



# Clinical Orthopaedics

ANTHONY F. DePALMA

*Editor-in-Chief*

With the Assistance of the  
ASSOCIATE EDITORS and the  
BOARD OF ADVISORY EDITORS



Number Three

COPYRIGHT, 1954  
BY J. B. LIPPINCOTT COMPANY

---

THIS BOOK IS FULLY PROTECTED BY COPYRIGHT  
AND, WITH THE EXCEPTION OF BRIEF EXCERPTS  
FOR REVIEW, NO PART OF IT MAY BE REPRODUCED  
IN ANY FORM WITHOUT THE WRITTEN PERMIS-  
SION OF THE PUBLISHERS

---

*Clinical Orthopaedics* is designed for the publication of original articles offering significant contributions to the advancement of surgical knowledge.

Original typed manuscripts, not carbon copies, and illustrations, should be forwarded prepaid, to Dr. Anthony F. DePalma, 1025 Walnut Street, Philadelphia 7, Pa.

Manuscripts should be typed double-spaced on one side of standard typewriter paper, leaving wide margins. While every effort will be made to guard against loss, it is advised that authors retain copies of manuscripts submitted. All pages should be numbered. Dorland's *American Illustrated Medical Dictionary* (edition 22) and Webster's *New International Dictionary* (edition 2) should be used as standard references. Scientific names for drugs should be used when possible. Copyright or trade names of drugs should be capitalized. Units of measurement, e.g., dosage, should be expressed in the metric system. Temperature should be expressed in degrees centigrade. A contribution in a foreign language, when accepted, will be translated and published in English.

Black-and-white illustrations will be reproduced free of charge, but the publisher reserves the right to establish a reasonable limit upon the number. Colored illustrations ordinarily cannot be published except at the author's expense. Black-and-white photographs should be in the form of glossy prints. Line and wash drawings should be on white art board, with lettering, in black india ink, large enough to be readable after necessary reduction. Large or bulky illustrations should be accompanied by smaller glossy reproductions of the same to facilitate their circulation among the members of the editorial board. Illustrations should be numbered, the tops indicated, and the author's name and the title of the article in brief should appear on the back. A separate typewritten sheet of legends for the illustrations should be supplied.

A bibliography of numbered references in alphabetical order should appear at the end of the manuscript with corresponding numbering in the text. Bibliographies should conform to the style of the *Quarterly Cumulative Index Medicus*: author's name, title of article, name of journal, volume number, inclusive page numbers, and year of publication in the order named.

Following are the general subjects of forthcoming  
issues of *Clinical Orthopaedics*:

*Joint Fractures and Dislocations, Fall, 1954*

*Backache, Spring, 1955*

*Present-Day Status of Endoprostheses, Fall, 1955*

*Tumors of Bone, Spring, 1956*

*Chronic Hereditary Diseases and Developmental Anomalies, Fall, 1956*

All contributors desiring to submit articles for consideration for publication on the topics listed above or in the general sections of this publication should submit them to the editor some months in advance of the date of the issue for which they are intended.

