Clinical Orthopaedics

Clinical Orthopaedics

ANTHONY F. DePALMA
Editor-in-Chief

With the Assistance of the
ASSOCIATE EDITORS
THE BOARD OF ADVISORY EDITORS
THE BOARD OF CORRESPONDING EDITORS

Number Fourteen
Summer, 1959

Albert B. Ferguson, Jr., Guest Editor

J. B. LIPPINCOTT COMPANY
Philadelphia and Montreal

Distributed in Great Britain by Pitman Medical Publishing Co., Limited, London

Library of Congress Catalog Card Number 53-7647

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. Ordinarily, colored illustrations cannot be published except at the author's expense. Black-and-white photographs should be in the form of glossy prints. **These should not be defaced in any way.** Any changes desired in them should be marked on a tissue overlay. This should be done before it is pasted to the print, since it is important not to mar the print in any way. Or any changes may be indicated on a separate sheet of paper. 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. **However, this should be done lightly, so as to leave no imprint on the face of the illustration.** A separate typewritten sheet of legends for the illustrations should be supplied.

A bibliography of numbered references *in alphabetic 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:*

If a book:

Author's name, title of book, edition if there is more than one, page numbers if it is wished to direct the reader to a specific section of the book, city in which publisher is located, publisher's name, year of publication of book, *in the order named.*

If an article in a journal:

Author's name, title of article, volume number, inclusive page numbers, year of publication, *in the order named.*

Manuscript may be submitted to us in the original language of the author. Now it is our policy to handle the translation of these articles by our office without cost to the contributor if the article is found to be acceptable for publication.

All manuscripts should be submitted with an extra carbon copy, including a short synopsis of approximately 200 to 250 words for translation into Interlingua.

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

***The Hand, Part II,** Fall, 1959*
***The Foot,** Spring, 1960*
***Clinical Physiology and Pathology of Bone,** Summer, 1960*
***Internal Derangement of the Knee Joint,** Fall, 1960*
***Soft-Tissue Tumors,** Spring, 1961*
***Disorders of the Shoulder Joint,** Summer, 1961*
***Back Disorders in Children,** Fall, 1961*

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.

PRINTED IN THE UNITED STATES OF AMERICA

CLINICAL
ORTHOPAEDICS
Number Fourteen
Summer, 1959

Contents

Section II

GENERAL ORTHOPAEDICS

1

Michael Hoke

J. HIRAM KITE, M.D.*

Michael Hoke was born in Lincolnton, North Carolina, on June 28, 1874. His father was the illustrious Major General Robert F. Hoke of the Confederate Army. His mother was Lydia Van Wyck, of New York. His early years were spent in Lincolnton and Raleigh, North Carolina. After finishing high school in Raleigh, he entered the University of North Carolina. He was athletic, even though he was slender in build and of medium height. He was an outstanding football player and was captain of the team during his senior year. He graduated from the University of North Carolina in 1893 with a Bachelor of Science degree in electrical engineering. The training that he received in mechanics at the university proved to be most valuable to him in later years when he undertook the study of the mechanics of the human foot.

Medicine appealed strongly to the young engineer; consequently, he went to Charlottesville and entered the Medical School of the University of Virginia. He completed the 2-year course and received his degree of Doctor of Medicine in 1895. He interned at the newly opened Johns Hopkins Hospital, in Baltimore. There he came under the influence of Dr. William Osler, chief of Medical Service, whom Dr. Hoke regarded as a very close personal friend. He worked under Dr. William Stewart Halsted, who was professor of surgery and the teacher of many famous surgeons. Halsted's teaching and meticulous attention to detail was reflected in Dr. Hoke's surgery in the years to follow. After leaving Baltimore he spent a year at Harvard.

At that time Atlanta had recovered from the War between the States and was one of the most promising cities in the South. Dr. Hoke began practice in Atlanta in 1897, doing general surgery. Later, he specialized in orthopaedic surgery. He was the pioneer orthopaedist in Georgia. He taught orthopaedics at the Atlanta College of Physicians and Surgeons, which later consolidated with the Medical School of Emory University.

On April 20, 1904, after 7 years in practice, Dr. Hoke married Miss Laurie H. Harrison, of Atlanta. The marriage was an unusually happy one: Mrs. Hoke entered fully into her husband's professional life and his many outside interests. They had two daughters.

Dr. Hoke was a member of the Fulton County Medical Association and the Medical Association of Georgia, and he played a prominent part in the founding of the Southern Medical Association. He was a member of the American Orthopedic Association and was elected president in 1925. He presided at the annual meeting held in Atlanta in 1926. This was the only time that the American Orthopedic Association met in Atlanta. When the American Academy of Orthopedic Surgeons was formed later, he was a charter member.

