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YEAR BOOK OF HAND SURGERY® 1989

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The Year Book of HAND SURGERY®

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1989
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Journals Represented

Year Book Medical Publishers subscribes to and surveys more than 700 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 Physiologica Scandinavica
Acta Psychiatrica Scandinavica
Advances in External Control of Human Extremities
Age and Ageing
American Journal of Medicine
American Journal of Roentgenology
American Journal of Sports Medicine
Annales de Chirurgie de la Main
Annales de Chirurgie Plastique et Esthetique
Annals of Emergency Medicine
Annals of Plastic Surgery
Annals of Surgery
Archives of Neurology
Archives of Orthopedic and Traumatic Surgery
British Journal of Plastic Surgery
British Journal of Surgery
Burns
Canadian Journal of Surgery
Chinese Medical Journal
Clinical Orthopaedics and Related Research
Clinical Pediatrics
Clinical Pharmacology and Therapeutics
European Journal of Plastic Surgery
European Journal of Radiology
Experimental Neurology
French Journal of Orthopaedic Surgery
Handchirurgie, Mikrochirurgie, Plastische Chirurgie
IEEE Transactions on Biomedical Engineering
Injury
International Journal of Dermatology
International Orthopaedics
Journal of Biomedical Engineering
Journal of Bone and Joint Surgery (American vol.)
Journal of Bone and Joint Surgery (British vol.)
Journal de Chirurgie
Journal of Hand Surgery (American)
Journal of Hand Surgery (British)
Journal of Neurology, Neurosurgery and Psychiatry
Journal of Occupational Medicine
Journal of Orthopaedic Research
Journal of Orthopaedic Trauma
Journal of Pediatric Orthopedics
Journal of Rheumatology
Journal of Surgical Research
Journal of Trauma
Journal of Vascular Surgery
Medical and Biological Engineering and Computing

Introduction

It is hard to believe that with this edition the YEAR BOOK OF HAND SURGERY reaches the half decade mark. Writing this introduction provides me the welcome opportunity to recognize, on my own behalf and that of the readership, the seminal and continuing capital role played by James H. Dobyns, whose effort and perseverance have made the YEAR BOOK a dynamic and quality publication. The indefatigable Peter Amadio, who became an assistant editor last year, has expended enormous effort in helping to sift through the literature and seeking out appropriate reviewers. Both Jim and Peter deserve our thanks and appreciation.

Jim, Peter, and I would also like to thank all those who have contributed editorial commentary to this edition of the YEAR BOOK. We are very pleased that our base of contributors now spans the continental United States to include editors from the State University of New York at Buffalo, the University of Cincinnati, Wake Forest University, Harvard, and the University of California at Davis in addition to our regular contributors from Stanford University and the Mayo Clinic.

With this issue the YEAR BOOK reaches established maturity but by no means its full potential. Suggestions from the readership are always welcome as this publication undergoes incremental progression in comprehensiveness and quality. Please feel free to address your comments to us in care of Year Book Medical Publishers, 200 North LaSalle, Chicago, IL 60601. The responses from our many reviewers are heartening and renew my deeply held feeling that as physicians/surgeons we truly are professionals.

The readership continues to expand apace, particularly on the international front. This issue reflects the growing number of notable publications on the elbow and shoulder, and the continuing flood of microsurgery papers. In next year's issue it is likely that continuing advances resulting from microsurgical techniques will be recognized by expansion of that section. Anatomical studies relevant to hand surgery continue to hold their own in the literature pool and, therefore, in the YEAR BOOK.

We look forward to the second half of the first decade of publication of the YEAR BOOK OF HAND SURGERY.

Robert A. Chase, M.D.

Table of Contents

The material covered in this volume represents literature reviewed through March 1988.

1 Anatomy and Biomechanics

Anatomy

Development of the Olecranon Bursa: An Anatomic Cadaver Study
Chen J, Alk D, Eventov I, Wientroub S (Tel-Aviv Univ, Tel-Aviv, Israel)
Acta Orthop Scand 58:408–409, August 1987 1–1

Septic and nonseptic bursitis in adults is often associated with occupational or sports trauma or systemic conditions. Septic bursitis in children has been described as occurring mainly in superficial bursae; however, only 1 case of septic olecranon bursitis in a child has been reported. The authors conducted an anatomical study to determine whether the incidental disparity of bursitis between children and adults might be explained by anatomical differences.

Both elbows in each of 63 cadavers were dissected. The cadavers were either stillborn infants or traffic accident victims without signs of trauma to the elbows. Bursa volume was determined by syringes used for methylene blue injections. There were no olecranon bursae in children younger than 7 years. The volume of the bursae increased with age, ranging from 3 to 580 μl in patients aged 10–15 years; from 3 to 450 μl in patients aged 15–20 years; and from 663 to 9,500 μl in patients aged 50–80 years. In all age groups, the bursae were larger on 1 side, a difference that increased with age. The bursae were usually larger on the right, or commonly dominant, side.

