

MODERN TEXTBOOK OF
**FORENSIC MEDICINE
& TOXICOLOGY**

Putul Mahanta



JAYPEE

Modern Textbook of **FORENSIC MEDICINE AND TOXICOLOGY**

Editor

Putul Mahanta MD FIAMLE

Associate Professor

Department of Forensic Medicine and Toxicology

Tezpur Medical College

Tezpur, Assam, India

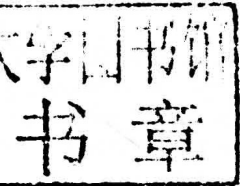
Forewords

UC Sarma

PC Sarmah

Anil Aggrawal

RK Gorea



JAYPEE

JAYPEE BROTHERS MEDICAL PUBLISHERS (P) LTD.

New Delhi • London • Philadelphia • Panama



Jaypee Brothers Medical Publishers (P) Ltd

Headquarters

Jaypee Brothers Medical Publishers (P) Ltd
4838/24, Ansari Road, Daryaganj
New Delhi 110 002, India
Phone: +91-11-43574357
Fax: +91-11-43574314
Email: jaypee@jaypeebrothers.com

Overseas Offices

J.P. Medical Ltd
83 Victoria Street, London
SW1H 0HW (UK)
Phone: +44-2031708910
Fax: +02-03-0086180
Email: info@jpmedpub.com

Jaypee-Highlights Medical Publishers Inc.
City of Knowledge, Bld. 237, Clayton
Panama City, Panama
Phone: +1 507-301-0496
Fax: +1 507-301-0499
Email: cservice@jphmedical.com

Jaypee Medical Inc.
The Bourse
111 South Independence Mall East
Suite 835, Philadelphia, PA 19106, USA
Phone: +1 267-519-9789
Email: jpmed.us@gmail.com

Jaypee Brothers Medical Publishers (P) Ltd
17/1-B Babar Road, Block-B, Shaymali
Mohammadpur, Dhaka-1207
Bangladesh
Mobile: +08801912003485
Email: jaypeedhaka@gmail.com

Jaypee Brothers Medical Publishers (P) Ltd
Bhotahity, Kathmandu, Nepal
Phone: +977-9741283608
Email: kathmandu@jaypeebrothers.com

Website: www.jaypeebrothers.com

Website: www.jaypeedigital.com

© 2014, Jaypee Brothers Medical Publishers

The views and opinions expressed in this book are solely those of the original contributor(s)/author(s) and do not necessarily represent those of editor(s) of the book.

All rights reserved. No part of this publication may be reproduced, stored or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission in writing of the publishers.

All brand names and product names used in this book are trade names, service marks, trademarks or registered trademarks of their respective owners. The publisher is not associated with any product or vendor mentioned in this book.

Medical knowledge and practice change constantly. This book is designed to provide accurate, authoritative information about the subject matter in question. However, readers are advised to check the most current information available on procedures included and check information from the manufacturer of each product to be administered, to verify the recommended dose, formula, method and duration of administration, adverse effects and contraindications. It is the responsibility of the practitioner to take all appropriate safety precautions. Neither the publisher nor the author(s)/editor(s) assume any liability for any injury and/or damage to persons or property arising from or related to use of material in this book.

This book is sold on the understanding that the publisher is not engaged in providing professional medical services. If such advice or services are required, the services of a competent medical professional should be sought.

Every effort has been made where necessary to contact holders of copyright to obtain permission to reproduce copyright material. If any have been inadvertently overlooked, the publisher will be pleased to make the necessary arrangements at the first opportunity.

Inquiries for bulk sales may be solicited at: jaypee@jaypeebrothers.com

Modern Textbook of Forensic Medicine and Toxicology

First Edition: **2014**

ISBN: 978-93-5152-211-9

Printed at Replika Press Pvt. Ltd.