*Library of Congress  
Catalog Card Number  
53-7647*

PRINTED IN THE UNITED STATES OF AMERICA

## EDITOR-IN-CHIEF

ANTHONY F. DEPALMA  
*Philadelphia, Pa.*

## ASSOCIATE EDITORS

ROBERT T. McELVENNY  
*Chicago, Illinois*

CHARLES W. GOFF  
*Hartford, Connecticut*

EARL D. MCBRIDE  
*Oklahoma City, Oklahoma*

DUNCAN C. MCKEEVER  
*Houston, Texas*

DANA M. STREET  
*Memphis, Tennessee*

## BOARD OF ADVISORY EDITORS

ALBERT B. FERGUSON, SR.  
*Brookline, Massachusetts*

RALPH K. GHORMLEY  
*Rochester, Minnesota*

EDWARD C. REIFENSTEIN, JR.  
*Bloomfield, New Jersey*

JAMES E. M. THOMSON  
*Lincoln, Nebraska*

H. WINNETT ORR  
*Lincoln, Nebraska*

HARRISON L. McLAUGHLIN  
*New York, New York*

# Contents

## SECTION I SOFT-TISSUE CONDITIONS AROUND JOINTS

1. A REVIEW OF THE SURGICAL TREATMENT OF CONGENITAL DISLOCATION, RECURRENT DISLOCATION, OR SLIPPING PATELLA . . . . .	3
H. Winnett Orr, M.D.	
2. SPRAINS . . . . .	8
Garrett Pipkin, M.D.	
Brief Regional Analyses . . . . .	9
Conclusion . . . . .	19
3. INJURIES TO THE LIGAMENTS OF THE KNEE . . . . .	20
T. B. Quigley, M.D.	
4. CYSTS OF THE SEMILUNAR CARTILAGES OF THE KNEE . . . . .	29
Louis W. Breck, M.D.	
Introduction . . . . .	29
Incidence and Location . . . . .	29
Etiology . . . . .	30
Pathology . . . . .	31
Symptoms . . . . .	32
Physical Examination . . . . .	33
Differential Diagnosis . . . . .	33
Treatment, After-Care and Prognosis . . . . .	33
Report of a Series of 18 Cases of Cysts of the Menisci . . . . .	35
Discussion . . . . .	36
5. TRAUMATIC LESIONS OF MENISCI . . . . .	39
R. A. Murray, M.D.	
Anatomy and Pathology . . . . .	39
Symptomatology and Physical Findings . . . . .	40
Differential Diagnosis . . . . .	43
Conservative Treatment . . . . .	43
Surgical Treatment . . . . .	44
Prognosis and Complications . . . . .	45
6. INJURIES OF THE MEDIAL MENISCUS . . . . .	48
Frederick Lee Lieboit, M.D.	
7. RECURRENT DISLOCATION OF THE PATELLA . . . . .	55
Duncan C. McKeever, M.D.	
Treatment . . . . .	57

8. TREATMENT OF DISLOCATION OF THE PATELLA . . . . .	61
Fritz Teal, M.D.	
Etiology . . . . .	61
Mechanism of Dislocation of Patella . . . . .	61
Complications . . . . .	61
Treatment of Simple Patellar Dislocation . . . . .	61
Surgical Treatment . . . . .	62
Author's Method . . . . .	
9. AVULSION OF THE HAMSTRING TENDONS FROM THE ISCHIAL TUBEROSITY: REPORT OF CASE . . . . .	66
Lewis M. Overton, M.D., and Robert England, M.D.	
Case Report . . . . .	66
Comment . . . . .	68
10. BICIPITAL TENOSYNOVITIS . . . . .	69
Anthony F. DePalma, M.D., and Gerald E. Callery, M.D.	
Incidence . . . . .	70
Pathology . . . . .	70
Etiology . . . . .	73
Anatomic and Functional Factors . . . . .	73
Anomalies of the Bicipital Groove . . . . .	76
Degenerative Processes . . . . .	77
Clinical Features . . . . .	77
Bicipital Tenosynovitis in the Young . . . . .	77
Bicipital Tenosynovitis After the Age of 30 Years . . . . .	78
Treatment . . . . .	79
Operative Procedures . . . . .	81
Postoperative Management . . . . .	81
Analysis of Cases Reviewed . . . . .	81
Analysis of Poor Results . . . . .	84
Conclusions . . . . .	85
11. RECURRENT ANTERIOR DISLOCATION OF THE SHOULDER JOINT . . . . .	86
John J. Gartland, M.D., and John J. Dowling, M.D.	
Treatment . . . . .	87
Operative Procedure . . . . .	88
Analysis of Results . . . . .	90
12. RUPTURES OF THE ROTATOR CUFF . . . . .	92
Julius S. Neviaser, M.D.	
Rupture of the Rotator Cuff Without Dislocation or Fracture . . . . .	92
Ruptures of the Rotator Cuff Following a Dislocation of the Shoulder . . . . .	96
Ruptures of the Rotator Cuff Following a Dislocation of the Shoulder and Fracture of the Greater Tuberosity . . . . .	96
Ruptures of the Biceps Tendon . . . . .	97

