried to confine myself to the elements of the subject, both physiological and pathological, and their application to diagnosis and treatment. The addition of some fifty pages is due as much to the introduction of new ideas about old problems as to the inclusion of entirely new material, and although most of the rare diseases are mentioned, they are discussed as briefly as possible. Operative details of interest chiefly to the specialist are deliberately left out, and the many technical advances of the last few years are introduced only when they have a bearing on prognosis.

Every page has been corrected or revised and there is not a chapter without major alterations to several sections. Many of the old illustrations have been replaced by better examples, a few have been omitted and about thirty new figures have been added. Amongst the sections that have been rewritten are those on the etiology of postural defects; the etiology, classification and treatment of pain in the back; the treatment of sciatica and of scoliosis; the investigation and treatment of congenital dislocation of the hip; the etiology and treatment of osteoarthritis of the hip and the knee; chondromalacia of the patella; cervical spondylosis; ischæmic contracture; osteomalacia and renal osteodystrophy; and the classification and terminology relating to tumours of bone has been brought up to date.

The chapter on pain in the back has been the most difficult to write because there is still so little precise knowledge of the etiology; several new ideas which seem to be soundly based have, however, been introduced, and the popular notion that most complaints can be explained in terms of a "slipped disc" has been steadfastly resisted. The treatment of tuberculous disease of bones and joints, which is being revolutionized by antibiotics, has also been difficult because, at the time of writing, the new path is not clearly defined and it has been possible only to indicate its direction.

I must again pay tribute to my teachers, Sir Gordon Gordon-Taylor who first introduced me to surgery, Lord Webb-Johnson whom I had the privilege of serving as first assistant for three years, and the late Mr. A. S. B. Bankart to whom I was apprenticed in orthopædic surgery—three great surgeons and fine men; as the years pass, I appreciate my debt the more. And I owe as much to my contemporaries and colleagues for all they have taught me, especially the members of the W. J. Little Orthopædic Club—H. Jackson Burrows, H. Osmond-Clarke, Derrick Coltart,

A. T. Fripp, Herbert J. Seddon, T. T. Stamm, Reginald Watson-Jones, and the late V. H. Ellis—some or all of whom have met for intimate discussion each winter month for nearly twenty years.

The manuscript of the first edition was read and freely criticized by a number of my friends on the staffs of London Teaching Hospitals. On this occasion there has been insufficient time to seek their help again and it is only the sections on tuberculous disease, with which Mr. H. J. Seddon has been so kind as to help me, that have been submitted to criticism.

My colleagues have again been generous enough to make available a number of illustrations and it is with great pleasure that I thank Mr. St. J. D. Buxton for Fig. 344, Mr. J. A. Cholmeley for Fig. 71, Mr. W. D. Coltart for Fig. 377, Sir Thomas Fairbank for Fig. 378, Mr. J. I. P. James for Figs. 76, 77 and 78, Dr. Leo Mayer for Fig. 30, Dr. Ali Mohammed for Fig. 316, Mr P. H. Newman for Figs. 297, 299 and 392, Mr. K. I. Nissen for Fig. 190, Prof. R. W. Scarff for Fig. 275, Mr. H. J. Seddon for Figs. 91, 92, 94, 114, 124, 172, 173, 280, 319, 320, 321, 323 and 356, Dr. P. H. S. Silver for Figs. 2 and 44, Dr. F. H. Stevenson for Fig. 174, Sir Reginald Watson-Jones for Fig. 358, Mr. M. C. Wilkinson for Fig. 93, and Prof. B. W. Windeyer for Fig. 357.

Finally, I wish to thank Mr. M. Turney and his staff in the Photographic Department of the Middlesex Hospital for their skill in preparing the radiographs for reproduction, and Mr. Rodney Sweetnam for the care with which he has corrected the proofs.

LONDON

PHILIP WILES

PREFACE TO THE FIRST EDITION

NICOLAS ANDRY, in 1741, wrote a book which he called *L'Orthopédie* because it was about the problems of "straightening children," and the term has remained in use ever since. It is, however, an imperfect description of the work of the present-day orthopædic surgeon as this includes all diseases and injuries of bones and joints, and of the muscles and nerves controlling them. The field has become so vast, even when fractures are excluded, and much is so specialized, that no single volume could cover all aspects. I have, therefore, endeavoured to explain as simply as possible the physiological and pathological basis of orthopædics and its application to diagnosis and treatment. The increasing appreciation of the importance of posture has made it desirable to pay special attention to this subject.

