YEAR BOOK®

YEAR BOOK OF PODIATRIC MEDICINE AND SURGERY® 1989

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The Year Book of PODIATRIC MEDICINE AND SURGERY®

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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 Radiologica
American Family Physician
American Journal of Medicine
American Journal of Roentgenology
American Journal of Sports Medicine
American Journal of Surgical Pathology
Annals of Emergency Medicine
Annals of Rheumatic Diseases
Archives of Dermatology
Archives of Orthopedic and Traumatic Surgery
Archives of Physical Medicine and Rehabilitation
Arthritis and Rheumatism
Athletic Training
British Journal of Dermatology
British Journal of Radioloy
British Journal of Sports Medicine
Cancer
Chiropodist
Contemporary Orthopedics
CRC Critical Reviews in Biomedical Engineering
Current Orthopaedics
Current Podiatric Medicine
Danish Medical Bulletin
Developmental Medicine and Child Neurology
European Journal of Plastic Surgery
Foot and Ankle
Heart and Lung
Injury
International Orthopaedics
Italian Journal of Orthopedics and Traumatology
Journal of the American Medical Association
Journal of the American Podiatric Association
Journal of Biomedical Engineering
Journal of Bone and Joint Surgery (American volume)
Journal of Bone and Joint Surgery (British volume)
Journal of Dermatologic Surgery and Oncology
Journal of Foot Surgery
Journal of Neurology, Neurosurgery and Psychiatry
Journal of Neurophysiology
Journal of Orthopaedic Research
Journal of Orthopaedic and Sports Physical Therapy
Journal of Pediatric Orthopedics
Journal of Pediatrics
Journal of Reconstructive Microsurgery
Journal of Rheumatology
Journal of the Royal College of General Practitioners
Journal of the Royal College of Surgeons of Edinburgh

Journal of Trauma
Journal of Vascular Surgery
Leprosy Review
Orthopaedic Review
Orthopedics
Orthotics and Prosthetics
Pain
Pediatrics Infectious Disease
Physical Therapy Journal
Physician and Sportsmedicine
Plastic and Reconstructive Surgery
Postgraduate Medicine
Postgraduate Radiology
Prosthetics and Orthotics International
Psychosomatic Medicine
Radiology
S Afr Med J
Scandinavian Journal of Primary Health Care
Seminars in Nuclear Medicine
VASA: Zeitschrift fur Grefasskrankheiten

Introduction

The YEAR BOOK OF PODIATRIC MEDICINE AND SURGERY has grown over the past 5 years to the point where it is the standard reference for the latest literature pertaining to the foot and ankle. This 1989 YEAR BOOK is no different in providing those professionals dealing with the foot and ankle with abstracts and editorial comments on more than 200 articles. The articles selected are superlative and the comments are from the experts.

The style of the YEAR BOOK OF PODIATRIC MEDICINE AND SURGERY enables the reader to review new literature quickly and at the same time read a challenging and thought-provoking comment. The purpose of both is an increase in quality with regard to the treatment of foot and ankle disorders.

Richard M. Jay, D.P.M.

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

1 Pediatrics

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Orthopaedic Out-Patient Care for Children of Pre-School Age
Widhe T (Huddinge Univ, Huddinge, Sweden)
Scand J Prim Health Care 6:99–103, 1988 1–1

Number of Children Referred in Each Age Group With Hip Disorders, Foot Deformities, and Other Anomalies

	Age at referral (months)									
	<1	1–2	3–5	6–11	12–23	24–35	36–47	48–59	60–71	Total
Hip	83	41	30	17	9	1	2	2	4	189
Foot	12	5	19	26	30	28	14	23	11	168
Other	4	2	4	4	29	17	17	21	11	109
Total	99	48	53	47	68	46	33	46	26	466

(Courtesy of Widhe T: *Scand J Prim Health Care* 6:99–103, 1988.)

An attempt was made to learn why preschool children are referred to orthopedic surgeons and to determine the degree to which referring physicians' assessments were consistent with those of the surgeon. The study group of 466 patients comprised 11.5% of children aged 6 years and younger who were referred to an orthopedic clinic. Trauma patients were excluded. About one fourth of children were referred from obstetric services and about two thirds from children's health centers. Two thirds of the children made more than 1 visit.