13. INJURIES OF THE LIGAMENTOUS AND ASSOCIATED STRUCTURES ABOUT THE HIP JOINT . . . . .	99
T. H. Vinke, M.D., and F. M. Deuschle	
Anatomy of the Hip Joint . . . . .	99
Relations of the Hip Joint . . . . .	100
Movements of the Hip Joint . . . . .	101
Development of the Hip Joint . . . . .	101
Clinical Aspects . . . . .	102
14. SPRAINS AND RUPTURES OF LIGAMENTS OF THE ANKLE JOINT . . . . .	109
Judson D. Wilson, M.D.	
Surgical Anatomy . . . . .	109
Physical Examination . . . . .	111
The Treatment of Sprains of the Ankle . . . . .	112
Ligamentous Rupture with Disruption of Ankle Mortise . . . . .	117
Complications as the Result of Maltreatment . . . . .	119
15. THE PELLEGRINI-STIEDA PARA-ARTICULAR CALCIFICATION . . . . .	121
I. Williams Nachlas, M.D.	
Etiology . . . . .	121
Pathology . . . . .	122
Clinical Picture . . . . .	125
Treatment . . . . .	126

## SECTION II

### GENERAL ORTHOPAEDICS

16. GIANT-CELL TUMOR OF BONE AND ITS DIFFERENTIAL DIAGNOSIS . . . . .	131
William C. Herrick, M.D., and Henry L. Kazal, M.D.	
Introduction . . . . .	131
History . . . . .	131
Etiology and Pathogenesis . . . . .	133
Clinical History and Physical Findings . . . . .	133
Age . . . . .	134
Sex . . . . .	134
Location . . . . .	135
Roentgenographic Findings . . . . .	135
Gross Pathology . . . . .	136
Microscopic Findings . . . . .	136
Grade I . . . . .	137
Grade II . . . . .	138
Grade III . . . . .	138
Differential Diagnosis . . . . .	138
Aneurysmal Bone Cyst . . . . .	138
Nonossifying Fibroma of Bone . . . . .	139
Ossifying Fibroma . . . . .	139
Chondromyxoid Fibroma of Bone . . . . .	139
Benign Chondroblastoma of Bone . . . . .	140
Unicameral Bone Cyst . . . . .	141

16. GIANT-CELL TUMOR OF BONE AND ITS DIFFERENTIAL DIAGNOSIS ( <i>Continued</i> )	
The Biopsy . . . . .	141
Prognosis . . . . .	142
17. STEP-CUT KNEE FUSION WITH MEDULLARY FIXATION . . . . .	145
Wm. Minor Deyerle, M.D., and Virgil R. May, Jr., M.D.	
Operative Technic . . . . .	146
Case Report . . . . .	149
18. CLOSED MEDULLARY PINNING OF COLLES' FRACTURE . . . . .	152
Leslie V. Rush, M.D.	
Indications . . . . .	153
Time of Operation . . . . .	154
Reconstruction . . . . .	155
Stability of Fixation . . . . .	158
Anatomic Results . . . . .	158
Dynamic Factors . . . . .	158
Technical Errors and Complications . . . . .	160
Return to Function . . . . .	161
Removing the Pin . . . . .	161
Discussion . . . . .	
19. A COMPARATIVE CLINICAL STUDY OF AUTOGENOUS AND FROZEN HOMOGENOUS BONE IN GRAFTING PROCEDURES . . . . .	163
Ernest A. Brav, Colonel, MC, U.S.A.	
Statistical Data . . . . .	165
Discussion . . . . .	169
20. THE USE OF TUBADIL (REPOSITORY INJECTION OF TUBOCURARINE) IN ACUTE BACK STRAIN . . . . .	172
Commander John S. Thiemeyer, Jr., (MC) USN, and Lieutenant E. F. Reed, Jr., (MC) USN	
Report of Cases Illustrative of the Above Therapy . . . . .	173
21. FATIGUE FRACTURE OF THE SHAFT OF THE FEMUR—REPORT OF A CASE . . . . .	177
Hyman R. Osheroff, Colonel, MC, U.S.A., and Thomas C. Devlin, First Lieutenant, MC, U.S.A.	
Case Report . . . . .	177
22. VASCULAR RELATIONS OF THE ANKLE AND THEIR CLINICAL SIGNIFICANCE . . . . .	179
H. Kelikian, M.D.	
Arterial Pathways . . . . .	179
Summary . . . . .	182
Return Circulation . . . . .	183
Clinical Correlation . . . . .	185
Summary and Implications . . . . .	208
23. TREATMENT OF FEMORAL-NECK FRACTURES . . . . .	209
Richard P. Giliberty, M.D.	
INDEX . . . . .	217