CONTRIBUTORS

Abdulwahab Ali Abuderman MD PhD

Vice Dean
Department of Quality and
Development
College of Medicine
Salman bin Abdulaziz University
Al-Kharj, Kingdom of
Saudi Arabia



Adarsh Kumar MD

PGCHM Commonwealth
Fellow (UK) FRSM FIAMLE
Additional Professor
Department of Forensic
Medicine and Toxicology
All India Institute of Medical
Sciences
New Delhi, India



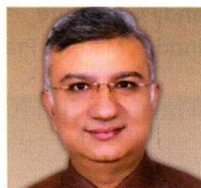
AJ Patowary MD Fellow NCFM

Associate Professor
Department of Forensic
Medicine and Toxicology
Gauhati Medical College
and Hospital
Guwahati, Assam, India



Ajay Logani BDS MDS

Associate Professor
Department of Conservative
Dentistry and Endodontics
Center of Dental Education
and Research
All India Institute of Medical Sciences
New Delhi, India



Akash Deep Aggarwal

MD DNB DFM (Australia)

Associate Professor
Department of Forensic
Medicine and Toxicology
Government Medical College
Patiala, Punjab, India



Anil Garg MD (Forensic Medicine and Toxicology)

Joint Editor
Journal of Punjab Academy
of Forensic Medicine and
Toxicology
Associate Professor
Department of Forensic
Medicine
Gian Sagar Medical College
and Hospital
Patiala, Punjab, India



Anku Moni Saikia MD (Social and Preventive Medicine)

Associate Professor
Department of Community
Medicine
Gauhati Medical College
Guwahati, Assam, India



Anurupa Choudhury

MD (Forensic Medicine and
Toxicology)

Department of Forensic
Medicine and Toxicology
Gauhati Medical College
and Hospital
Guwahati, Assam, India



CB Jani MD (Patho) MD
DNB (Forensic Medicine and
Toxicology) LLB

Professor and Head
Department of Forensic
Medicine and Toxicology
Gujarat Cancer Society
Medical College
Ahmedabad, Gujarat, India



Imran Sabri MD
(Forensic Medicine and Toxicology)

Faculty of Forensic Medicine
Department of Biomedical
Sciences
College of Medicine, King
Faisal University
Al-Ahsa, Kingdom of
Saudi Arabia



Chaithra V BDS MDS

Faculty
The Oxford Dental Collage
Hospital and Research Center
Bengaluru, Karnataka, India



KK Bairagi MD
(Forensic Medicine and Toxicology)

Professor and Head
Department of Forensic
Medicine and Toxicology
Tagore Medical College and
Hospital
Rathinamangalam
Chennai, Tamil Nadu, India



Deepanjali Medhi MD
(Psychiatry)

Associate Professor
Department of Psychiatry
Gauhati Medical College and
Hospital
Guwahati, Assam, India



Madhab Ch Rajbongshi
MS FAIS FMAS FICS

Faculty
Department of Surgery
Gauhati Medical College and
Hospital
Guwahati, Assam, India



Deepjyoti Kalita MD
(Microbiology)

Associate Professor
Department of Microbiology
Fakhruddin Ali Ahmed Medical
College
Barpeta, Assam, India



Manish Nigam MD
(Forensic Medicine and
Toxicology)

Professor and Head
Department of Forensic
Medicine and Toxicology
Sri Aurobindo Medical College
and PG Institute
Indore, Madhya Pradesh, India



Gunajit Das MD (Forensic
Medicine and Toxicology)

Associate Professor
Department of Forensic
Medicine and Toxicology
Silchar Medical College and
Hospital
Silchar, Assam, India



Manjula Bai KH MD
(Forensic Medicine and
Toxicology)

Professor and Head
Department of Forensic
Medicine and Toxicology
Jawaharlal Nehru Medical
College
KLE University
Belgaum, Karnataka, India



HK Mahanta DFM MD LLB

Professor and Head
Department of Forensic
Medicine and Toxicology
Assam Medical College
Dibrugarh, Assam, India



Monika Garg MD
(Pathology)

Associate Professor
Department of Pathology
MM Institute of Medical
Sciences and Research
Mullana, Haryana, India



Mrinal Haloi MD
(Forensic Medicine and
Toxicology)

Department of Forensic
Medicine and Toxicology
Gauhati Medical College,
Guwahati, Assam, India



