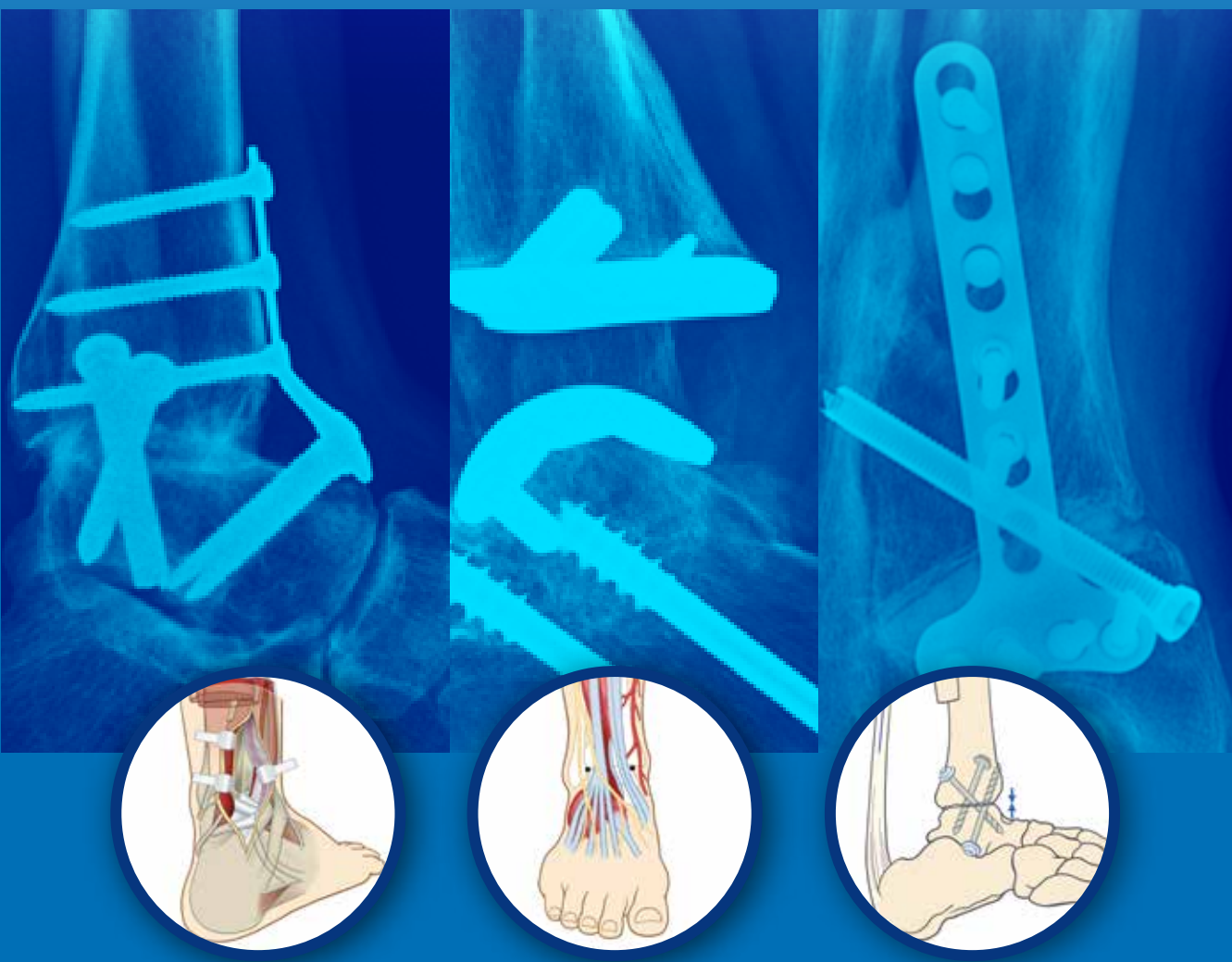
THE ANKLE

OSTEOARTHRITIS:

EVIDENCE-BASED TREATMENT



Chayanin Angthong, M.D., Ph.D.

BANLUE PUBLICATIONS CO.,LTD.

The Ankle Osteoarthritis

Evidence-based Treatment

Chayanin Angthong, M.D., Ph.D.
Editor-in-Chief
Associate Professor
Department of Orthopaedics
Faculty of Medicine, Thammasat University
Pathum Thani, Thailand

Banlue Publications Co., Ltd.
955 Soi Suthiporn, Prachasongkroh Road,
Dindaeng, Bangkok, 10400

The Ankle Osteoarthritis: Evidence-based Treatment

ISBN 978-616-568-663-1
price **3,800** baht

Published by Chayanin Angthong, M.D., Ph.D.

The Ankle Osteoarthritis: Evidence-based Treatment
Editor: **Chayanin Angthong, M.D., Ph.D.**

Printed in Bangkok, Thailand

To my wife, Wirana,

who always supports many things for me in my life.

