

# YEAR BOOK<sup>®</sup>

## YEAR BOOK OF HAND SURGERY<sup>®</sup> 1992

*PETER C. AMADIO  
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1992

# The Year Book of HAND SURGERY®

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## Journals Represented

Mosby—Year Book subscribes to and surveys nearly 900 U.S. and foreign medical and allied health journals. From these journals, the Editors select the articles to be abstracted. Journals represented in this YEAR BOOK are listed below.

Acta Orthopaedica Scandinavica  
Acta Radiologica  
American Journal of Emergency Medicine  
American Journal of Epidemiology  
American Journal of Public Health  
American Journal of Sports Medicine  
Annales de Chirurgie de la Main  
Annales de Chirurgie de la Main et du Membre Superieur  
Annals of Hand Surgery  
Annals of Plastic Surgery  
Annals of Vascular Surgery  
Archives of Internal Medicine  
Archives of Orthopaedic and Trauma Surgery  
Archives of Physical Medicine and Rehabilitation  
Brain—Journal of Neurology  
British Journal of Industrial Medicine  
British Journal of Plastic Surgery  
British Journal of Sports Medicine  
Burns  
Cancer  
Clinical Orthopaedics and Related Research  
Clinical and Experimental Dermatology  
Contemporary Orthopaedics  
Handchirurgie, Mikrochirurgie, Plastische Chirurgie  
International Journal of Epidemiology  
Italian Journal of Orthopaedics and Traumatology  
Journal de Chirurgie  
Journal of Biomechanics  
Journal of Bone and Joint Surgery (American Volume)  
Journal of Bone and Joint Surgery (British Volume)  
Journal of Hand Surgery (American)  
Journal of Hand Surgery (British)  
Journal of Hand Therapy  
Journal of Neurophysiology  
Journal of Occupational Medicine  
Journal of Oral and Maxillofacial Surgery  
Journal of Orthopaedic Research  
Journal of Orthopaedic Trauma  
Journal of Pediatric Orthopedics  
Journal of Reconstructive Microsurgery  
Journal of Rehabilitation Research and Development  
Journal of Rheumatology  
Journal of Surgical Research  
Journal of Trauma  
Journal of the Royal College of Surgeons of Edinburgh  
Medicine du Sport  
Medical Problems of Performing Artists  
Microsurgery

Movement Disorders  
Muscle and Nerve  
Neurosurgery  
Occupational Therapy Journal of Research  
Orthopaedic Review  
Plastic and Reconstructive Surgery  
Proceedings of the National Academy of Sciences  
ROFO: Fortschritte Auf Dem Gebiete Der Rontgenstrahlen Und Der  
Nuklearmedizin  
Radiology  
Revue de Chirurgie Orthopedique  
Scandinavian Journal of Plastic and Reconstructive Surgery and Hand Surgery  
Scandinavian Journal of Rehabilitation Medicine  
Scandinavian Journal of Work, Environment and Health  
Schweizerische Medizinische Wochenschrift  
Semaine des Hopitaux  
Skeletal Radiology  
Southern Medical Journal  
Surgery

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**STANDARD ABBREVIATIONS**

The following terms are abbreviated in this edition: acquired immunodeficiency syndrome (AIDS), central nervous system (CNS), cerebrospinal fluid (CSF), computed tomography (CT), electrocardiography (ECG), human immunodeficiency virus (HIV), and magnetic resonance (MR) imaging (MRI).

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## Publisher's Preface

As publishers, we feel challenged to seek ways of presenting complex information in a clear and readable manner. To this end, the 1992 YEAR BOOK OF HAND SURGERY now provides structured abstracts in which the various components of a study can easily be identified through headings. These headings are not the same in all abstracts, but rather are those which most accurately designate the content of each particular journal article. We are confident that our readers will find the information contained in our abstracts to be more accessible than ever before. We welcome your comments.

Peter C. Amadio, M.D.

