

THE HAND

EXAMINATION AND DIAGNOSIS

SECOND
EDITION



AMERICAN SOCIETY
FOR SURGERY OF
THE HAND

CHURCHILL LIVINGSTONE

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THE HAND

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FOREWORD

Although this monograph outlines the examination of the hand, it is important to stress that the function of the hand begins within the central nervous system. Modern surgery of the hand is not a limited regional speciality. No medical or surgical specialist treats a greater variety of pathological entities than the hand surgeon.

The armamentarium of the hand surgeon includes the established procedures of the orthopaedic surgeon and the plastic surgeon, plus innovative techniques such as tendon implants for the severe injury or rheumatoid arthritis. The technical skills of the neurosurgeon and vascular surgeon are modified for microsurgery, such as the replantation of amputated digits. Pediatric studies are utilized by the hand surgeon in the medical and surgical management of the congenital upper extremity anomaly.

The basic discipline of the hand surgeon is anatomy, and this monograph emphasizes the anatomical principles for the diagnosis and treatment of the abnormal hand.

The Instructional Aids Committee of the Division of Education has developed this text with enthusiasm and prolonged effort. The individual members have met in

repeated workshops based on personal experience and research. The result is a valuable handbook.

The personality and activities of the individual are often recorded in the appearance and dexterity of their hand. This monograph attempts to define, in a limited way, how one might preserve and reconstruct that individuality.

George E. Omer, M.D.

President,

American Society for Surgery of the Hand, 1979

PREFACE

The hand is composed of material for touch of great sensitivity and a system of exact machinery of great specialization and refinement — all in a most complex array and condensed into a unit weighing less than a pound. With this amazing tool, we implement the desires of the human brain, whether requiring the speed and precision of the fingering hand of a concert violinist or the brute power grasp needed to wield a sledge hammer.

Sir Charles Bell,¹ the leading British anatomist, physiologist, and neurologist of the early 19th century, was among the first to recognise the unique qualities of the human hand: ‘... it is in the human hand that we perceive the consummation of all perfection, as an instrument. This superiority consists in its combination of strength, with variety, extent, and rapidity of motion ... and the sensibility, which adapt it for holding, pulling, spinning, weaving, and constructing; ...’ With the hands the laborer supports a family, the parent loves and cares for a baby, the musician plays a sonata, the blind ‘read’, and the deaf ‘talk’.

This essential organ, the hand, is often crippled by injury, by disease, or by birth defects.

To address this human need, there has emerged in

the last three decades a special area of expertise — Surgery of the Hand.

One of the earliest pioneers in Surgery of the Hand was Allen B. Kanavel of Chicago (1874-1938). His main contributions were in the understanding and treatment of infections of the hand, and his book on this subject is a classic. His efforts were furthered by his associate, Sumner Koch (1888-1976).

During this same era, Arthur Steindler (1878-1959) of Iowa City developed the principles and many of the details of tendon and muscle transfers for the disabled upper extremity — concepts which are still utilized today.

Perhaps the most influential person in the history of Surgery of the Hand was Sterling Bunnell. In order to improve the treatment of the hands disabled in combat, during World War II, he was appointed as a special consultant to the Secretary of War 'to guide, integrate, and develop the special field of Hand Surgery'. From the hand centers which he developed sprang a core of surgeons dedicated to the principles and philosophies of Dr Bunnell.

From this small group of Dr Bunnell's disciples emerged a group of surgeons from general, orthopaedic, and plastic surgery who, recognizing the uniqueness of this specialized organ, organized the American Society for Surgery of the Hand. Through its influence, in turn, similar Hand Societies have been founded in most countries of Europe, Asia, and Central and South America. These efforts have culminated in the formation of the International Federation of Societies for Surgery of the Hand.

Today the horizons for Surgery of the Hand have further expanded to include arthritis, congenital deformities, and even the replantation of amputated parts. As

Sterling Bunnell aptly summarized,² 'To recondition these members successfully is difficult. Surgical reconstruction of the hand requires special careful technique. . . . It is a composite problem requiring the correlation of various specialities — orthopaedic, plastic, and neurologic surgery — the knowledge of any one of which alone is inadequate for repairing the hand. . . . As the problem is composite, the surgeon must also be . . . The surgeon must face the situation and equip himself to handle any and all of the tissues of a limb.'