▶ This study confirms the notion that the body has the propensity to develop a bursa wherever a rigid skeletal part is repeatedly and chronically subjected to shearing forces in the overlying soft tissues. Ischial tuberosities, prepatellar areas, and amputation stumps like the olecranon process are such sites. Absent such chronic trauma there will probably be no bursa, thus the absence in very young children.—R.A. Chase, M.D.

Investigations of the Clinical Anatomy of the Carpal Tunnel of the Human Hand
Schmidt H-M, Moser T, Lucas D (Univ of Würzburg; Aschaffenburg City Hosp, Aschaffenburg, West Germany)
Handchir Mikrochir Plast Chir, 19:145–152, May 1987 1–2

The authors performed an anatomical study of cadaver hands to examine the anatomy of the carpal tunnel in detail. The study material consisted of 31 right hands and 29 left hands obtained from adult cadavers aged 42–96 years. All hands were also examined by computed tomography and magnetic resonance tomography.

For each hand, the length of the flexor retinaculum was determined at its proximal and distal ends. The width of the flexor retinaculum was measured at 3 points: the ulnar side, the middle, and the radial side. The thickness of the flexor retinaculum was determined by measuring the diameter of cross sections at proximal, middle, and distal points. The length, width, and thickness data of the flexor retinaculum were used to calculate the size of the carpal tunnel.

Analysis of the data showed that the narrowest section of the carpal tunnel is in the middle region. As the median nerve increases in width while passing from the proximal end to the distal end of the carpal tunnel, its thickness decreases.

After opening the carpal tunnel, the position and course of the median nerve could be studied. In 66.7% of the study sample, the median nerve ran straight under the flexor retinaculum to the palm of the hand; in the other 33.3%, the nerve ran in a radial (21.6%) or ulnar (11.7%) direction. The median nerve ran radially through the middle section of the carpal tunnel to the palmar side in 43.3% of the study sample, was located exactly under the middle of the flexor retinaculum in 21.7%, and had shifted to the ulnar side in only 1.7% of the study sample. The remaining hands had winding patterns. These findings should contribute to a better understanding of carpal tunnel nerve compression.

▶ Debates concerning the geometry of the carpal tunnel and the usual as well as varying relationships of the median nerve within the tunnel will be enhanced and more legitimate as a result of this detailed study. Carpal tunnel watchers should intellectually digest the whole paper.—R.A. Chase, M.D.

Tendons: High-Field-Strength, Surface Coil MR Imaging

Beltran J, Noto AM, Herman LJ, Lubbers LM (Ohio State Univ; Riverside Methodist Hosp, Columbus, Ohio)

Radiology 162:735–740, March 1987 1–3

High-field-strength magnetic resonance (MR) now allows imaging of small structures in dramatic detail using surface coils and reduced fields of view. Small size, lack of inherent motion, and areas of interest close to the surface make the extremities ideally suited for surface coil imaging. Tendons in particular are well visualized because their low water content makes them appear black against the high-signal surrounding fat. An evaluation was made of suspected tendon pathology in 11 patients (6 hands, 5 ankles or feet) in addition to study of animals, cadavers, and healthy volunteers.

In 4 cases, postsurgical scarring was seen as an irregularity of the tendon surface associated with loss of the normal surrounding fat; 1 case also showed thinning of the tendon (Fig 1–1). There was 1 case of postsurgical rerupture, identified by a gap within the tendon. Two patients showed acute inflammatory changes. One was a diabetic man with signs

