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## Foreword

### Perception and Execution....

The tips of our fingers are the antennae, the eyes of our upper extremity, and the tools and instruments with which we carry out our most precise and intimate functions. They are ultimate sensory organs through which we touch and perceive pressure, two-point discrimination, proprioception, temperature, shape, texture, and even danger. They are the eyes of those who have no sight.

Through the sensory organs of our fingertips, we perceive the loving touch of a soul mate and are able to caress the soft, frail, dependent trust of our newborn child. It is through this articulate sensory organ that we perceive the gentle caress of a loved one and impart sensual, protective, secure reassurance, and communication with those to whom we give our hand. Metaphorically we can leave the thumbprint of our involvement as a lasting remembrance. The skin, bones, ligaments, nail bed, sensory end organs, and even fingernails combine to form the most precise instrument of sensation and execution.

The child exploring his or her awakening universe, the musician, the artist, the sculptor creating a masterpiece of auditory, visual, or structural beauty all employ this incredible end organ in unique and creative ways. We surgeons use our fingertips to explore, diagnose, and precisely execute the maneuvers over which to perform our own art form.

Injury to the fingertip can be devastating. Loss of sensation, prehension, coordination, strength, and endurance can result when trauma or disease has affected the most distal extent of our upper extremity.

In this text, Dr. Rozmaryn has assembled the unique thoughts, experiences, and expertise of creative thought leaders in the practice of surgery of the hand to provide their individual, yet universal perspectives on this incredible, animated instrument, which combines sensory and motor precision.

The reader will be enlightened by the various perspectives on managing every component of injury to the fingertip that can occur. The creative and well-respected techniques which the authors provide will enhance the readers' ability to care for fingertip injuries and restore sensory and motor function to this extremely important instrument located at the distal extent of our hands.

It is a privilege to provide a foreword to this text which will become a staple in the library of the practicing hand surgeon.

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## Preface

The fingertip is truly one of our windows to the world. It is our only primary sensory perception that is outside of our head and face. It is a critically important part of the hand. It is the sensory perception inherent in normal fingertip motion that gives prehension of our hands their true meaning. Without sensory perception in our fingertips, vision and hearing would have little meaning as we would be unable to interact with objects that surround us in any meaningful way.

Fingertip injuries are exceedingly common. Taken in the entirety, they constitute the largest percentage of orthopedic injuries seen in the emergency room. The scenarios in which these occur constitute the full palate of human endeavor from work, sports, home, to a simple crush in a car door. They are a leading cause of time off from work and worker's compensation claims. Children are affected as often as adults. An injury to fingertips creating anesthesia or pain severely impairs the functions of the hand. Fingertip injuries are frequently misunderstood, and thus, these are usually treated by the least skilled members of the medical team. All too frequently, these injuries end up with suboptimal results.

Mechanisms of injury vary widely from crush, avulsion, degloving, laceration, amputation, eccentric tendon overuse, hyperflexion, or extension of the distal phalanx. They can involve any and all of the structures in the finger, and injuries can be open or closed. High-pressure injection injury is a special type of fingertip injury resulting in a mini compartment syndrome in the volar pad of the finger. If it is not addressed promptly, it can result in irreversible ischemia or in gangrene or eventual amputation of the tip. Closed injuries can result in fracture of the distal phalanx, dislocation, collateral injuries of the wrist of the distal interphalangeal joints, and closed avulsions of the flexor digitorum profundus and mallet fingers. Open injuries include dorsal and volar lacerations resulting in trauma to the nail apparatus or terminal flexor and extensor tendons and digital nerve as the nail bed crush and avulsion injuries which can coexist with open fractures of the distal phalanx. Degloving injuries to the dorsal volar skin frequently accompany crush injuries to the tip. In extreme cases, the tip of the finger may be amputated by a sharp instrument leaving a deficit that is either transverse or oblique and either in the sagittal or coronal plane. The defect can be complex such as a severe crushing injury and amputations may or may not have exposed bone.

The goal of the treatment is to restore an esthetically pleasing, painless, tactile, mobile, stable fingertip that can sense pain, temperature, pressure, stereognosis, and fine touch. The fingertip must also be the terminus of the

gripping mechanism of the hand. Unfortunately, all too often, these injuries are under recognized resulting in fingertip numbness, cold sensitivity, nail growth abnormalities, nail fold to volar pad deformities, hyperesthesia, and painful stiffness of the distal interphalangeal joint.

The purpose of this book is to outline the various categories of injury to the fingertip, anatomy, physiology, mechanisms of injury, treatment options and outcomes, as well as possible complications of treating these injuries. Treatment may constitute simple splinting or expectant observation to complex microvascular reconstruction, open reduction internal fixation, complex nail reconstruction, emergent decompression of high-pressure injection injuries, local and regional flap reconstructions, and free tissue transfers for finger tip coverage. Also dealt within this book are management of fingertip burns and special considerations for pediatric injuries as well as rehabilitation of the fingertip. An increased awareness of these injuries will hopefully optimize treatment of these frequently undertreated injuries and lead to better clinical care.

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Fingertip Injuries

Diagnosis, Management and Reconstruction

Rozmaryn, L.M. (Ed.)

2015, XVI, 191 p. 146 illus., 123 illus. in color.,

Hardcover

ISBN: 978-3-319-13226-6