The intent of this brief monograph is to introduce some of the basic anatomic principles upon which is based this new but exacting and essential discipline.

Richard I. Burton, M.D.

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1. Bell Sir Charles 1833 *The Hand, Its Mechanism and Vital Endowments, as Evincing Design*. Coney, Lea and Blanchard, Philadelphia.
2. Bunnell S 1944 *Surgery of the Hand*. Lippincott, Philadelphia.

ACKNOWLEDGEMENT

The germinal concept of this book began at a meeting of the Task Force on Continuing Education in 1974 attended by Drs George Omer, Fred Kessler, James Becton, Edward Nalebuff and myself. It fell to Dr Becton to produce a working outline and preliminary drawings of this production. Each chapter was then amplified and supervised by an individual member of the Instructional Aids Committee of the American Society for Surgery of the Hand. Dr Richard Burton, chairman of that committee, has been tireless in his efforts to produce an academically sound, yet practical approach to the physical diagnosis of the hand.

Though this has truly been a product of the entire committee, I am especially grateful to Dr Becton not only for his original outline, but for his continued efforts; Dr Burton for his skill and diplomacy in guiding a true committee effort; Dr Omer for his guidance and Dr Kessler, without whose spark, continued leadership, and editorial supervision this work might not have been produced at all.

Gordon B. McFarland, Jr., M.D.

Coordinator, Division of Post-Graduate Education,
American Society for Surgery of the Hand, 1978

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PART 1

EXAMINATION

INTRODUCTION

This text is a core of information on the diagnostic history and physical examination of the normal, diseased or injured hand. A method for thorough, systematic evaluation of the hand is presented so that with practice the reader can develop a routine for accurate examination to achieve a specific diagnosis.

A brief introduction to specific conditions of the hand is given, followed by illustrations of the more common disorders. A limited description of certain lacerations, fractures, dislocations, and deformities is included.

Specific treatment of each diagnosis is *not* discussed. The reader is referred to the standard texts and the current literature of hand surgery for detailed descriptions of treatment methods.

1

HISTORY AND GENERAL EXAMINATION

HISTORY

Before examining the hands, a detailed history of the present problem should be obtained:

A. What are the patient's age, occupation, and pursuits?

Which is the dominant hand?

Has there been a previous hand impairment or injury?

B. *In trauma problems* the history should include the following specific information:

1. *When* did the injury occur and how much time has elapsed since the injury?
2. *Where* did the injury occur? Was it at work, home, or play? Under what conditions — was the environment clean or dirty?
3. *How* did the injury happen? What was the exact mechanism of the injury? (This helps to evaluate the amount of crush, contamination, blood loss, and level of injury to gliding parts.) What was the exact posture of the hand at the time of injury?
4. *What* previous treatment has been administered?