Mukesh Yadav BSc
MD (FMT) MBA (HCA) LLB
PGDHRMD

Editor
Journal of Indian Academy
of Forensic Medicine
Professor and Head
Department of Forensic
Medicine and Toxicology
School of Medical Sciences and Research,
Sharda University
Greater Noida, Uttar Pradesh, India



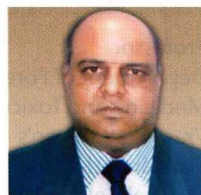
Nisha Goyal MS
(Anatomy)

Faculty
Department of Anatomy
Adesh Institute of Medical
Sciences and Research
Adesh University
Bathinda, Punjab, India



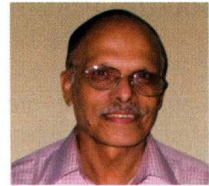
NK Aggarwal MD
WHO Fellow

Professor and Head
Department of Forensic
Medicine and Toxicology
University College of Medical
Sciences and GTB Hospital
New Delhi, India



PC Sarmah DFM MD
(Forensic Medicine and Toxicology)
LLB FICFMT FIAFM

Professor and Head
Department of Forensic
Medicine and Toxicology
Sikkim Manipal Institute of
Medical Sciences
Gangtok, Sikkim, India
Formerly Head
Department of Forensic
Medicine and Toxicology
Gauhati Medical College
Guwahati, Assam, India



Pooja Malik Puri BDS
MSc (Forensic Science)

Faculty
Amity Institute of Forensic
Sciences
Amity University
Noida, Uttar Pradesh, India



Prabir Kumar Dev MD
(Forensic Medicine and Toxicology)

Professor
Department of Forensic
Medicine and Toxicology
Nilratan Sircar Medical College
Kolkata, West Bengal, India



Pushendra Malik

Department of Onco-surgery
Postgraduate Institute of
Medical Sciences
Rohtak, Haryana, India



Putul Mahanta MD
FIAMLE

Associate Professor
Department of Forensic
Medicine and Toxicology
Tezpur Medical College
Tezpur, Assam, India



Raktim Pratim Tamuli

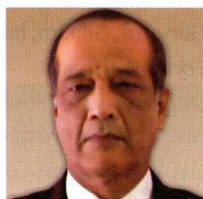
MD (Forensic Medicine and Toxicology)

Department of Forensic Medicine and Toxicology
Tezpur Medical College
Tezpur, Assam, India

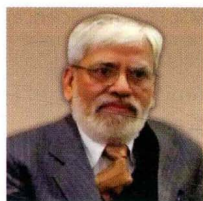
**Rituraj Chaliha** MD

(Forensic Medicine and Toxicology)

Professor and Head
Department of Forensic Medicine and Toxicology
Gauhati Medical College and Hospital
Guwahati, Assam, India

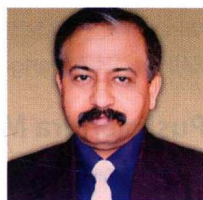
**RK Gorea** BSc MD PhD DNB

College of Medicine
Salman Bin Abdul Aziz
University
Al Kharj, Saudi Arabia
Chief Adviser Indo-Pacific
Academy of Forensic
Odontology
President: Indo-Pacific Academy of
Forensic Nursing Science
President: Society for Prevention of Injuries and
Corporal Punishment

**Sanjoy Das** MD (Forensic

Medicine and Toxicology)

Professor and Head
Department of Forensic
Medicine and Toxicology
Himalayan Institute of Medical
Sciences
Jolly Grant, Dehradun, Uttarakhand, India

**Shouvanik Adhya** MD

(Forensic Medicine and Toxicology)

Faculty
Department of Forensic
Medicine and Toxicology
College of Medicine and
JNM Hospital
West Bengal University of Health Sciences
Kalyani, West Bengal, India

**Sunit Kr Joshi** MD

(Forensic Medicine and Toxicology)

Associate Professor
Department of Biomedical
Sciences
KPC Medical College
Jadavpur, West Bengal, India