Hip disorders accounted for 40% of the referrals, foot conditions for 36%, and gait disorders for 17%. Hip disorders predominated before age 6 months, and foot deformity afterward (table). Of 83 infants seen before age 1 month for congenital hip dysplasia, 54 were treated. The diagnosis was confirmed in only 3 of 90 children older than age 1 month. Inserts or orthoses were prescribed for 25% of 80 children referred for pes adductus and for 31% of 65 referred for pes planus.

The findings on orthopedic assessment often disagreed with the impression of the referring physician. When, however, the assessments agreed, the referring physician often used more precise descriptive language than the orthopedic surgeon.

▶ This article demonstrates the need for early detection of orthopedic abnormalities. More interesting is that foot deformities were the greatest reason for referrals of pediatric patients from other practitioners to the orthopedists. I hope our profession takes heed that there are many children in the United States who need early intervention and treatment. We should not ignore the young developing foot and should take the initiative to secure these referrals and follow with *early intervention.*— R.M. Jay, D.P.M.

Pediatric Treatment Modalities of the Lower Extremity

Valmassy RL, Lipe L, Falconer R (California College of Podiatric Medicine, San Francisco)

J Am Podiatr Med Assoc 78:69–80, February 1988 1–2

In correcting problems of the lower extremity in children, bars and splints are used to modify positional and torsional abnormalities or to maintain correction after serial plaster immobilization. It is best not to attempt to correct an entire deformity at once, but to allow the body to adapt gradually to the corrected position. These devices are intended for use by children aged 3 months to 5 years, usually during naps or sleep at night.

The Denis Browne splint was first described for the treatment of congenital talipes equinovarus. The Fillauer bar is a modified Denis Browne bar that simplifies shoe application. The Uni-Bar is another modification that permits easy fitting and adjustment of the bar to the patient. The Ganley splint is used to treat internal or external femoral position; internal, low, or external malleolar position; metatarsus adductus; calcaneovalgus; and flexible pes planus. It also is used in talipes equinovarus.

The Pediatric Rotational System is used to correct femoral and maleolar torsional problems. Various in-toe and out-toe disorders in infants are managed with the Langer Pediatric Counter Rotational System. The Friedman counter splint is a device used to treat internal femoral position that produces an in-toed gait. As an adjunct to serial plaster immobilization, the Stevens metatarsal abduction splint is intended to treat metatarsus adductus deformities in children.

Properly fitted shoes serve a protective function and should be worn when the child starts to walk. A rigid shank provides support and allows the foot to act as a propulsive lever.

▶ This is a nice review article of some up-to-date devices and some out-of-date devices. I am not an advocate of using any of these systems as the primary treatment for a certain etiology. The etiology of the deformity must be approached directly. The correction needed to reduce the deformity will not be made by these devices; rather, these devices will maintain the correction that has been obtained by addressing the deformity.

For example, calcaneovalgus in a child aged 6 months will be reduced by serial casting (correction obtained). Correction will then be maintained by a Ganley splint or Bebax. Shoes cannot hold a foot with the precision of a cast.—R.M. Jay, D.P.M.

Occult Fractures in Preschool Children

Oudjhane K, Newman B, Oh KS, Young LW, Girdany BR (Univ of Pittsburgh)

J Trauma 28:858–860, June 1988 1–3

The occurrence of occult fractures was studied in 500 consecutive children younger than age 5 years who had radiography after presenting with an acute limp of unknown origin. Birth trauma and proved child abuse were excluded.

Most of the 100 children with fractures were aged 1 to 2 years. The tibia or fibula was injured in 56 patients, and 30 patients had femoral fractures. Eleven patients had metatarsal fractures and 1 had a calcaneal fracture. In the tibia, the distal metaphysis was most often injured, followed by the proximal metaphysis. The fibula was most often fractured at its distal metaphysis. Two thirds of infants younger than age 1 year with fractures had femoral injuries, and the distal metaphysis was the most common site of fracture. Nine metatarsal fractures involved the first metatarsal. These injuries predominated at the time of early ambulation. Two patients had incomplete fractures of the pubic ramus.