I have had in mind primarily the needs of the general practitioner who has to advise the patient in the first instance, the undergraduate student who requires classified information to help him order his thoughts, and the postgraduate who is beginning his surgical training. A regional arrangement is used in order to assist with diagnosis, and when a disease occurs at several sites, the pathology is considered either with the region at which it is most common or in a separate chapter. Treatment is described in detail when it can be carried out by a general practitioner; in other cases the available methods of treatment and the probable functional results are discussed, operative procedures being described only in general terms.

The foundations of modern orthopædic surgery were laid less than a generation ago by a small band of pioneers, and between these men was formed a bond of fellowship that knew no international boundaries. We are proud that now, when orthopædic surgeons are numbered by thousands instead of by tens, this fellowship remains and there is still the freeest interchange of ideas and experiences between one surgeon and another, and one country and another. It is well that this is so because orthopædics is still in its infancy and there is hardly a procedure that is universally accepted as "best," or that someone, somewhere is not trying to improve. Progress has been particularly rapid in the U.S.A. during the last decade, and in spite of difficulties in communication during the war, many of the new developments have been adopted by British surgeons. There remain, however, a few major differences in the current practice of the two countries, and this is a healthy sign of the mutual criticism that is not only tolerated, but encouraged.

Orthopædics differs from other branches of surgery in that it deals chiefly with injuries and diseases that are potentially crippling. The major role in treatment has often to be played by the patient who alone can

prevent his joints from becoming stiff and his muscles from wasting. It is, therefore, essential to have the whole-hearted co-operation of the patient and, equally important, the help of a team consisting of nurse, physiotherapist and social worker to stimulate and direct his efforts. The purpose of operation is to make it possible for the patient to do his share of the work ; it is but an incident in the course of treatment, and if its part is over-emphasized in the written account, it is because it would be tedious to repeat the other aspects continually even though they are just as important.

PHILIP WILES

LONDON
1949

CONTENTS

CHAPTER I — POSTURAL DEFECTS

	PAGE
PHYSIOLOGY	1
ETIOLOGY	4
NORMAL POSTURE	6
ANTERO-POSTERIOR CURVES OF THE SPINE	8
POSTURAL LATERAL CURVATURE	14
THE FEET	16
PES VALGUS	23
GENU VALGUM	31
GENU VARUM	35
TREATMENT OF POSTURAL DEFECTS	39

CHAPTER II — BACK PAIN

CLASSIFICATION	43
CERVICAL	47
THORACIC	50
LOW BACK PAIN	52
COCCYDYNIA	80
SCIATICA	81

CHAPTER III — THE SPINE

THE INTERVERTEBRAL DISCS	92
ADOLESCENT KYPHOSIS	97
SENILE KYPHOSIS	99
SENILE OSTEOPOROSIS	100
ANKYLOSING SPONDYLITIS	102
STRUCTURAL SCOLIOSIS	107
SPINA BIFIDA	118
SPONDYLOLISTHESIS	120

CHAPTER III—THE SPINE <i>(continued)</i>	PAGE
OSTEITIS CONDENSANS ILII	124
TORTICOLLIS	125
CONGENITAL ELEVATION OF THE SCAPULA	128
TUBERCULOSIS OF THE SPINE	129
TUBERCULOSIS OF THE SACROILIAC JOINTS	136
OSTEOMYELITIS	138
TUMOURS	139

CHAPTER IV—THE HIP

EXAMINATION	142
Infants	
ACUTE SUPPURATIVE ARTHRITIS	147
CONGENITAL DISLOCATION	149
CONGENITAL COXA VARA	160
Children and Adolescents	
TRANSIENT SYNOVITIS	161
TUBERCULOSIS	162
PERTHES DISEASE	167
ADOLESCENT COXA VARA	170
Adults	
OSTEOARTHRITIS	174
Conditions Around the Hip	
BURSITIS	186
SNAPPING AND CLICKING HIPs	187

CHAPTER V—THE KNEE

EXAMINATION	188
Trauma	
LATERAL LIGAMENTS	192
INTERNAL SEMILUNAR CARTILAGE	197

CONTENTS

xi

CHAPTER V — THE KNEE (*continued*)

PAGE

EXTERNAL SEMILUNAR CARTILAGE	204
CRUCIATE LIGAMENTS	206
DIRECT VIOLENCE INJURIES	209
CHRONIC KNEE SPRAIN	210
CHONDROMALACIA PATELLÆ	212
OSTEOCHONDritis PATELLÆ	215
RUPTURED MUSCLES	216