## SECTION I

### SOFT-TISSUE CONDITIONS AROUND JOINTS



# A Review of the Surgical Treatment of Congenital Dislocation, Recurrent Dislocation, or Slipping Patella

H. WINNETT ORR, M.D.\*

There are two reasons for reviewing, for all orthopedic surgeons, the management of congenital dislocation of the patella. (1) So many operative procedures have continued in use, for example, release of the patella on the outer side, and reefing of the capsule on the inner side, which long ago were shown to be inefficient but continue to be employed as procedures for the relief of this disability. (2) In published reports of the operative care of slipping patella, it is the exception rather than the rule to find that all of the "slipping" parts involved have been controlled adequately in the postoperative care so that there was a real expectation of sound healing in correct anatomic and functional position.

The protection of the usually relaxed knee and all of its surrounding structures against stretching and strain after operation and when weight-bearing on the limb is resumed, is important not only for the prevention of the motion and the irritation that sometimes lead to postoperative wound infection but also to secure sound healing with all the parts in the relationship that will cure the disability and give "maximum benefit" for function. A proper appreciation of all this demands what Sir Robert Jones called "the orthopaedic conscience." For such care the

compression bandage, or even compression by an elastic knee "stocking," is entirely inadequate. This is a matter of special importance in those cases in which effusion is present. When there is fluid in the knee after the operation, aspiration, in addition to good immobilization, is almost always indicated.

The obvious requirements of treatment in cases of slipping patella, or recurrent dislocation, have been the replacement of the quadriceps tendon and its bony constituent between the femoral condyles at the correct level, the restoration of quadriceps function, and the prevention of a return of the deformity. These indications have been met, usually only in part, by physiologic therapy, exercises and massage, by such an expedient as Thomas' percussion of the femoral condyle to cause a hypertrophy of the outer margin of the tendon groove, by mechanical devices such as pads or splints, or by surgical operation. Usually the last has been the shifting about of the patella and the soft parts, or the reconstruction of the entire mechanism of flexion and extension of the leg by the rearrangement of the structures at the front of the knee. It is to the latter technical procedures that we shall direct our particular attention.

It is of interest in this connection, to note that early American surgeons made significant contributions toward straightening and

\*Lincoln, Neb.

stabilizing deformed knees. Some years ago at a meeting of the American Medical Association in Philadelphia the Mayor, not a surgeon, in his address of welcome mentioned Jones, Physick, Dorsey, Mutter, Barton, Gibson, and others whose osteotomies and other corrections of deformity were "firsts" in laying the foundations of orthopedic surgery both at home and abroad.

That these men got training and inspiration from John Hunter, the Bells, Cooper, Velpeau, Bichat, Larrey and Dupuytren does not detract from their achievements and the influence of their teachers at the University of Pennsylvania, and their courage as pioneer surgeons immediately after the American Revolution.

Most of the surgical expedients proposed to retain the patella between the femoral condyles have been based upon using the soft tissues in the neighborhood either to pull the patella inward or to transfer bands of tissue to the outer side to prevent the patella from following its tendency toward outward displacement. None of these has been more than partially successful, yet they have continued to be employed. Now, better and sounder technics have been proposed and will be described.

Barton,<sup>1</sup> in the 1830's, and Gibson and Buck,<sup>2,3</sup> in the 1840's, gave us some useful suggestions by their use of arthroplasty and osteotomy to relieve deformity and to stabilize lower extremities in good position. One might do well, in many cases of knee operation, to follow their rules, especially those of Mutter, in the selection of patients for the treatment of fractures, and the after-care of this class of patients.

Pearson, a British surgeon,<sup>4</sup> employed a very good, early "knee cage" brace to hold a slipping patella in correct position. However, like its successors, it probably was not a great success. Some of the early operators who employed incision along the outer side of the patella and "reefing" along the inner side were Canton,<sup>5</sup> Roux<sup>6</sup> (see Goldthwait) and Appel.<sup>7</sup> The last had collected 30 cases from the literature.