Dr. Hoke's chief relaxations were golf and hunting. He liked the outdoors and pur-

* Atlanta, Ga.

Dr. Michael Hoke

chased a large tract of land in South Georgia, where he could go hunting with his dogs. Most of his week ends were spent on the farm. It was not long until he began to experiment with various kinds of grasses for year-round pasture. He soon developed a very fine herd of cattle, which won many prizes at the various livestock shows in South Georgia.

Dr. Hoke devoted a great deal of time to working on the charity service of Grady Memorial Hospital.

Mrs. W. C. Wardlaw, a prominent citizen of Atlanta, and 6 other ladies sold pencils to raise money for the hospital expenses of a number of crippled children, whom Dr. Hoke treated without pay. These were cared for in the Wesley Memorial Hospital, which later became Emory University Hospital. Soon the need of a convalescent home was evident, and 2 cottages were rented in Decatur. As the demands for more beds grew, the ladies were unable to continue to finance the home. At this time, the Scottish Rite Masons of Atlanta, under the leadership of Mr. Forrest Adair, came to their aid, and the Scottish Rite Hospital for Crippled Children was founded in 1915. Operations were performed at Wesley Memorial Hospital for the next 4 years, and the children returned to the home for convalescent care as soon as their condition permitted. In 1919 the present building was built, and it became a complete hospital with an outpatient clinic, operating rooms, x-ray department, physical therapy department and school. Dr. Hoke considered this hospital to be his most important contribution to humanity. He was one of the chief financial contributors to the new hospital and was surgeon-in-chief until his retirement in 1927. It was here that he worked out many of the procedures that were to perpetuate his name.

It was the Scottish Rite Hospital in Decatur that inspired the Shrine of North America to form a chain of Crippled Children's Hospitals over the United States, Canada, Mexico and Hawaii. Seventeen hospitals are now carrying on the work of treating crippled children that was started by Dr. Hoke and Mr. Adair in Decatur. Dr. Hoke was one of the first 5 orthopaedic consultants for the Shriners' Hospitals. One of his stipulations was that they always be kept free of city, state or university involvement.

The highest honor obtainable in Scottish Rite Masonry was awarded Dr. Hoke on October 16, 1923. His patent, hanging in the hospital, states that he received this 33rd Degree "because of the extraordinary services rendered the Scottish Rite in the development of the Hospital for Crippled Children."

Later, Dr. Hoke served for a number of years on the Advisory Board of the Alfred I. DuPont Institute for Crippled Children at Wilmington, Delaware.

In 1931, the University of North Carolina conferred on Dr. Hoke the honorary degree of Doctor of Laws. In the same year, President Roosevelt offered him the post of medical director of the Institute for the Treatment of Infantile Paralysis at Warm Springs, Georgia. It was a difficult decision for Dr. Hoke to make—to give up his private practice in Atlanta and become the full-time medical director of a convalescent hospital that had no operating facilities. Finally, on the President's insistence, he went to Warm Springs. However, he did drive the 75 miles back to Atlanta to do the necessary operations on some of the patients until an operating room was completed at the Foundation. Dr. and Mrs. Hoke lived in the "Little White House" at Warm Springs, vacating it only when the President visited the Foundation. By 1935, Dr. Hoke considered that his work had been completed at the Foundation and returned to his private practice in Atlanta.

From 1914 to 1917, Dr. Hoke worked on a method of stabilizing paralytic feet. At that time various procedures were being reported for this purpose. In his paper describing an operation for stabilizing paralytic feet, he states:

> We have regarded tendon transplantation done alone as unmechanical. We have regarded the fixation of tendons to bone to control lateral deformity and lateral mobility as unmechanical, and we have, therefore, done no operations of this nature. We have done no silk insertion operation for this purpose, for we did not believe they would hold against the powerful body weight thrust. We have not done Davis' operation, for it is done blindly and does not take into consideration the architectural details which we think are fundamental. Astragalectomy is certainly an objectionable operation.
>
> We believe a stable skeletal foundation is necessary. After paralysis the patient walks on a universal joint over which he has no control. We think it is necessary to do away with the universal joint motion. There is motion in three places: the ankle joint, the subastragaloid joint and the astragaloscaphoid joint. It is necessary to stabilize the subastragaloid and the astragaloscaphoid joints.

Originally, Dr. Hoke did not resect the calcaneocuboid joint, but shortly after 1921 he included this joint, making a triple arthrodesis. His operation differed from the triple arthrodesis of that day by removing the head and the neck of the astragalus and replacing it in different positions according to the different types of deformities in order to restore the normal weight thrust to the bones of the foot. From 1917 to 1921, when he reported his operation, he performed his stabilization operation on 104 cases at the Scottish Rite Hospital.