Locking of the Joint

OSTEOCHONDritis DISSECANS	219
SYNOVIAL OSTEOCHONDROMATOSIS	222
RECURRENT DISLOCATION OF THE PATELLA	223

Chronic Pain and Swelling

CHRONIC ARTHRITIS	227
TUBERCULOSIS	234
SYPHILIS	239
HÆMOPHILIA	240
INTERMITTENT HYDRARTHROSIS	241

Swellings Around the Knee

OSTEOCHONDritis OF THE TIBIAL TUBERCLE	244
PREPATELLAR BURSTITIS	244
POPLITEAL HERNIA	246
SEMIMEMBRANOSUS BURSA	246
CYSTS OF THE SEMILUNAR CARTILAGES	246

Clicking Knees	247
--------------------------	-----

CHAPTER VI — THE FOOT AND ANKLE

"FLAT FOOT"	250
CHRONIC FOOT STRAIN	250
PERONEO-EXTENSOR SPASM	252
TALO-CALCANEAL SYNOSTOSIS	255

CHAPTER VI—THE FOOT AND ANKLE (*continued*)

PAGE

PAIN IN THE FOREFOOT	257
OSTEOCHONDRITIS OF THE NAVICULAR BONE	265
PES CAVUS AND CLAW TOES	266
HALLUX VALGUS	270
HALLUX RIGIDUS	276
DEFORMITIES OF THE TOES AND NAILS	279
CORNS AND CALLOUS	284
PLANTAR WARTS	285
INGROWING TOE NAIL	286
RINGWORM	287
GOUT	289
SWELLING OF THE FOOT AND ANKLE	291
PAIN UNDER THE HEEL	292
PAIN BEHIND THE HEEL	293
RUPTURE OF THE TENDO-ACHILLIS	294
“PULLED” CALF MUSCLE	295
LATERAL LIGAMENTS OF THE ANKLE	296
ACCESSORY AND SESAMOID BONES	300
OSTEOARTHRITIS	302
TUBERCULOSIS	303
TALIPES	305

CHAPTER VII — THE SHOULDER GIRDLE

PAIN IN THE SHOULDER, ARM AND HAND	313
PRESSURE AT THE CERVICO-BRACHIAL JUNCTION	314
CERVICAL SPONDYLOSIS	319
CARPAL TUNNEL COMPRESSION	324
STIFF AND PAINFUL SHOULDERS	325
RECURRENT DISLOCATION OF THE SHOULDER	339
THE ACROMIO-CLAVICULAR JOINT	342
THE STERNO-CLAVICULAR JOINT	344
TUBERCULOSIS	345

CHAPTER VIII — THE ELBOW

	PAGE
"TENNIS ELBOW"	348
OSTEOARTHRITIS	352
PERIARTICULAR OSSIFICATION	354
OSTEOCHONDRITIS DISSECANS	355
LOOSE BODIES	356
ULNAR PALSY	357
RUPTURE OF BICEPS	359
TUBERCULOSIS	360

CHAPTER IX — THE WRIST AND HAND

TENDONS AND TENDON SHEATHS	362
SPRAIN	371
DUPUYTREN'S CONTRACTURE	372
ISCHÆMIC CONTRACTURE	373
CLAW HAND	376
OSTEOARTHRITIS	378
KIENBOCH'S DISEASE	381
PYOGENIC INFECTION	383
TUBERCULOSIS	390
CONGENITAL DEFECTS	395

CHAPTER X — PYOGENIC INFECTION

PATHOLOGY	402
ACUTE HÆMATOGENOUS OSTEOMYELITIS	404
CHRONIC OSTEOMYELITIS	411
SYPHILITIC OSTEOMYELITIS	415
ACUTE SUPPURATIVE ARTHRITIS	417