Contributors

Chayanin Angthong, M.D., Ph.D.
Associate Professor
Department of Orthopaedics
Faculty of Medicine
Thammasat University
Pathum Thani, Thailand

Song Ho Chang, M.D., Ph.D.
Assistant Professor
Department of Orthopaedic Surgery
Faculty of Medicine
University of Tokyo
Tokyo, Japan

Whi-Je Cho, M.D.
Fellow
Department of Orthopedic, Bucheon hospital
Soonchunhyang University
Bucheon-si, Gyeonggi-do, Korea

Henry Ricardo Handoyo, M.D.
Fellow
Faculty of Medicine Widya Mandala Catholic University
Surabaya-Indonesia
Gotong Royong Hospital Surabaya, Indonesia
Surabaya Orthopedi and Traumatology Hospital, Indonesia

Seksan Kukreja, M.D.
Intern physician
Department of Orthopaedics
Faculty of Medicine
Thammasat University
Pathum Thani, Thailand

Young Koo Lee, M.D., Ph.D.
Secretary General,
Sports Medicine Summit Congress at the occasion of Olympic Winter Games
PyeongChang 2018
Professor
Chief of Diabetic regenerative medicine laboratory
Chief of Foot and Ankle biomechanical laboratory
Chief of Foot and Ankle Service
Department of Orthopedic, Bucheon hospital
Soonchunhyang University
Bucheon-si, Gyeonggi-do, Korea

Yudha Manggala, M.D.
Clinician
Department of Orthopaedic Surgery
Soegijapranata Catholic University
Semarang, Indonesia

Contributors

Siranya Paecharoen, M.D.
Lecturer
Department of Physical Medicine and Rehabilitation
Faculty of Medicine
Thammasat University
Pathum Thani, Thailand

Andri Primadhi, M.D.
Assistant Professor
Department of Orthopaedic Surgery
Padjadjaran University Medical School/Hasan Sadikin Hospital
Bandung, Indonesia

Prasit Rajbhandari, M.S., MBBS.
Clinician
Manmohan Memorial Teaching Hospital
Kathmandu, Nepal

Kittipong Wattanasirisombat, M.D.
Intern physician
Department of Orthopaedics
Faculty of Medicine
Thammasat University
Pathum Thani, Thailand

Ricky Wibowo, M.D.
Resident physician
Department of Orthopaedic Surgery
Padjadjaran University Medical School/Hasan Sadikin Hospital
Bandung, Indonesia

Ichiro Yoshimura, M.D., Ph.D.
Assistant Professor
Chief in Foot & Ankle Unit
Department of Orthopaedic Surgery
Faculty of Medicine
Fukuoka University
Fukuoka, Japan

Foreword

Ankle osteoarthritis is one of major disability in the foot and ankle. It is less common than hip or knee osteoarthritis; however, it is significantly related to poor quality of life. Treatments have conventionally consisted of various options until operative treatment in the form of arthrodesis is required. More recently, interesting modality has been increasing in both nonoperative and alternative operative options, including biologic injections, joint-sparing osteotomy surgery, arthroscopic ankle arthrodesis, and new arthroplasty designs. This textbook exclusively presents currently evidence-based information on diagnosis, three-dimensional technology application, other new technology and perspectives, and the updated treatment options available for the ankle osteoarthritis.

Chayanin Angthong, M.D., Ph.D.
Associate Professor
Department of Orthopaedics
Faculty of Medicine
Thammasat University
Pathum Thani, Thailand

Preface

Arthritis of the ankle continues to be a significant problem for patients and its prevalence, at least post-traumatic osteoarthritis, appears to be increasing. Currently there is a great deal of interest within the orthopaedic foot and ankle community concerned with treating patients with osteoarthritis of the ankle. In the past, ankle arthrodesis has been advocated as the golden standard for treatment of ankle osteoarthritis. However, as we became aware that there are many more secondary problems associated with ankle arthrodesis, some sophisticated treatment modalities and alternative solutions have become promoted such as visco-supplementation, PRP, and other conservative options, and joint preserving procedures to realign and stabilize the ankle for the less advanced stage of ankle osteoarthritis and total ankle replacement for the end-stage ankle osteoarthritis. As many of these new treatment modalities still lack of evidenced based results, there is need for thorough analysis of their effectiveness, potential risks and limitations.

With this textbook, Dr. Chayanin Angthong has added a masterpiece for every orthopaedic surgeon faced with the treatment of ankle osteoarthritis. With the contribution of recognized experts in their field, he understood to provide thorough insight in the current possibilities and in their effectiveness, based on evidenced based analysis. I find this book to be extremely timely and I congratulate Dr. Chayanin Angthong for his great work. Without any doubt, it will become an important book for **all serious foot and ankle surgeons for successful decision making and treatment of ankle osteoarthritis.**

Beat Hintermann, M.D., Ph.D.
Professor
Clinic of Orthopaedic Surgery, Kantonsspital
Baselland, Liestal Switzerland

Acknowledgement

The author would like to acknowledge the helpful tasks from Dr. Wirana Angthong and Mr. Robert Steven Cho to create this wonderful textbook. The author would like to express the gratitude to them.