# Introduction

Vincent R. Hentz and I assume editorship of the YEAR BOOK OF HAND SURGERY with this 8th annual volume. No major changes are anticipated; the successful format established by Jim Dobyns and Bob Chase will be our template, at least for the near future. As in past editions, we rely heavily on a diverse board of contributing editors. Orthopedists, plastic surgeons, dermatologists, neurologists, radiologists, physiatrists, and hand therapists all have something to contribute. This 1992 edition also introduces an international flavor, with commentaries from Canada and Germany. In the future, we hope to expand our global network even further. Foreign language literature now covered includes French, German, Italian, and Spanish; we hope to add Japanese soon, to capture that large literature source. As always, our goal is to present the best of the world's literature, enriched by expert commentary. We hope that this effort meets with your satisfaction.

Peter C. Amadio, M.D.



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# Table of Contents

The material covered in this volume represents literature reviewed through March 1991.

Journals Represented . . . . .	xiii
Publisher's Preface . . . . .	xv
Introduction . . . . .	xvii
1. ANATOMY AND BIOMECHANICS . . . . .	1
2. DIAGNOSIS AND EVALUATION . . . . .	19
3. SKELETAL TRAUMA AND RECONSTRUCTION . . . . .	25
4. SOFT TISSUE . . . . .	39
5. VASCULAR . . . . .	59
6. TENDON TRAUMA AND RECONSTRUCTION . . . . .	65
7. NERVE TRAUMA AND RECONSTRUCTION . . . . .	87
8. COMPRESSION NEUROPATHY . . . . .	93
9. WRIST . . . . .	115
Complications . . . . .	115
Treatment . . . . .	129
Anatomy . . . . .	170
Research . . . . .	181
10. ELBOW . . . . .	193
11. NEUROMUSCULAR DISORDERS . . . . .	203
12. OCCUPATIONAL AND AVOCATIONAL STRESS . . . . .	223
13. STENOSING TENOSYNOVITIS . . . . .	239
14. ARTHRITIS . . . . .	247
15. INFECTIONS . . . . .	265
16. TUMORS . . . . .	269
17. CONGENITAL AND PEDIATRIC PROBLEMS . . . . .	281
18. REHABILITATION . . . . .	293
19. MICROSURGERY . . . . .	297
20. RESEARCH . . . . .	313
SUBJECT INDEX . . . . .	333
AUTHOR INDEX . . . . .	347

# 1 Anatomy and Biomechanics

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## Postnatal Growth and Development of the Flexor Tendon Pulley System

Flake J, Light TR, Ogden JA (Univ of Minnesota Hosp, Minneapolis; Loyola Univ, Chicago; Shriners Hosp for Crippled Children, Tampa, Fla)

*J Pediatr Orthop* 10:612-617, 1990

1-1

**Background.**—The flexor tendon pulley system in adults has been well described, but no comparable information on the skeletally immature hand is available. The number of annular and cruciform pulleys in the child's hand and the anatomic relationships of the annular pulleys to the skeletal components and to superficial hand structures during postnatal growth were determined.

**Methods.**—Twenty-one pairs of cadaveric hands were available for analysis. The chronologic age of the cadavers ranged from full-term newborn to 15 years. None of the specimens had external evidence of congenital deformity or trauma. On the basis of size and osseous development, 3 hands were believed to be growth retarded. The flexor tendon pulley system was examined by dissection, observation, direct measurement, and radiographic evaluation.

**Results.**—As in the adult, the child's finger contains 5 annular and 3 cruciate pulleys. Two annular pulleys and 1 cruciform pulley were defined consistently in the thumb. The fifth annular pulley, not observed in some previous studies, was detected with magnification dissection techniques. The pulley system was evident at birth and did not change appreciably during skeletal maturation. The attachment of pulleys to bone allows longitudinal physal growth without the need to significantly alter either the size or shape of a given pulley (Fig 1-1). Three hands classified as growth retarded showed mild abnormalities in the location of pulleys.