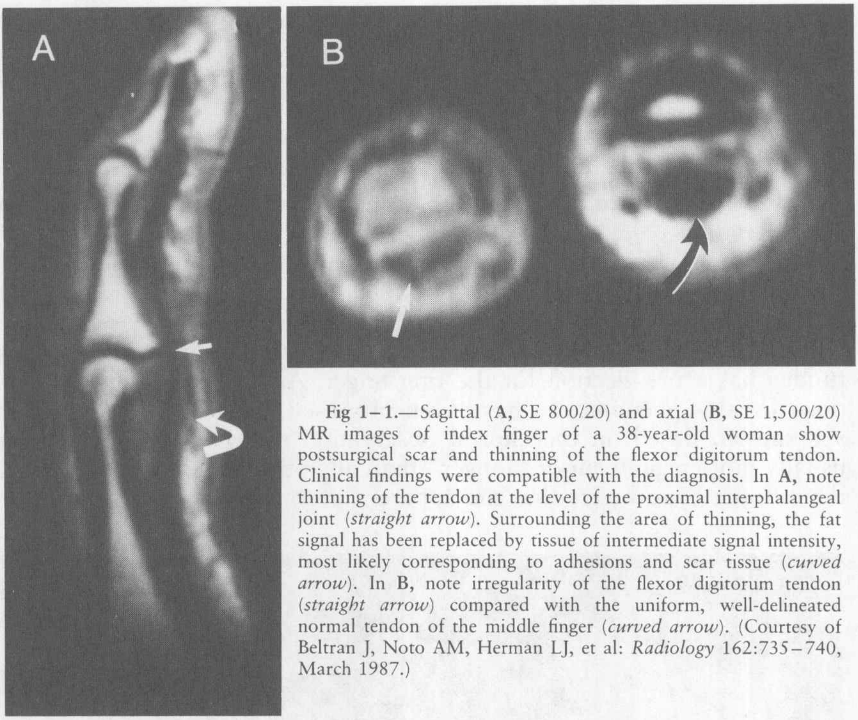

Fig 1–1.—Sagittal (**A**, SE 800/20) and axial (**B**, SE 1,500/20) MR images of index finger of a 38-year-old woman show postsurgical scar and thinning of the flexor digitorum tendon. Clinical findings were compatible with the diagnosis. In **A**, note thinning of the tendon at the level of the proximal interphalangeal joint (*straight arrow*). Surrounding the area of thinning, the fat signal has been replaced by tissue of intermediate signal intensity, most likely corresponding to adhesions and scar tissue (*curved arrow*). In **B**, note irregularity of the flexor digitorum tendon (*straight arrow*) compared with the uniform, well-delineated normal tendon of the middle finger (*curved arrow*). (Courtesy of Beltran J, Noto AM, Herman LJ, et al: *Radiology* 162:735–740, March 1987.)

of soft tissue infection and osteomyelitis following transmetatarsal amputation. Areas of high signal intensity compatible with fluid distending the tendon sheaths, along with fluid in the tibiotalar joint, were demonstrated by MR imaging. Purulent fluid was obtained on needle aspiration of 2 small fluid collections seen in the anterior aspect of the ankle, compressing the tibialis anterior tendon, while joint-space and tendon-sheath aspiration produced clear fluid.

The MR imaging in the other case of acute inflammation (index finger of a 2-year-old girl) revealed distention in the flexor tendon sheaths and effusion in the proximal interphalangeal joint. Tendon thickening, interpreted as chronic tendinitis, accompanied by a central line of increased signal intensity possibly representing a chronic longitudinal incomplete tear, was seen in a female runner. Fraying and irregularity of the broken ends were seen in 2 cases of tendon rupture—1 of the flexor hallucis longus and 1 of the calcaneal tendon. Low signal intensity in surrounding soft tissue was attributed to acute hematoma.

Improved soft tissue contrast and resolution in surface-coil MR imaging represent significant advantages over computerized tomography and ultrasonography in evaluating tendon abnormalities. The principal drawbacks are the procedure's expense and limited availability.

▶ The authors accurately describe the value of surface coil MR imaging in the extremities. Its value for identification and determination of the extent of pathologic involvement is clear.

One problem—positioning of coils for upper extremity imaging—was not addressed. Unless off-axis, small field of view is available, it can be difficult to image the upper extremity. This problem is currently being addressed in new software developments.—R.A. Chase, M.D.

Avulsion of the Flexor Digitorum Profundus: Anatomic and Biomechanical Considerations

Bynum DK Jr, Gilbert JA (Univ of North Carolina School of Medicine)
J Hand Surg [Am] 13A:222–227, March 1988 1–4

Previous studies have shown that avulsion of the flexor digitorum profundus has a predilection for the ring finger. Although several explanations for this phenomenon have been proposed, the exact reason is not yet known. Based on the clinical observation that the ring fingertip is usually more prominent or "longer" than any other fingertip during grip, the authors hypothesize that the apparent prominence of the ring finger