Dr. Hoke tested a new procedure thoroughly before he reported it. He developed a "clubfoot plastic" operation, in which he cut through the neck of the talus immediately distal to the body and shifted the head medially to restore the normal alignment and weight thrust. Because of the technical difficulty in anchoring the head in the desired position, this operation was not reported.

He was also interested in scoliosis and devised several different types of plaster jackets with a lever and hinge to make pressure on the prominence over the ribs. He also experimented with a derotation table for the correction of scoliosis. This was very much like the table reported about the same time by Galeazzi. Derotation jackets were given up later, and traction jackets were used.

One of his most useful devices was his "well-leg traction apparatus," which was used to treat fractured femurs, to correct flexion contractures of hips, and to pull down congenital dislocation of hips before reduction.

In 1924 he devised and described in the Piedmont Hospital *Bulletin* an operation for recurring dislocation of the shoulder. He drilled a tunnel through the greater tuberosity of the humerus and passed a cord of fascia lata through this and anchored it to the acromion process.

Dr. Hoke was interested in the treatment of cerebral palsy. In 1924, with Dr. Charles

E. Dowman, he published a paper on the treatment of spastic paralysis in which he described the various orthopaedic procedures that could be used in these cases.

Dr. Hoke's mechanical genius is demonstrated best in his interpretation of the mechanics of a foot, as he explained the forces at work in the very relaxed flatfoot. He showed that the anterotibial, the posterotibial and the flexor hallucis longus tendons held up the arch of the foot if the cuneonavicular articulation were stable. Should this joint not be stable, the muscles mentioned had no lever and could not hold up the arch. By fusing this one joint, no stiffness was added to the foot. He performed this operation first in 1923 and reported it in 1931.

In 1937, at the age of 63, he retired from practice in Atlanta for reasons of health and moved with his family to the lovely old town of Beaufort, South Carolina. Their home was known as "Windy Marsh." He died on September 24, 1944.

Dr. Hoke's contribution to the treatment of cripples did not cease with his death; it is perpetuated in the use of the operations that he devised. His inspiration as a teacher continues in the men who had the privilege of working with him; they were instructed thoroughly in the fundamentals of the mechanics of orthopaedics and have contributed much to orthopaedic literature.

SECTION 1

RECENT ADVANCES IN ORTHOPAEDIC SURGERY IN INFANCY AND CHILDHOOD

2

The Significance of Growth in Orthopaedic Surgery*

ROBERT B. DUTHIE, CH.M., F.R.C.S.E.†

In the orthopaedic care of children we are particularly concerned with abnormalities and diseases that affect a growing individual. Growth has been defined by Weiss[34] as a developmental increase in the total mass and size of the body. Moreover, growth has to be differentiated from development in which there are maturation and differentiation of tissues and organs necessary for the formation and the completion of the whole individual.

Many orthopaedic abnormalities and conditions are aggravated by or result from growth and its disturbances. It is important to correlate the natural history of the disease process with the growth pattern so that the etiology, the treatment and the prognosis can be defined more accurately. Orthopaedists are in a position to follow and to observe normal growth sequences as well as disease processes in childhood; therefore, they can contribute to this subject which encompasses other disciplines of biology, anthropology, medicine and endocrinology.

The purpose here is to review very briefly the physiologic and the endocrinologic background of skeletal growth and to consider various orthopaedic conditions with the known growth patterns.

SKELETAL GROWTH

Method of Studying Skeletal Growth. Many studies of growth, or development, have been carried out during the past half century, but it is now realized that standardization of methods and expression of data with statistical testing is essential. The significance of results from the more commonly carried out *cross-sectional studies* and from *longitudinal studies* has been clearly described by Tanner[31] and Ellis.[7] Cross-sectional studies are carried out more quickly when measurements of trunk and leg lengths, pelvic and shoulder diameters, etc., are taken from numerous children of the same age group. Although they require a greater number of original cases for accurate analysis, they have provided much information of mean height and other such standards of growth. Longitudinal studies in which similar measurements are obtained from the same child over successive time intervals during growth require less statistical proof and have more significance even in small numbers. From these one can study rate of growth or change; i.e., growth velocity, as well as the various mean standards. But, more importantly, it is this type of study that orthopaedists can carry out.

Results of Growth Studies. The oldest

* This work was carried out while the author was a member of the External Scientific Staff of the Medical Research Council at the Royal National Orthopaedic Hospital, London. He is indebted to Mr. H. J. Seddon, C.M.G., D.M., F.R.C.S., for help and encouragement in preparing this material.