**Thejaswi HT** MD (Forensic

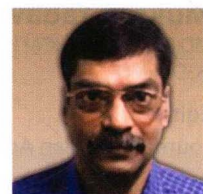
Medicine and Toxicology)

Department of
Forensic Medicine
All India Institute of
Medical Sciences
New Delhi, India

**TK Bose** MD DFM

(Forensic Medicine and Toxicology)

Professor and Head
Department of Forensic
Medicine and Toxicology
National Medical College
West Bengal University of
Health Sciences
Kolkata, West Bengal, India
Ex-Sectional President (Med Sc)
Indian Science Congress 2009-10

**Vijayamahantesh SN**

MD (Forensic Medicine and Toxicology)

Associate Professor
Department of Forensic
Medicine and Toxicology
S Nijalingappa Medical College
Bagalkot, Karnataka, India

**Vijayanath V** MD DNB

(Forensic Medicine and Toxicology)

Professor
Department of Forensic
Medicine and Toxicology
Vinayaka Mission's
Kirupananda Variyar
Medical College
Salem, Tamil Nadu, India



YN Singha MD (Forensic
Medicine and Toxicology)
RCGP FIDM

Faculty
Department of Forensic
Medicine and Toxicology
Silchar Medical College
Silchar, Assam, India



Yogender Malik MD
(Forensic Medicine and Toxicology)

Faculty
Department of Forensic
Medicine and Toxicology
Bhagat Phool Singh
Government Medical College
for Women
Sonapat, Haryana, India



ADVISORS

Aboelyazied Ahmed Fouad MD

Course Coordinator, Forensic Medicine
Department of Biomedical Sciences
Chairman of Student Academic Affairs Committee
College of Medicine
King Faisal University
Al-Ahsa, Kingdom of Saudi Arabia

Ajoy Gupta MD

Professor and Head
Department of Forensic Medicine
and Toxicology
KPC Medical College
Jadavpur, West Bengal, India

Anil Aggrawal MD

Director and Professor
Department of Forensic Medicine
Maulana Azad Medical College
New Delhi, India

Cliford Parera

Professor and Head
Department of Forensic Medicine
Galle, Sri Lanka

H Sarma MD

Professor and Head
Department of Forensic Medicine
and Toxicology
Agartala Government Medical College
Agartala, Tripura, India

Khaled M Gdarah MD

Professor and Head
Department of Forensic Medicine and Toxicology
Tripoli University
Tripoli, Libya

Nageshkumar G Rao MD

Professor
Department of Forensic Medicine
and Toxicology
SDM College of Medical Sciences, Dharwad
Director, Medicolegal Point
Manipal, Karnataka, India

PC Sarmah DFM MD LLB FICFMT FIAFM

Professor and Head
Department of Forensic Medicine
and Toxicology
Sikkim Manipal Institute of
Medical Sciences
Gangtok, Sikkim, India
Formerly Head
Department of Forensic Medicine
and Toxicology
Gauhati Medical College
Guwahati, Assam, India

Pradip Kumar Thakuria MD (Psy)

MD (FMT) FIPS DFID

Associate Professor
Department of Forensic Medicine
and Toxicology
Gauhati Medical College
Guwahati, Assam, India

RK Gorea MD PhD DNB (Forensic Medicine)

College of Medicine
Salman Bin Abdul Aziz University
Al Kharj, Saudi Arabia
Chief Adviser Indo-Pacific Academy of Forensic
Odontology
President: Indo-Pacific Academy of Forensic Nursing
Science
President: Society for Prevention of Injuries and
Corporal Punishment

RK Sarma MD

Former Head
Department of Forensic Medicine
and Toxicology
All India Institute of Medical Sciences
New Delhi, India

TK Bose MD DFM

Professor and Head
Department of Forensic Medicine and Toxicology
National Medical College
West Bengal University of Health Sciences
Kolkata, West Bengal, India

ASSOCIATE EDITORS

Adarsh Kumar MD PGCHM Commonwealth
Fellow (UK) FRSM FIAMLE

Additional Professor
Department of Forensic Medicine
and Toxicology
All India Institute of Medical Sciences
New Delhi, India