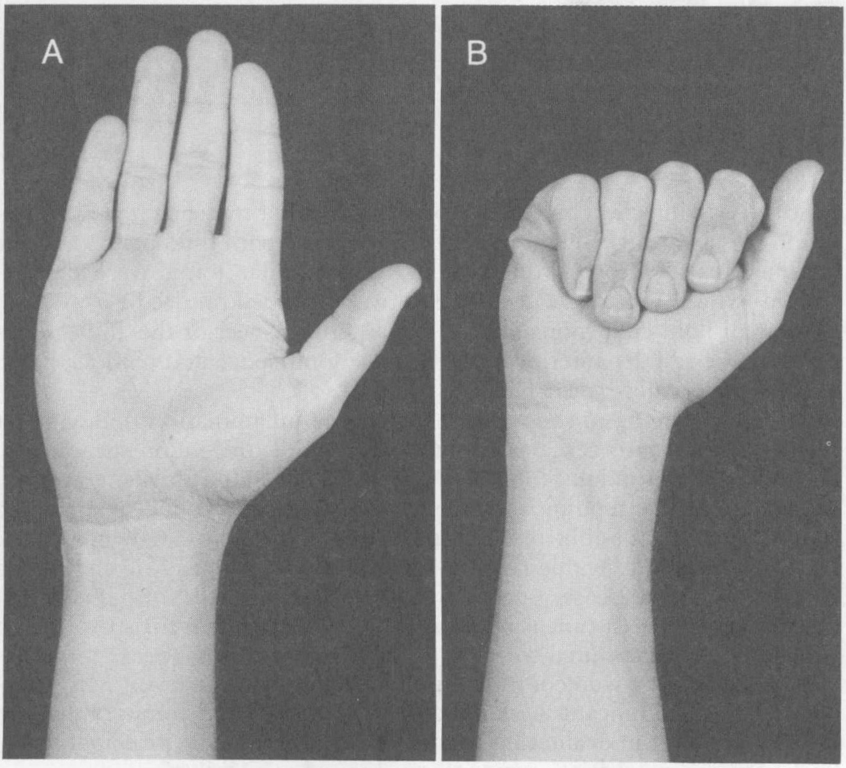

Fig 1–2.—The distance between the tips of the ring and long fingers were measured in full extension (**A**) and in profundus-minus grip (**B**). In profundus-minus grip, the ring finger was "longer" in 90% of subjects and was equal to or greater than 5 mm "longer" in 50%. (Courtesy of Bynum DK Jr, Gilbert JA: *J Hand Surg [Am]* 13A:222–227, March 1988.)

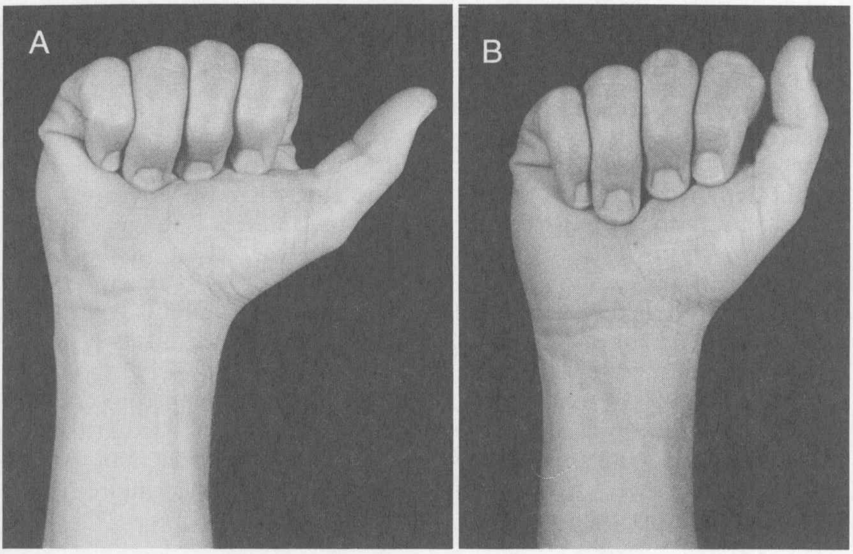

Fig 1–3.—The most prominent fingertip in both tight grip (A) and loose grip (B) is the ring fingertip. (Courtesy of Bynum DK Jr, Gilbert JA: *J Hand Surg* [*Am*] 13A:222–227, March 1988.)

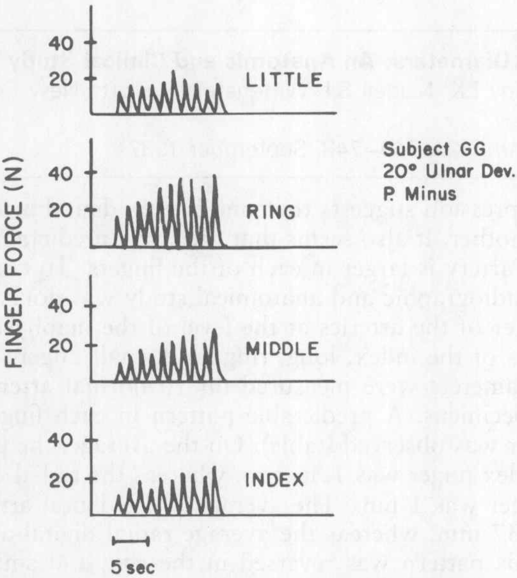

Fig 1–4.—A representative test sequence of 10 pulls in rapid succession. Two such series were averaged for each test position in each subject. (Courtesy of Bynum DK Jr, Gilbert J: *J Hand Surg* [*Am*] 13A:222–227, March 1988.)