† Professor of Orthopaedic Surgery, The University of Rochester School of Medicine and Dentistry, Rochester, N. Y.

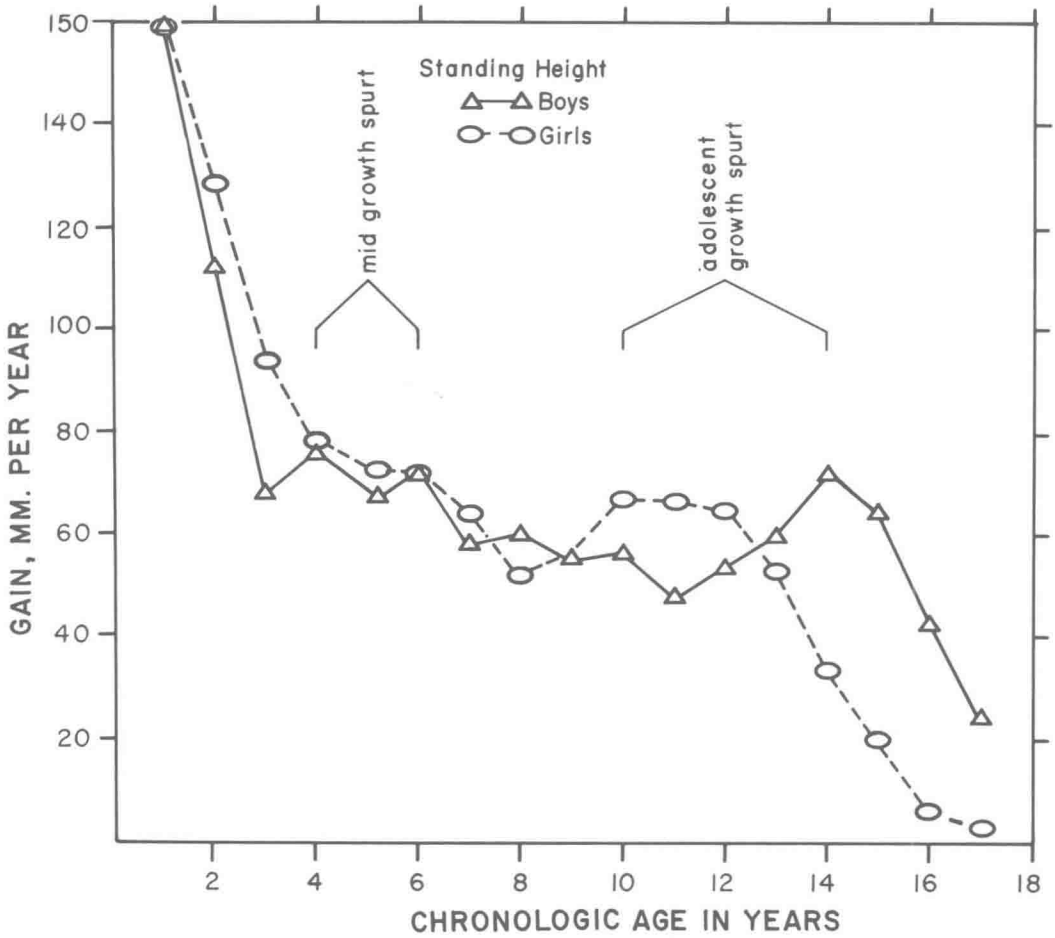

FIG. 1. Showing the standing height mean gain per year in normal boys and girls. (Data from Simmons, K.: Physical Growth and Development, Monogram, Society Research Child Development 9:1)

and most classic longitudinal study was carried out between 1759 and 1777 by de Montbaillard upon his own son.[24] In this the exponential fall in the growth curve is halted twice: firstly, between the ages of 5½ and 7 years, this period being called the *mid-growth spurt* (Tanner[31]); and, secondly, between 13 and 15 years, this being called the *adolescent growth spurt*. This has been confirmed by extensive cross-sectional studies of Simmons[27] and is illustrated in Figure 1. Although much information has been obtained about the adolescent period, relatively little is known about the mid-growth spurt. In orthopaedics many of our problems originate in the mid-growth spurt period or are aggravated by factors that produce it.

SEX DIFFERENCES IN TOTAL STATURE. Although boys may be slightly larger at birth and may grow slightly faster during the first year, between the ages of 1 and 9 years the growth velocities in both sexes are the same (Shuttleworth[26] and Simmons and Todd[28]). The girl at her adolescent growth spurt, which occurs 2 years earlier than in the boy, i.e., from 11 to 13 years, grows faster and larger before slowing up to become