CHAPTER XI — TUBERCULOSIS

TUBERCULOUS ARTHRITIS	422
TUBERCULOUS OSTEITIS	433

CHAPTER XII — CHRONIC ARTHRITIS

	PAGE
RHEUMATOID ARTHRITIS	435
OSTEOARTHRITIS	446
NEUROPATHIC ARTHRITIS	454

CHAPTER XIII — TUMOURS OF BONE

Benign Tumours of Bone

CHONDROMA AND OSTEOMA	456
FIBROUS DYSPLASIA	459
OSTEOCLASTOMA	462
OSTEOID OSTEOMA	464

Primary Skeletal Tumours

OSTEOSARCOMA	466
CHONDROSARCOMA	469
FIBROSARCOMA	471

Non-skeletal Tumours

MYELOMATOSIS	472
LEUKÆMIA AND HODGKIN'S DISEASE	474
ENDOTHELIOMA	475
HISTIOCYTOSIS	475

Metastatic Carcinoma	478
--------------------------------	-----

CHAPTER XIV — DISEASES AND CONGENITAL DEFECTS OF BONE

Metabolic and Other Diseases

AVITAMINOSIS D	481
RENAL OSTEODYSTROPHY	485
AVITAMINOSIS C	487
HYPERPARATHYROIDISM	488
HYPERTHYROID OSTEOPOROSIS	489

CONTENTS

xv

CHAPTER XIV — DISEASES AND CONGENITAL DEFECTS OF BONE *(continued)*

PAGE

HYPERPITUITARISM	490
PAGET'S DISEASE	491
LEONTIASIS OSSEA	493
INFANTILE CORTICAL HYPEROSTOSIS	494

Congenital Defects of the Skeleton

OSTEOGENESIS IMPERFECTA	495
ACHONDROPLASIA	496
DIAPHYSIAL ACLASIS	497
OSTEOPETROSIS	498
CLEIDOCRANIAL DYSOSTOSIS	499
DYSPLASIAS OF METAPHYSES AND EPIPHYSES	501

CHAPTER XV — DISEASES OF THE NERVOUS SYSTEM

POLIOMYELITIS	503
SPASTIC PARALYSIS	517
ADULT HEMIPLEGIA	522
THE HEREDITARY ATAXIAS	522
OBSTETRICAL PARALYSIS	523

CHAPTER I

POSTURAL DEFECTS

POSTURAL defects are variations from the accepted "normal" posture which can be corrected by the active effort of the patient. It is seldom that one part of the body alone is involved and usually the entire posture is at fault ; for example, valgus feet are found more frequently in association with abnormalities of the antero-posterior curves of the spine than as an isolated occurrence. The inter-dependence of defects of different parts of the body will be emphasized as much as possible although they have to be separated for systematic description, and when considering treatment it is particularly important to view the patient as a whole because a single fault cannot be corrected alone.

There are several minor structural abnormalities that are so commonly associated with postural defects as to be inseparable, and therefore they will be described in this chapter. They include slight wedging of the lower dorsal and upper lumbar vertebræ (dorsolumbar kyphosis), torsional deformities of the tibiæ, and obliquity of the lower articular surfaces of the tibiæ. Knock knee and bow legs are also included because they are often caused by a minor irregularity in growth or faulty posture.

Physiology

The posture of the body at any given moment depends on the position of the joints and this is controlled by the skeletal muscles. The part played by the ligaments in maintaining posture is a subject of controversy. It is argued by some that the strength, structure and arrangement of the ligaments make it obvious that it must be an important part. On the other hand it is clear that in the ordinary upright position no ligaments are under tension because every joint is at an intermediate point in its range of movement and can be moved in all directions. Ligaments are so nearly inextensible that, if they were taut, movement would be impossible in at least one direction. Moreover continued strain on ligaments is painful, as everyone is aware from the pain felt behind the knees after resting the feet for some time on the opposite seat in a railway carriage. For these reasons ligaments can play no direct part in holding the upright position. Their function is complementary to that of the muscles ; the muscles cause movements and maintain posture within the ordinary range, whereas the ligaments limit the extremes of movement and take the strain when the muscles are fatigued or overloaded.

The apparent paradox that muscles both cause movement and prevent it is not difficult to explain. When a muscle fibre is stimulated it

develops within itself a state of tension and its subsequent behaviour depends on conditions external to it. If there is no resistance, the fibre contracts and causes movement ; if there is resistance which it is unable to overcome, movement is absent or minimal and the contraction is said to be "isometric." The former process is used in making movements, the latter in maintaining posture. Individual fibres follow the "all or none" law and therefore the power exerted by a contracting muscle is proportionate to the number of fibres in action. This in turn depends on the external resistance to be overcome and the rapidity of movement. For the maintenance of posture, the number of fibres in use simultaneously is small and there is a continual change of contracting fibres which reduces fatigue to a minimum (Fig. 1).

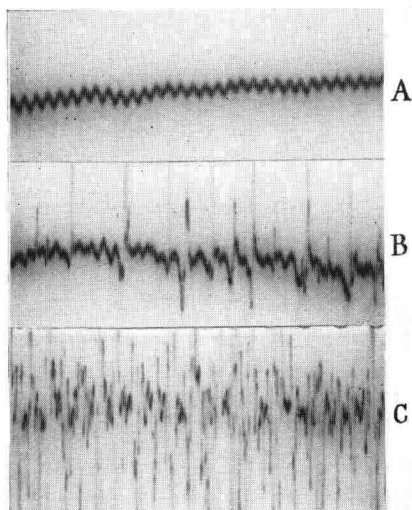


FIG. 1. Electromyogram of the gluteus medius muscle. Intramuscular electrode. Photograph of oscillations of a cathode ray tube.