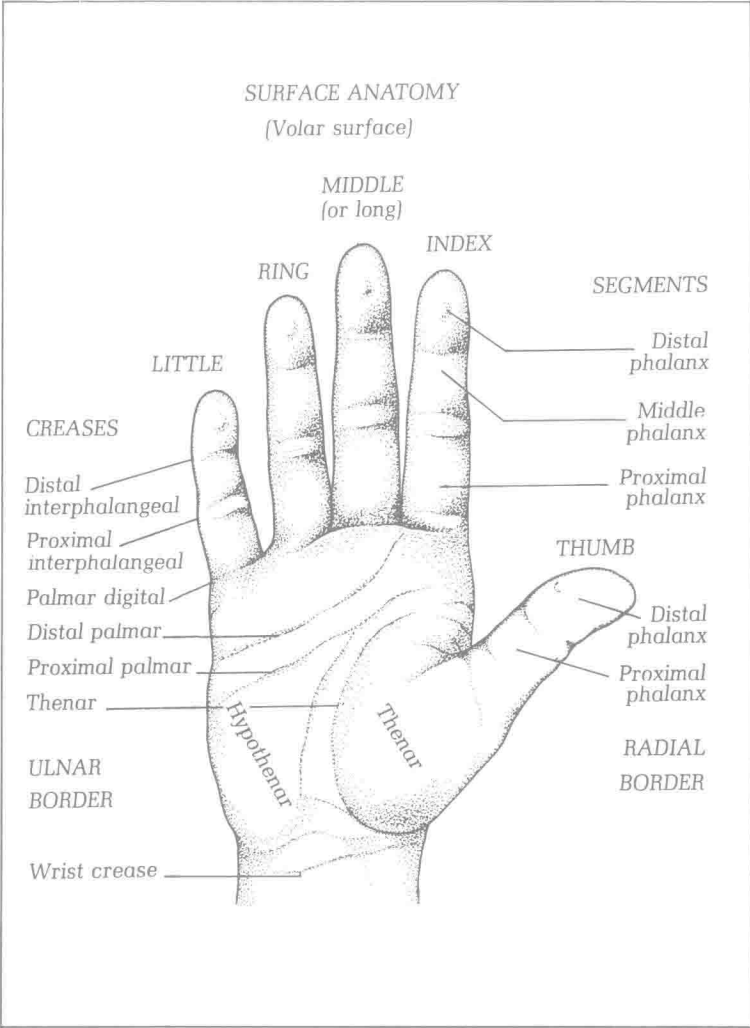


Figure 1
Surface anatomy of the hand

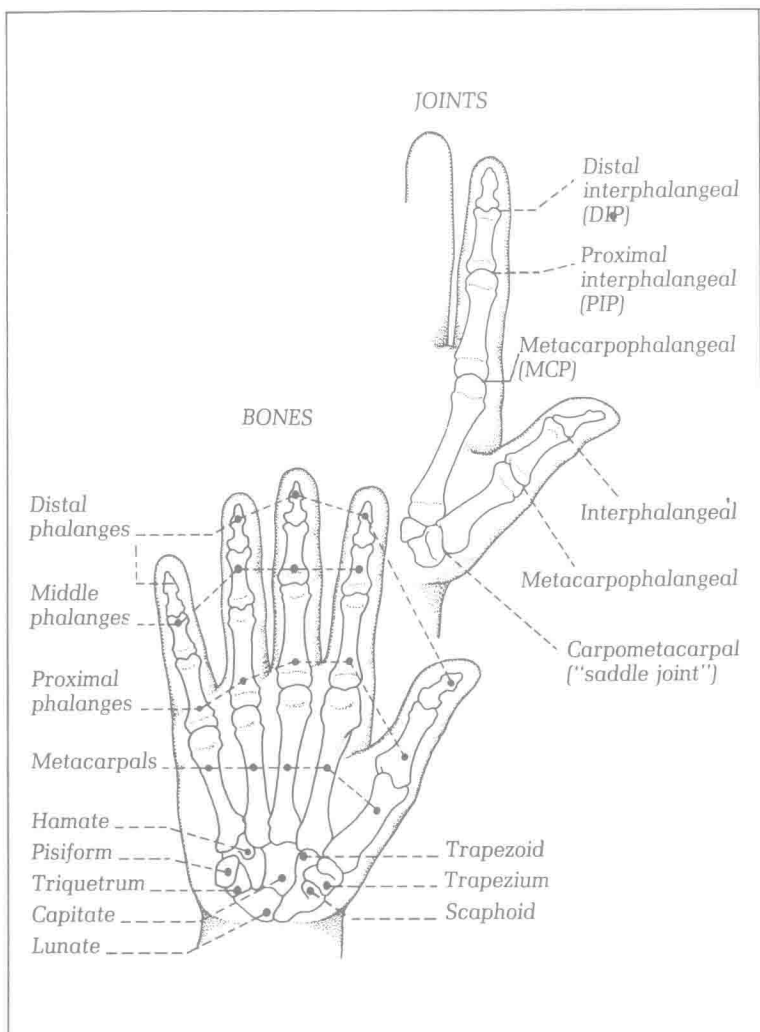


Figure 2
Skeleton of the hand and wrist