The incidence of fracture probably would have been higher if bone scanning had been used to detect injuries not evident on plain radiographs. When occult trauma is suspected but the exact site of injury is not apparent clinically, the pelvis and entire lower extremities, including the metatarsals, should be radiographed.

▶ Complete radiographs are to be taken from toes to hip to rule out fractures in a child who rapidly starts to limp. Bone scans should also be included in this study. Early childhood fractures may not be absolutely visible on conventional radiographs, and a bone scan can also help rule out suspected osteomyelitis.— R.M. Jay, D.P.M.

Orientation of the First Metatarsal Base Wedge Osteotomy: Perpendicular to the Metatarsal Versus Weight-Bearing Surface

Palladino SJ (California College of Podiatric Medicine, San Francisco)

J Foot Surg 27:294–297, July–August 1988 1–4

Sound theoretical reasoning has led to proposed changes in the orientation of the first metatarsal base closing abductory wedge osteotomy. The newer proposed method, which involves an orientation of the osteotomy perpendicular to the weight-bearing surface, produces only pure transverse plane motion and no loss of ground contact by hinge axis mechanisms. The traditional osteotomy orientation, perpendicular to the long axis of the metatarsal, produces extraneous frontal plane motion that results in loss of ground contact as the osteotomy site is closed. A mathematical model was developed to calculate the amount of loss of ground contact produced by the traditional orientation.

A trigonometric model of a closing abductory base wedge osteotomy done perpendicular to the long axis of the first metatarsal was developed, and 168 calculations were made. The range of ground contact loss attributed to the placement of the osteotomy perpendicular to the long axis of the metatarsal extended from 0.0021 to 0.6899 mm. The frequency of outcomes for ground contact loss produced by the 168 calculations was determined. One hundred of the 168 calculations made yielded a ground contact loss of less than 0.1 mm. These values suggest much less clinical significance to the change than implied or stated previously.

▶ The author makes "much ado about nothing." It *is* and *was* obvious that a transverse plane reduction in the intermetatarsal angle occurs when the cut is made perpendicular to the weight-bearing surface. However, this article is nicely presented. Caution must be taken not to ignore the length of the second metatarsal as it relates to the length of the first ray. Keeping this in mind, one can more accurately address the first ray. The first ray can be slightly dorsiflexed, plantarflexed, or kept on the same plane by adjusting the base cut to ground angle.— R.M. Jay, D.P.M.

Freiberg's Disease: A Suggested Pattern of Management
Helal B, Gibb P (London Hosp Royal Natl Orthopaedic Hosp, London)
Foot Ankle 8:94–102, October 1987 1–5

Freiberg's infraction of metatarsal head is a disease of the second or third metatarsal bone with thickening of its shaft and changes about its articular head. The disorder, which is thought to result from a dorsal trabecular stress injury of the metatarsal head, is characterized by pain in the metatarsophalangeal joint on walking or standing.

Treatment in the early phases of stages I and II disease consists of providing relief from weight-bearing by the use of crutches or of a

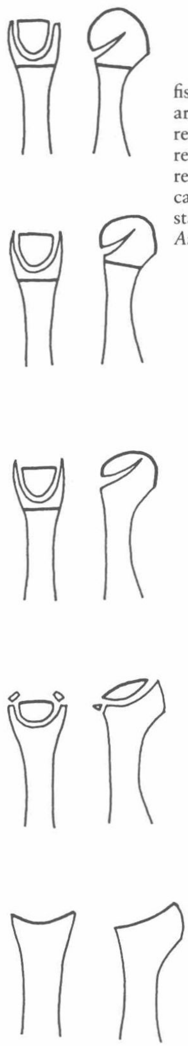

Fig 1–1.—Smillie's pathologic staging of Freiberg's disease. Stage I, fissure fracture develops in the ischemic epiphysis. Stage II, contour of the articular surface is altered by subsidence of the central portion after bone resorption. Stage III, central portion sinks into the head after further resorption, leaving projections on either side; the plantar articular cartilage remains intact. Stage IV, loose body separates after the plantar isthmus of cartilage gives way; the dorsal and lateral projections fracture. Stage V, final stage: flattening, deformity, and arthritis. (Courtesy of Helal B, Gibb P: *Foot Ankle* 8:94–102, October 1987.)