- A. At rest
- B. Standing on both legs
- C. Standing on one leg

When standing upright the body is not quite in a state of balance. There is a continual but very slight sway at the ankles which is corrected by the flexor and extensor muscles contracting alternately (Fig. 2). A larger change of balance, say moving the hands forwards an inch, displaces the centre of gravity sufficiently for a compensatory contraction of the erector spinæ to be detected. More complicated movements call for correspondingly elaborate integration. The regulation of the process is carried out by the central nervous system which receives afferent impulses from the muscles, eyes, ears and skin. But before this information can be translated into efferent motor impulses, it must be integrated with the habits of stance and movement of the particular individual concerned. Posture thus becomes a psychosomatic phenomenon determined by the brain and executed by the muscles.

The posture of an individual is best considered in relation to the concept of "body image" introduced many years ago by Henry Head to convey the idea each person has of his *own* body (and that can be quite different from the ideas others have of it). It is a very personal affair which is

constructed from information derived from intrinsic sources and related to the environment, both objective and subjective. The principal intrinsic sources are visual impulses, tactile impulses and proprioceptive impulses. Visual information about ourselves is peculiar in that we see ourselves, for the most part, either in reflection or else upside down; we relate it to the right-way-up appearance of other people. Tactile impulses tell us what we feel like and this is different from the feel of others because it is felt simultaneously by both the touching and the touched parts of the body. Proprioception is perhaps the most important of these percepts. It is

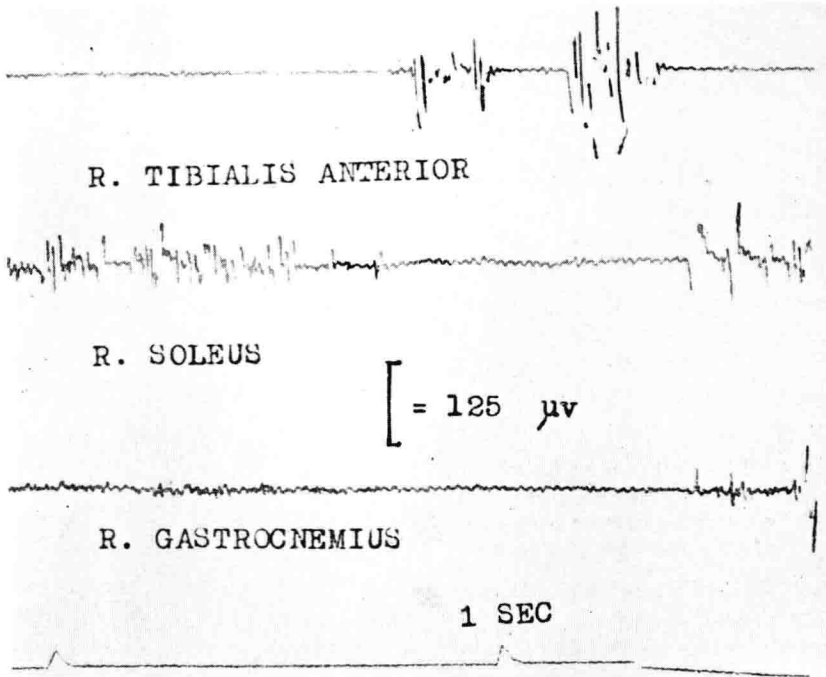


FIG. 2. Electromyogram from a man standing still. Surface electrodes, ink writing oscillograph.

The reciprocal action of the anterior and posterior calf muscles is well shown.

(By courtesy of Dr. P. H. Spencer-Silver.)

entirely personal without possibility of relation to the experience of others, and it is unconscious. It gives information as to the movements of joints and the relative length of the controlling muscles, hence of position in space.

The body image can be extended to include a certain amount of extra-personal space; thus the touch-typist comes to include the keys of her machine. Blake Pritchard gives the example of the experienced driver whose image extends to the tips of the wings of his car, whilst that of his passenger very definitely does not! The body image of those born blind, or without a limb, or with spastic paraplegia, is obviously different from that of a normal person, and even small variations in physique must modify it to some extent. Modification arising from the individual's