William Anderson<sup>8</sup> reported the treatment of a fractured patella by a technic not utilized as it should have been by others until a long time afterward. He transfixed the upper and the lower parts of the fractured bone with long pins, then brought the fragments into correct relationship and fastened the pins at one end in a cork and at the other ends by wires so that all the parts were controlled in correct position. This was as good a method of pin fixation as any—except plaster of Paris—and much better than sutures, wires, or even the Malgaigne clamps.

Pollard<sup>9</sup> released the patella on the outer side and reefed the capsule on the inner side. When this failed, he persevered with an osteotomy of the femur to get a better line for the knee; later he deepened the groove for the quadriceps and resutured the capsule on the inner side, pulling the patella inward once more. Finally, he got a satisfactory result. J. S. McLaren<sup>10</sup> followed a similar program, using silk sutures for the internal capsule at the last operation; after 4 years he got some improvement in the knee and the limb.

In the meantime, some more courageous operators, J. W. Perkins,<sup>11</sup> Goldthwait,<sup>12</sup> and Krogius<sup>13</sup> introduced operative suggestions that have led to the more successful technics and results of the present time. Perkins (1893) had a patient with a dislocation of the patella of 6 years standing. He transplanted a long and fairly wide strip of the internal capsule and the tendon over the remainder of the tendon and the patella and to the outer side of the front of the knee. In this way he carried the patella with its tendon through the open knee joint to the inner side. By suturing these structures in their new position he closed the joint with a very strong correction of the dislocation. He said that he obtained a good result. Hauser, in his paper in 1938, gave Perkins somewhat less than enough credit by referring to this operation as "an attempt to free the patella and hold it in medial displacement."

In 1900 Goldthwait operated upon a patient, doing a transference of a portion of the quadriceps tendon across from the outer to the inner side in one knee, and an inward transference of the tibial tubercle with its quadriceps attachment on the other. Dr. Goldthwait got a better result with his tendon transference, but he expressed a preference for the bone fixation on the inner side of the tibia as being the sounder surgical procedure. Several subsequent writers, including Hauser, who used a similar transference of the tibial insertion of the tendon, overlooked Goldthwait's second procedure, giving him credit for the tendon transference only.

Krogius really followed Perkins in his employment of a heavy band which he carried over from the inner to the outer side of the patella but without entering the knee joint. He sewed the band from the inner side into an incision on the outer side, in front of the knee, pulling the patella inward as he closed the space from which he had taken his flap. This procedure appeared, in his drawing, to disturb the mechanism of knee flexion and extension more than the more radical Perkins operation.

In connection with this discussion of knee surgery, we may do well to call attention to the encyclopedic paper of Paul Heinrich<sup>14</sup> in which the entire field is covered, but with the common difficulty that one travels long distances and arrives nowhere in particular. It provides all kinds of surgeons with all kinds of expedients, but a choice of an operation for any particular occasion is difficult.

We had some experience with a problem very similar to the patellar displacement during World War I when Hey Groves at Bristol<sup>15</sup> and S. Alwyn Smith,<sup>16</sup> my Chief at the Welsh Metropolitan War Hospital, at Cardiff, were doing their reconstructions of damaged or lost cruciate ligaments of the knee. They employed long strands of fascia, through drill holes in the femoral condyles and the tibia, to restore stability to some very unstable knees. There were several very satisfactory results. As I remember, I

may have had something to do with the fact that Alwyn Smith immobilized the last 5 of his 7 cases in plaster of Paris and secured better results than he had in his first 2. Some of the lessons we learned from these cases were not taken advantage of as promptly and as thoroughly as they should have been. A. H. Edwards,<sup>17</sup> for example, reported cases, in 1920, in which he was still trying to hold slipping patellae in place with capsular sutures only.

Soutter,<sup>18</sup> of Boston, reported the use of a "new" fixation to the inner side of the tibia by the transference of a free fascia flap to make a reinforcement of the internal lateral ligament and capsule of the knee. He looped this strip of fascia lata through holes in the inner edge of the patella and sutured them in place somewhat as Sir Robert Jones and Gallie did their "tenodesis" operations in tendon plastic procedures. It appeared, however, that if the new ligament were tight it interfered with flexion of the knee, and if loose, the displacement of the patella recurred. Soutter referred to the Goldthwait operation of 25 years before as a "transplantation inward of the outer half of the quadriceps tendon" which seemed to be inadequate for a Boston neighbor only a few squares away.