weight-relieving orthosis. There are several operations to treat stage I and stage II disease if changes are observed radiographically, including removal of loose bodies if present, but in a recent series Smillie's osteotomy with bone grafting was used (Fig 1–1). It involves restoring the contour of the metatarsal head by inserting a dorsal graft of cancellous bone. A modification of this technique includes transfixion of the head with a Kirschner wire and a below-knee walking plaster for 6 weeks to maintain the position. Late management in stages III and IV should be adjusted individually to the cause of symptoms. If a metatarsal head has already been excised, and the patient has pressure metatarsalgia underneath the remaining metatarsal heads, replacement for the excised head in combination with metatarsal osteotomies of the other heads effectively levels the tread with lasting relief of symptoms.

An evaluation of published data shows a high percentage of good results with early operation with the Smillie procedure modified by Kirschner wire metatarsal head stabilization, suggesting that this method may produce results superior to conservative management. However, no conclusive data are as yet available. Careful individual assessment of clinical and radiologic data in Freiberg's infraction at all stages is advocated.

Osteochondral Disruption of the Second Metatarsal: A Variant of Freiberg's Infraction?

Young MC, Fornasier VL, Cameron HU (Univ of Toronto)

Foot Ankle 8:103–109, October 1987 1–6

Freiberg's infraction refers to osteochondrosis of the head of metatarsal bones, particularly the second metatarsal. It has been suggested that Freiberg's infraction is the result of aseptic epiphyseal necrosis of the involved metatarsal head, which causes collapse of subchondral bone leading to articular cartilage fragmentation from the loss of bony support. Freiberg's infraction, most common among younger patients, has been related to periods of rapid bone growth before closure of the epiphyseal plate.

Man, 55, complained of increasingly severe sharp pain in the area of the second metatarsophalangeal joints. Fifteen months before presentation he sustained a ligamentous inversion injury of the left ankle, which was treated with a below-knee cast that extended beyond the metatarsal heads of the left foot. When pain first occurred after the cast was removed, the second metatarsal phalangeal joint was radiographically normal. However, roentgenograms taken 1 year later revealed sclerosis of the distal second metatarsal bone with incongruity of the metatarsophalangeal joint. These changes strongly suggested a depression of the articular surface into subjacent bone, and the second metatarsal head was subsequently resected. After 24 months of follow-up, the patient was walking normally without pain.

Histopathologic examination of the excised metatarsal head revealed no necrotic bone, but a shearing type of separation at the interface between the articular cartilage and the subjacent mineralized cartilage-bony plate complex. This finding demonstrated that a mechanical disruption, rather than avascularity, was the causative factor in this patient. A review of the patient's history suggested that the injury must have occurred during the recovery period after the cast was removed.

In adults, Freiberg's infraction may result from a shearing-compression type of injury occurring at the interface between mineralized and nonmineralized articular cartilage, rather than from true avascular necrosis.

▶ Both this article and Abstract 1–5 address the rigidity that eventually evolves in Frieberg's infraction. Interestingly, Helal and Gibb (Abstract 1–5) in late management replace the joint with an artificial joint. Bravo! When, a rigid, stiff, immovable painful joint is present, why resect and do nothing? By replacing the joint, we have restored motion, preserved length, and minimized pain. I personally would not hesitate in replacing the joint in earlier stages as well, after orthotic control has afforded no relief.—R.M. Jay, D.P.M.

Pediatric Metatarsus Adductus Angle

Lepow GM, Lepow RS, Lepow RM, Hillman L, Neville R (Westbury and Parkway Hosps, Houston)

J Am Podiatr Med Assoc 77:529–532, October 1987 1–7

It is often difficult to treat metatarsus adductus, the most common congenital foot deformity, because radiographic evaluation is impossible with the infant's immature ossification. A method of measuring the metatarsus adductus angle in infants was developed. A compass and straight edge are used to determine the metatarsus adductus angle (Fig 1–2). The postreduction angle is subtracted from the pretreatment angle, determining the amount of reduction achieved through casting.