**Conclusion.**—The pulley system of the flexor tendon sheath in the child resembles that of the normal adult pattern and grows in an orderly, proportionate manner. The data on normal hands may aid in the diagnosis and treatment of children with congenitally malformed or growth-retarded hands.

► This interesting article helps in 2 ways. First, it shows that pulley anatomy changes very little with development. Human pulleys do not thicken and mature as we age, suggesting that there is not a qualitative difference in hand function in utero and postnatally. In both, the hands are used for grasping and not for weight-bearing stress. Distinction can clearly be drawn here between human beings and, for example, dogs, where there is a qualitative difference in

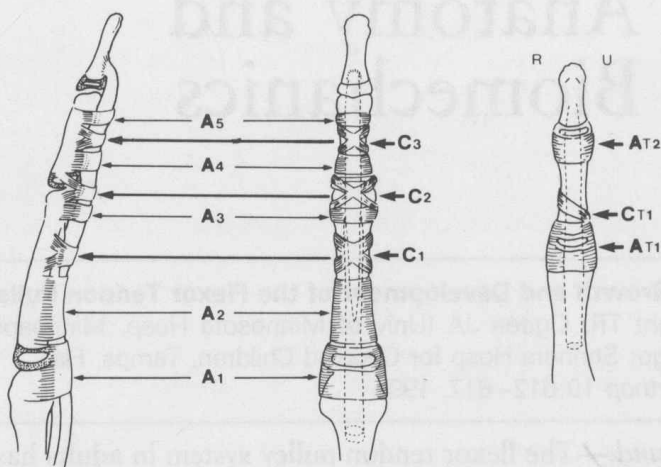


Fig 1-1.—Schematic of the relationships of tendon sheath pulleys to the physes and joints.  $A_1$  through  $A_5$ , annular pulleys 1-5;  $C_1$  through  $C_3$ , cruciform pulleys 1-3. (Courtesy of Flake J, Light TR, Ogden JA: *J Pediatr Orthop* 10:612-617, 1990.)

the anatomy of tendon and pulley systems with development. This represents a switch from non-weight-bearing to weight-bearing existence through life ex utero.

The second point to be made is the relationship of the pulleys to growth plates. Interestingly, the  $A_1$  and  $A_3$  pulleys insert at least partially on epiphyses. Unlike collateral ligaments, which do cross epiphyses, pulleys would not be expected to be injured in an epiphyseal fracture of the proximal or middle phalanges.—P.C. Amadio, M.D.

### The Nerve of Henlé

McCabe SJ, Kleinert JM (Christone M Kleinert Inst for Hand and Micro Surgery, Louisville, Ky)

*J Hand Surg* 15-A:784-788, 1990

1-2

**Background.**—The nerve of Henlé is a branch of the ulnar nerve that provides sympathetic innervation to the ulnar artery. To define the anatomical relationships of the nerve of Henlé, 40 cadaveric forearms were dissected under magnification.

**Findings.**—The nerve of Henlé was observed in 23 of the 40 extremities. Of these, 18 exhibited a typical pattern, with the nerve originating 16 cm proximal to the ulnar styloid, traveling distally with the ulnar artery. In 13 (72%), the nerve branched to pierce the superficial fascia 6 cm proximal to the ulnar styloid to innervate the skin of the distal ulnar forearm (Fig 1-2). The other 5 extremities exhibited an atypical pattern, with the nerve originating in the distal forearm about 8 cm proximal to the ulnar styloid and traveling briefly with the ulnar artery before branching to the skin. None of the 40 forearms had separate palmar cutaneous branches of the ulnar nerve.