H. Page Mauck<sup>19</sup> proposed "a new operative procedure" in which he did the Goldthwait transference of the tibial tubercle, with its quadriceps attachment, carrying along a good part of the internal lateral ligament inward and downward to place the patella well toward the inner side of the knee and tighten all of the structures involved in the "looseness" of the patella and its tendon. All of his 5 cases were improved.

Two years later, Emil D. W. Hauser,<sup>20</sup> of Chicago, employed a procedure which seems to combine all the best features of the various operations described above. Hauser took out a good-sized bone block, with the tibial tubercle and the quadriceps attachment, and transferred it inward and downward on the tibia to an opening prepared for it beforehand. He was careful to get the patella into

correct alignment and to obtain the tension upon the quadriceps tendon exactly right for the stabilization of the knee joint and the range of motion of the knee. He added a reef in the internal lateral capsule to assist in correcting the valgus that is present so often.

Regarding this operation of 15 years ago, Dr. Hauser has just sent me the following supplementary comments: "The quadriceps tendon, the patella and the patellar ligament are all brought to the mid-line, thus re-establishing the normal pull of the quadriceps muscle from its origin to its insertion. The new insertion of the patellar ligament is lower than the original, bringing about normal tension and increased strength to the quadriceps muscle.

"The countertransplant of the bone block is readily executed and gives an immediate, firm attachment. The procedure is relatively simple and logical and has been successful." Dr. Hauser makes this observation:

"I feel that the Soutter ligament operation is more complicated than need be. Also, it is not complete enough in that it does not presuppose a complete transplant of the quadriceps tendon and thus does not assure that the force exerted at the upper margin of the patella, where the greatest force is exerted in weight-bearing when the knee is flexed, would be in the right direction."

Steindler,<sup>21</sup> in his second book on *Operative Orthopedics*, commended the Krogus operation, but for his own work added the moving of the tibial tubercle with its quadriceps attachment. He said that Horwitz had failed in 2 cases (of 20) because of inadequate postoperative physiotherapy. (There might have been insufficient support for the weak knee after the operation. See my remarks elsewhere on that point.) (H.W.O.)

Willis Campbell,<sup>22</sup> who borrowed the title of his book from Steindler's first edition, reviews with approbation the operations of Ober (which resembled the Goldthwait tendon transference operation), Krogus, and Goldthwait's tibial tubercle transfer. He also

endorsed the Hauser bone block transference of the quadriceps attachment to the inner side of the tibia. Campbell went on, as so many writers do, to recommend the Gallie procedure (resembling Soutter's), elevation of the outer rim of the intercondylar groove (with which he credited Brackett, who did the operation two years before Albee), and Albee's own bone graft procedure. This fault of suggesting so many procedures, some of which must be combined with others for a good result, makes for a difficult choice by any except the most experienced surgeons. Campbell, with his own large experience and good judgment, was definite upon one matter; he employed plaster-of-Paris casts, good splints and adequate after-care to obtain real "end results" in these cases.

To recapitulate, usually too little attention has been paid to minimizing damage during and after operation, even by surgeons who are supposed to have an "orthopedic conscience." Injudicious manipulations or incisions sometimes contribute to disability instead of repair.

The old injunction to "do the patient no harm" should be borne in mind, especially at the operating table. After-care is, if anything, even more important. Valgus knees, backward displacement of the tibia on the femur, and undue stretching of the quadriceps tendon and the knee ligaments are all factors that have been neglected in the surgery of recurring dislocation of the patella. It always should be borne in mind that replacement of the patella in correct position is only one of the items in a reconstruction of the anatomy and the physiology of the affected knee joint.

I cannot close without reminding some of you that in our own work I have not hesitated to employ pin fixation through both tibia and femur, and in plaster-of-Paris casts, until healing is well established. The patient is certainly safer and more comfortable with this kind of immobilization.

For several years past, Dr. Fritz Teal and our other associates have performed patel-

lectomies in cases of recurrent dislocation of the patella. Degenerative changes have been found on the adjacent articular surfaces of the patella and the femoral condyles. At the time of the operation these changes were sufficiently severe to suggest that the more conservative procedures would be inadequate. The results have been good. One large teen-age girl had the patellae removed on both sides and got an excellent result. Duncan McKeever (in a letter) suggests his patelloplasty in such cases.