The author would like to propose the special thanks to the Faculty of Medicine, Thammasat University. The author received the fund to support this textbook production from the Faculty of Medicine, Thammasat University, year 2017.

Contents

Contents

Part I

The Introduction

Chapter 1

The Importance of Ankle Osteoarthritis

Chayanin Angthong, M.D., Ph.D.

Ankle osteoarthritis is an inflammation with the degeneration and destruction of the talocrural joint from various causes. Traumatic injury is the most common etiology of ankle osteoarthritis. The incidences of ankle osteoarthritis may not be high as in other major joints such as the hip and knee; however, it is undoubtedly a condition that is associated with disability in terms of reduced function, mobility, and quality of life based on the current evidence.

Introduction

Ankle osteoarthritis is an inflammation with the degeneration and destruction of the talocrural joint from various causes. Traumatic injury is the most common etiology of ankle osteoarthritis (Figure 1.1).[1] The ankle anatomy consists of the tibial plafond and medial malleolus, which articulates with the dorsal and medial talus.[2] Here, the articulation has a slight posterior slope in the sagittal plane.[2] In the coronal plane, the distal tibial surface is 88 to 92 degrees relative to the lateral tibial shaft axis.[2] In addition to the tibiotalar articulation, the distal fibula articulates with the lateral talus.[2] This part is responsible for one-sixth of the axial load distribution of the ankle.[2] The rest is carried by the syndesmotic articulation between the distal tibia and fibula.

Based on the mentioned anatomy, the ankle joint is the integral part

A. Anteroposterior view. B. Mortise view. C. Lateral view.

Figure1.1 Ankle radiographs of a 41-year-old man with possibly post-traumatic right ankle osteoarthritis from the previous tibial and fibular fractures.

that dissipates the axial load from the body through the leg to the structures below including the hindfoot, midfoot, and forefoot. Osteoarthritis of this joint is, therefore, associated with the deterioration of weight-bearing ability, mobility, and quality of life.

Epidemiology

Ankle osteoarthritis accounts for 6-13% from all of arthritis in the body.[3] Lateef et al reported that nearly 7% of a large, well-characterized, community-based cohort of older individuals (864 participants) had radiographic ankle osteoarthritis.[4] In our institution, the incidence of symptomatic ankle osteoarthritis was 4.1%, based on a review of 318 patients in the foot and ankle service. One of major causes of the ankle osteoarthritis is the post-traumatic issue. For instance, the natural progression of post-traumatic osteoarthritis is shown in a 49-year-old woman who suffered a traumatic event and a left talar fracture that led to avascular necrosis, nonunion, deformed articular surface of the talar dome, and deformity of the talus (Figure 1.2). Apoptosis of chondrocytes and fibrous union were found in the histopathologic sections (Figure 1.3).

Figure 1.2 Ankle radiographs.
A. Anteroposterior view shows nonunion of a talar dome fracture.
B. Lateral view shows the deformed articular surface of the talar dome and deformed talar morphology with anterior subluxation of the talus.

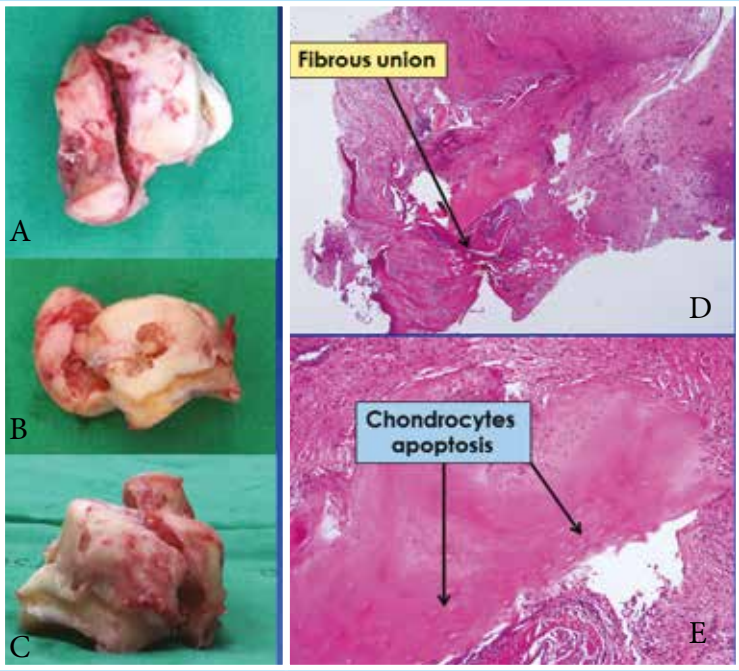


Figure 1.3 demonstrate the gross appearances as the nonunion and osteo-arthritic changes of talus (A-C) and pathologic sections with the fibrous union and chondrocytes apoptosis (D-E) of a talus from a patient in figure 1.2 who had a talectomy for the total talar prosthesis replacement.