
Treatise On Fractures

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TREATISE
ON
FRACTURES

IN
GENERAL, INDUSTRIAL, AND
MILITARY PRACTICE

BY

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SECOND EDITION
REVISED AND ENTIRELY RESET

*WITH 1081 ILLUSTRATIONS:
RADIOGRAMS, DRAWINGS AND PHOTOGRAPHS*



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PREFACE TO SECOND EDITION

MANY opinions on surgical therapeutics have been modified by the experiences and great clinical opportunities of the World War.

The treatment of gunshot wounds of bones has been revolutionized thereby, because a distinction has been made between contaminated and infected open fractures. Lucas-Championnière's dogma that early mobilization and gentle massage are of value in restoring function and contour in fractures of shafts and joint-ends of bones has been accepted. Lane's insistence that closed fractures need operative fixation with steel plates, as a usual routine, has been found to be an untenable creed. Treatment of fractures of the femur and of the tibia by suspension, long ago advocated by N. R. Smith, Hewson and Hodgen in this country, and by others in Europe, has been reinstated in general favor. Critical, intelligent, and frequent examination of fractures, instead of a too absolute reliance on radiographic interpretations by inexperienced laboratory workers, has become an orthodox requirement. These are a few of the by-products of war surgery brought from the battlefields of Europe.

Another agency forcing a revision of old methods in the treatment of broken bones is the advent in the United States of workmen's compensation laws. The payment, by industrial plants and firms, of money for hospital care and surgical treatment of injured employes, has deepened the sense of responsibility in hospital trustees, surgeons and physicians.

In response to these determining factors, there has been an endeavor to make, in this second edition, a volume of value to all those who treat fractures.

The reader, whether engaged in private, in industrial or in military surgery, will find that the text has been thoroughly revised, particular attention given to differential diagnosis and many valuable illustrations added.

A general view of the contents of the book will be obtained from the following summary of treatment:

1. The treatment of broken flat bones consists in great part of attention to associated injuries of the contents of cranium, thorax, abdomen or pelvis.
2. In fractures of the shafts of long bones, with absence of impaction or entanglement, overriding often may be overcome by means of gentle massage, or moderate traction, aided by rest in bed and anodyne remedies to relieve pain and quiet the patient's nervous system. This statement applies with great force to fractures at upper end of humerus and of femur.
3. Radiographic study, to determine the degree of success obtained

by efforts to reconstruct anatomical contour, is not infrequently deceptive. This is due to variations in the relative position of the Crookes tube, the fracture and the photographic plate; or to faulty interpretation of the skiagraphic negatives.

4. Reduction, often under general anæsthesia, is an essential in fractures, especially in impacted fractures. The exact direction of the reducing force to be applied by the surgeon's hands may be indicated by radiographic examination.

5. Fractures of the maxilla and mandible frequently require that the surgeon have associated with him a competent dentist to prevent faulty occlusion of the teeth after union of the fracture.

6. The doctor should remember that however desirable perfection of anatomical contour may be, a functional restoration of the limb, as a whole, is of major importance. Obtain both, if practicable, but keep the patient alive and give the preference to good function rather than good looks, if either one has to be sacrificed.

7. The majority of closed fractures of long bones may be cured with good function and good anatomical result, without exposing the bone by operation. Some open fractures of these bones, if kept aseptic, may be cured without exposing the bone by operation.

8. A moderate proportion of closed fractures of tubular bones will need operative exposure to correct malposition of fragments, and may require direct fixation.

9. Many open fractures, especially gunshot injuries, will require operation to convert contaminated fractures into aseptic fractures, and to permit primary closure of the wounds. Some of these open fractures will also need readjustment and possibly direct fixation of fragments.

10. Conversion of contaminated open fractures into aseptic fractures should be done within the first eight or ten hours, by removal of foreign bodies and excision of debatable soft parts. The wounds should then be closed by primary suture and the bones given external rigid support; and the patient kept under careful surgical observation for advent of sepsis.

11. Closed fractures, needing exposure of bone for readjustment of fragments, will probably escape operative sepsis more frequently if operation is delayed about seven days after injury.

12. Comminution of bone in closed fractures does not add much to the severity of the injury, but it requires that the accuracy of coaptation and of external support receive vigilant attention.