Seven male and 8 female infants (average age, 6 months) were so treated. As noted in previous studies, bilateral involvement was common and the left foot was more often affected in those with unilateral deformities. Pretreatment angles averaged 34 degrees, and the posttreatment mean was 19 degrees, within the normal range for infants.

Response to treatment can be evaluated properly only when initial and postcasting angles are obtained. Treatment with serial casting should begin as soon as metatarsus adductus is diagnosed, although good results were achieved in older infants. The number of castings required varies and is not always related to the severity of the deformity.

▶ This is a geometrically sound principle to determine the metatarsus adductus angle. However, 2 major points need to be addressed. (1) How does this method of determining the metatarsus adductus angle relate numerically to the standard lesser tarsus bisection method? A normal metatarsus adductus angle must be attained before one can proceed to apply it clinically. (2) With this in

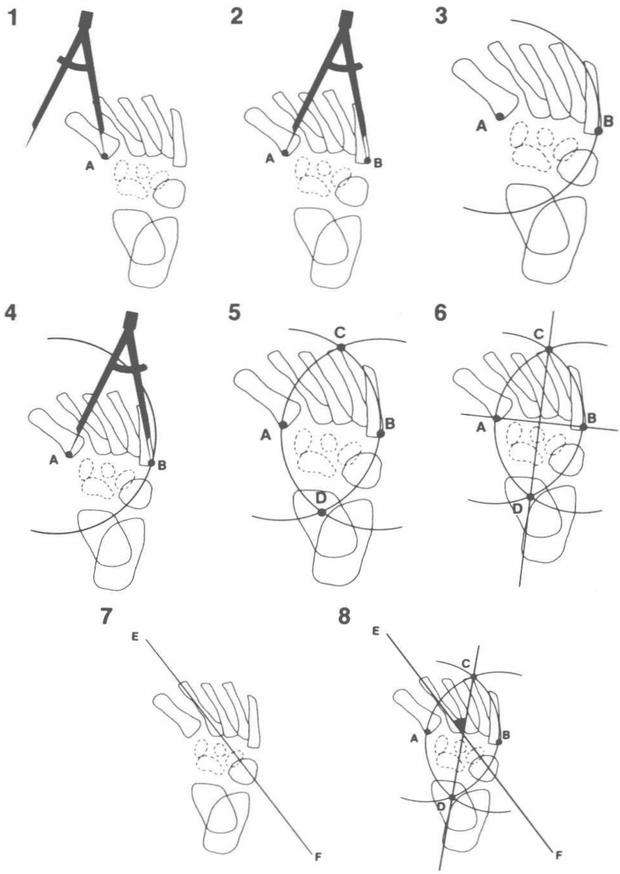

Fig 1–2.—Steps to determine the pediatric metatarsus adductus angle. **1,** place compass point at point *A,* the proximal medial aspect of the 1st metatarsal. **2,** open compass until pencil point reaches point *B,* the proximal lateral aspect of the base of the fifth metatarsal. **3,** draw a 180-degree arc, passing through *B,* **4,** without changing compass setting, reverse compass point so that it rests on *B* and pencil rests on point *A.* **5,** draw a 180-degree arc passing through *A;* the 2 arcs intersect at points C and *D.* **6,** draw line *CD.* **7,** draw second metatarsal bisector, *EF,* with a line connecting the bisection of the distal and proximal aspects of the second metatarsal shaft. **8,** intersection of *CD* and *EF* is the pediatric metatarsus adductus angle. (Courtesy of Lepow GM, Lepow RS, Lepow RM, et al: *J Am Podiatr Med Assoc* 77:529–532, October 1987.)

mind, the authors should have been cognizant to determine percent reduction of the metatarsus adductus angle.

For example, a female infant age 10 months had a metatarsus adductus angle of 38 degrees reduced with casting to 32 degrees, as stated by the authors. This resulted in a percentage reduction of 6% to 16%. Are we to assume that the norm is a zero degree metatarsus adductus angle and one should strive for a 100% reduction? I think not. The authors should address a larger population and correlate statistically both measurement systems.—R.M. Jay, D.P.M.