**Conclusions.**—The branch of the ulnar nerve traveling with the ulnar

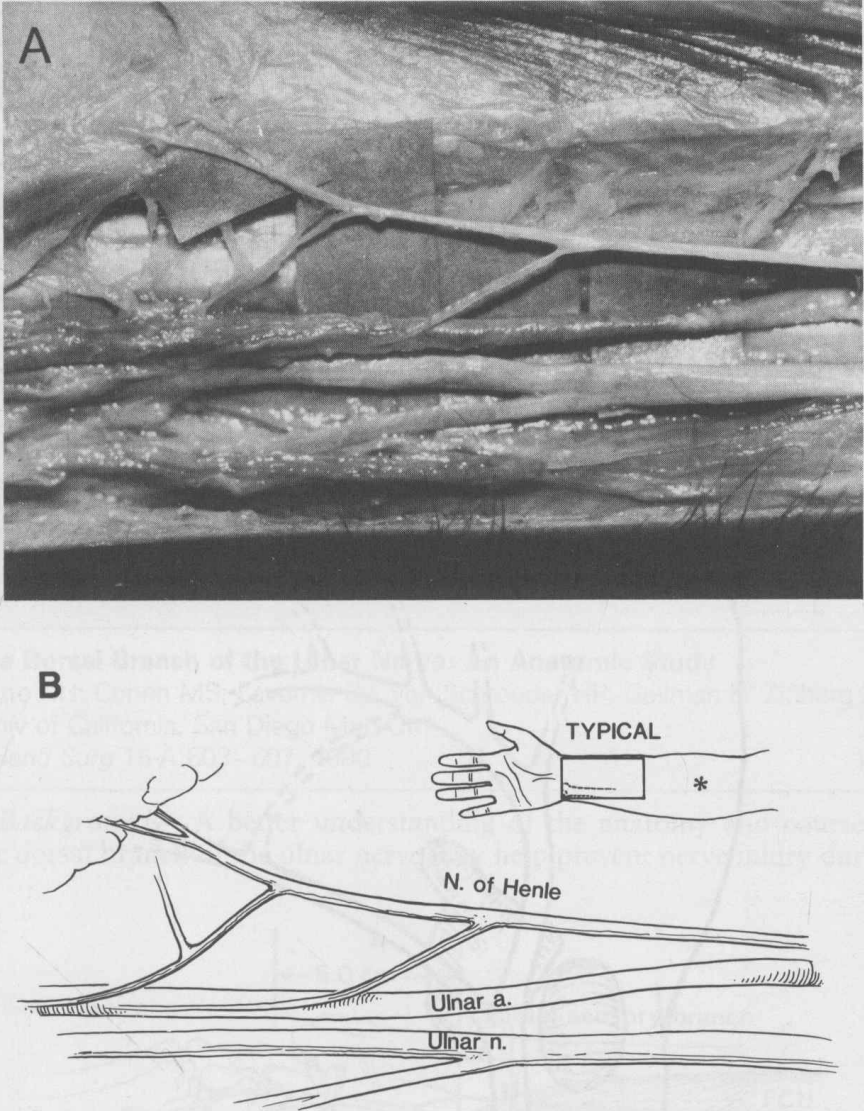


Fig 1-2.—A, dissection of the distal forearm of a cadaver with the typical nerve of Henlé. B, illustration indicating location of dissection and labeling salient anatomic structures. N., nerve; a., artery; n., nerve. (Courtesy of McCabe SJ, Kleinert JM: *J Hand Surg* 15-A:784–788, 1990.)

artery should be called the nerve of Henlé and should be referred to as typical (proximal) or atypical (distal), based on its origin. The clinical implications of this nerve need to be examined.

► This dissection of 40 upper extremities provides valuable observations that clarify the anatomic relationships between the ulnar nerve, its branches, and the ulnar artery. The nerve of Henlé is anatomically positioned to be either sensory or sympathetic or both. Its precise role in forearm and hand innervation needs additional histological and ultrastructural investigation. Only then will we know whether surgical manipulation of this notable nerve has the potential to