#### REFERENCES

1. Barton, John Rhea: A new treatment in a case of ankylosis of the knee, *Am. J. M. Sc.* 21:320, 1837.
2. Gibson, William: Operation for ankylosis of the knee, *Am. J. M. Sc.* 4:39, 1842.
3. Buck, Gordon: Resection of the knee, *Am. J. M. Sc.* 10:277, 1845.
4. Pearson: Pad for recurrent dislocation of the patella, *Lancet* 2:12, 1884.
5. Canton: Operation for recurrent dislocation of the patella, *Lancet*, March 24, 1860.
6. Roux: On slipping patella. See Goldthwait.
7. Appel: Report of 30 cases of congenital and recurrent displacement of the patella, *Munchen. med. Wchnschr.*, June 25, 1895.

\*See the separate communication by Dr. Teal in this volume.

8. Anderson, William: *Lancet*, October 7, 1892.
9. Pollard: Report of a case in which he did an osteotomy of the femur, *Lancet*, May 30, 1891.
10. McLaren, J. S.: *Ann. Surg.* 31:679, 1900.
11. Perkins, John W.: Complete dislocation of the patella reduced by arthrotomy after 6 years, *Ann. Surg.* 18:654, 1893.
12. Goldthwait, J. E.: *J. Am. Orthop. A.*, September, 1895.
13. Krogus: *Centralbl. f. Chir.* 31:254, 1904.
14. Heinrich, Paul: *Surg., Gynec. & Obst.* 9: 177, 1909.
15. Groves, E. W. Hey: *Lancet* 2:674, 1917.
16. Smith, S. A.: *Brit. J. Surg.* 6:176, 1918.
17. Edwards, A. H.: *Brit. J. Surg.* 8:266, 1920.
18. Soutter: *J.A.M.A.* 82:1261, 1924.
19. Mauck, H. P.: *J. Bone & Joint Surg.* 18: 984, 1936.
20. Hauser, E. D. W.: *Surg., Gynec. & Obst.* 66:199, 1938.
21. Steindler, A.: *Orthopedic Operations*, p. 448, Springfield, Ill., Thomas, 1940.
22. Campbell, Willis: *Operative Orthopedics*, p. 451, St. Louis, Mosby, 1939.

#### BIBLIOGRAPHY

- Bradford, E. H.: Slipping patella, *Boston M. J.* 134:1896.
- Hoffa: Habitual luxation of the patella, *Arch. f. klin. Chir.* 59:543, 1899.

## 2

# Sprains

GARRETT PIPKIN, M.D.\*

Scientifically, the subject of "sprains" is difficult to discuss, because such a diagnosis is no longer recognized. If one looks up "sprains" in the *Index Medicus*, one finds: "see individual joint, such as wrist, ankle"; subtitles read: "wounds and injuries of." In other words, there is no such thing pathologically as a sprain, and the scientists are insisting that the diagnosis be made more nearly accurate and they want the anatomic structure involved named specifically: e.g., a rupture of the deltoid ligament.

The average doctor and the laity are not concerned with scientific definitions and will continue to use the terms "strain" and "sprain" in spite of what the *Index Medicus* lists.

According to Blue Shield statistics for the Kansas City, Missouri, area, covering their fiscal year ending Dec. 31, 1952, the number of months of exposure to risk for all their members was 3,653,411. During this year they allowed payment for 114,698 claims. Included in this total were 1,486 sprains representing approximately a 1 per cent ratio. Their next largest allowance in their "Bone and Joint Classification" was for "Fracture of the Clavicle," which amounted to 257. "Colles' Fracture" was third, totaling 210 payments. The average of payments made to participating physicians covering sprains was \$5.33, to which must be added the overhead

for clerical processing. All sprains during the fiscal year of 1952 cost Blue Shield \$7,095.52. The cost to Blue Shield for 257 fractured clavicles was \$11,358.<sup>2</sup>

Insurance experts have pointed out that the individual would be financially ahead by assuming liability for sprains himself. They substantiate this statement with the following reasons: (1) that his recovery from Blue Shield is so small; and (2) that by eliminating the cost of processing these small claims, Blue Shield would be in a position to lower premiums.