13. Comminuted open fractures, if kept aseptic or early rendered aseptic, do well, because the small fragments furnish many centres of callus deposition.

14. Nearly all closed fractures, and many open ones of the upper limb, may be successfully treated as to functional ability and anatomical integrity by means of ambulatory dressings.

15. Nearly all fractures of the lower extremity, whether open or closed, do better when treated in bed with suspension of the limb and more or less continuous traction. Surgeons, however, are apt to forget that increased overriding of fragments is often caused by muscular spasm, due to pain or insufficient repose of mind and limb. Continuous moderate traction, with lateral support at seat of fracture, with opiates and bromides internally, may be better than great addition to traction weights.

16. An exception to the rule of treating fractures of the lower limb in bed may occur in fractures of the fibula and of bones of the foot.

17. Most fractures of the femur, and a considerable number of the tibia, must have traction added to suspension of the external fixation apparatus.

18. A few fractures of the upper limb, closed and open, require suspension with traction. This is particularly true in fractures near the upper end of the humerus, and is more frequently needed for infected than closed fractures in this site.

19. Fixation by external splinting is best given to the upper limb by using the thorax as a splint for fractures of upper part of the humerus, and some form of plastic material moulded to the surface for fractures of lower part and for the forearm. Encircling the arm or forearm by gypsum encasements is dangerous in early stages of the treatment. Fractures of the internal condyle often do well with full flexion of the elbow.

20. When suspension and traction are required for upper-limb fractures, the patient should be kept in bed for a time. Traction and splinting should usually be obtained with steel rods similar in form to the splints and braces used in fractures of the lower limb or with a modified Buck's traction apparatus.

21. The suspension and traction so valuable in fractures of the femur may best be obtained with the suspended N. R. Smith or Hodgen anterior heavy wire splint, a modified Thomas splint, or with traction by the Buck's traction method, with or without suspension, or by use of the Bradford frame.

22. The Thomas splint is probably the best of these methods in adults with great overriding of the fragments. It is particularly valuable when the patient must be subjected to transportation. The open ring Thomas splint and the one with movable footpiece are improvements over the earliest forms.

23. The joints, muscles and skin in fractures should be given attention from beginning to end of treatment by mobilization and gentle massage, if the best results are to be obtained.

24. Joint fractures should not be kept immobile longer than one or two days. Careful passive and active movements usually should be allowed within the first few days, and frequently repeated during the course of treatment.

25. It is a common practice to permit weight-bearing on fractures of the lower extremity too soon. Secondary deformity is frequently caused by this error. Crutches, braces and other devices often should be used after union to prevent such deformities.

26. No special form of splint or apparatus may be substituted with safety for the requisite knowledge of anatomy, pathology and mechanics. It is acquaintance with these subjects which constitutes a surgical grasp of the particular fracture needing intelligent care. These propositions are the essence of the teaching which it is hoped this volume will impart.

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J. B. R.
J. A. K.

February 21, 1921.

PREFACE TO FIRST EDITION

THE object of this book is to supply student and medical practitioner with a clear, concise, and systematic presentation of the subject of fractures.

In the following pages, a careful classification of the varieties of fracture occurring in each bone is given, together with statistics, symptomatology, diagnosis, prognosis and treatment. The varieties of fracture are shown by well-selected radiograms, the displacement of fragments is illustrated by accurate drawings, and when possible the methods of reduction and the application of retentive apparatus are presented by photographs.

The universal use of the Röntgen ray as a means of accurate diagnosis has brought about greater success in the recognition of fractures and has shown that many received methods of treatment are faulty or imperfectly understood. As a result, many fractures have been operated upon in which good anatomical and functional results could have been obtained by more conservative measures.

The purpose of the authors is to present a lucid view of the subject in the light of recent discoveries, to point out an accurate scientific procedure, whether operative or otherwise, according to the character of individual injuries, and to urge the general practitioner, as well as the surgical specialist, to the study of methods, operative or non-operative, with augury of propitious result.

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The photographs of specimens, patients, dressings, and copies of skiagrams were made by Mr. Meyer S. Lentz, the original drawings by Mr. Erwin F. Faber, to both of whom the authors are grateful for skill, patience, and untiring energy.