Several of the major insurance companies in this area issue policies which include payment for sprains. They also state that they have trouble processing these claims for sprains, since there is such a wide variance in the reports made by the doctors covering these injuries. One large company here reports that they have processed a claim in excess of \$1,500 for which they received no diagnosis other than "sprain."

The purpose of the foregoing list of statistics has been to show that strains and sprains are a real problem to the insured (the injured person), to the doctor and to the insurance companies. Any attempt made to resolve these difficulties must include some analysis of the injuries that are usually diagnosed as "strains or sprains."

As late as 1930 acceptable medical terminology defined a sprain as: "a wrench or a strain resulting in stretching or laceration of the soft parts without external wound." The outcome of a "sprain" therefore depends

\*Attending Orthopedic Surgeon, Kansas City General Hospital and Kansas City St. Joseph Hospital; Associate Editor, *Missouri Medicine and Clinical Medicine*.



upon (1) anatomic structures involved and (2) treatment received.

Sprains may be divided into two large classes: (1) articular, or those affecting the joints themselves, and (2) muscular, concerned with overstretching, or dislocation of muscles and their tendons.

Articular sprains may be divided into (a) simple sprains and (b) complicated sprains. In the simplest form of sprain, that is technically described as a strain, the soft parts merely are stretched beyond their capacity, and there is supposedly no laceration. No swelling is to be found, and the symptoms are only those of pain and stiffness with some loss of function. In the more severe forms of simple sprains, in which there has been more or less tearing of ligamentous structures, swelling occurs. Swelling immediately after an injury is due to hemorrhage. Arteries as well as veins are torn and pour their contents into surrounding tissues. Swelling that occurs hours, or even days later, is due to serous effusion. Delayed swelling in a joint injury in itself produces further symptoms and prolongs recovery. It is not necessary, and proper early treatment can circumvent it. For emphasis then, joint injuries occur in which swelling is immediate, is generally extensive and is due to hemorrhage. In others, pain and limited function are immediate, and swelling is delayed for from 12 to 24 hours. In this period of grace something can be done to alleviate the occurrence of secondary effusion and to shorten greatly the period of convalescence, if not actually reduce the likelihood of some degree of permanent disability. Of this I shall talk later.

## BRIEF REGIONAL ANALYSES

The most common injury involving the fingers manifests itself in the form of traumatic arthritis with serous or sanguinous effusion. Such injuries are best treated by immobilization in a slightly flexed position for 7 to 10 days. Unfortunately, many patients have such injuries bound to a tongue-depressor blade. In healing, the extensor sleeve or lateral digital

hinges shorten and create a stiff finger, which at that point may require many months of further treatment in an effort to restore usefulness. One of my many aphorisms to residents is: "The tongue depressor blade is the commonest cause of stiff fingers."

It is indeed a sad commentary on the ability of the average doctor that the Army, during World War II, found it necessary to issue a directive to the effect that no hand or finger injuries were to be immobilized in the forward units. Apparently an injured finger is not of sufficiently great importance for doctors as a whole to concern themselves to acquire the art of proper immobilization, even though all standard textbooks devote considerable space to the discussion of the proper immobilization of the hand and fingers. Our favorite finger dressing is composed of two longitudinal strips of gauze bandage overlaid with several coatings of collodion. This forms a well-fitting bandage which protects the injured finger, while permitting full use of the hand. A similar dressing may be used for injured toes.

In regard to the wrist joint and the hand, one sees few injuries which could be classified as a sprain. Washerwoman's sprain (DeQuervain's Disease—chronic stenosing tendosynovitis) is a chronic constriction of the extensor tendon sheath of the thumb. The principal disability is inability to wring clothes. It is more prevalent in women; hence, the name. Local infiltration of 0.1 cc. of hydrocortisone into the sheath relieves the symptoms dramatically. It may even result in a cure, if the patient can be educated sufficiently to avoid all motions comparable with the one used in wringing clothes. If the doctor is not sufficiently expert with a hypodermic needle to locate the swollen extensor sheath easily, or if the patient is an oversensitive subject, usually the same result may be obtained by the oral administration of hydrocortisone. The usual oral treatment consists of 4 daily doses of 20 mg. of hydrocortisone for as short a period as 2 days, at which time the disability may have cleared up completely. This latter method is a much