AJ Patowary MD Fellow NFCFM

Associate Professor
Department of Forensic Medicine
and Toxicology
Gauhati Medical College and Hospital
Guwahati, Assam, India

Akash Deep Aggarwal MD DNB DFM
(Australia)

Associate Professor
Department of Forensic Medicine
and Toxicology
Government Medical College
Patiala, Punjab, India

CB Jani MD (Patho) MD DNB
(Forensic Medicine and Toxicology) LLB

Professor and Head
Department of Forensic Medicine
and Toxicology
Gujarat Cancer Society Medical College
Ahmedabad, Gujarat, India

Gunajit Das MD
(Forensic Medicine and Toxicology)

Associate Professor
Department of Forensic Medicine and Toxicology
Silchar Medical College and Hospital
Silchar, Assam, India

KK Bairagi MD
(Forensic Medicine and Toxicology)

Professor and Head
Department of Forensic Medicine
and Toxicology
Tagore Medical College and Hospital
Rathinamangalam
Chennai, Tamil Nadu, India

Mukesh Yadav BSc MD (FMT)
MBA (HCA) LLB PGDHRMD

Editor
Journal of Indian Academy of
Forensic Medicine
Professor and Head
Department of Forensic Medicine
and Toxicology
School of Medical Sciences and Research
Sharda University
Greater Noida, Uttar Pradesh, India

Vijayanath V MD DNB
(Forensic Medicine and Toxicology)

Professor
Department of Forensic Medicine and Toxicology
Vinayaka Mission's Kirupananda
Variyar Medical College
Salem, Tamil Nadu, India

Manish Nigam MD
(Forensic Medicine and Toxicology)

Professor and Head
Department of Forensic Medicine
and Toxicology
Sri Aurobindo Medical College and PG Institute
Indore, Madhya Pradesh, India



FOREWORD

The book edited by Putul Mahanta entitled *Modern Textbook of Forensic Medicine and Toxicology* is an excellent book. The book contains 52 chapters, and eminent contributors have contributed a lot. The book also contains excellent colorful figures for easy understanding and self-learning. There was a long-felt need for a good textbook of this standard. The book deals with application of the principles and knowledge of medicine for the purpose of law, both civil and criminal. The common people believe that doctors are meant for treating patients. In addition to patient care, doctors are having the responsibilities to help the law enforcement authorities in handling legal matters. For this, medical students are to study Forensic Medicine as well as Toxicology. A doctor plays vital role in judgment delivery process as an important witness.



I hope, this book will fulfill long-felt need of both undergraduate and postgraduate students as well as teachers in the subject of Forensic Medicine and Toxicology.

UC Sarma MBBS (Gau) MD (BHU)

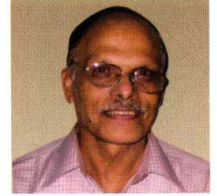
MSc in Epidemiology (London University)

PG Training in Epidemiology (London University)

Vice Chancellor, Srimanta Sankaradeva University of Health Sciences
Narakasur Hilltop, Bhangagarh, Guwahati, Assam, India
Former Director of Medical Education, Assam

FOREWORD

The usage of Forensic/Legal Medicine (term used in Western Countries) of medical science is by the law enforcement authorities for investigating criminal cases to identify criminals, thereby maintaining the law and order in the society. Every branch of medical science needs to be utilized for bringing out the truth and proving actual crime beyond reasonable doubt. In fact, forensic medicine serves as the link between the society and legal system.



Since time immemorial, forensic medicine has been developing to reach the present stage. In modern-day society, criminals use more sophisticated tools to commit crimes unlike the olden days' crimes committed by crude method. Apart from dealing with diseases, doctors often have to help the crime investigating authorities by providing information gathered during the treatment of victim and/or assailant and, at times have to depose in the Honorable Court about the case. Therefore, forensic medicine has been incorporated as a compulsory subject in the MBBS course.

Until *Modi's Medical Juridature and Toxicology* came out in 1920, books of forensic medicine written by foreign writers were followed in India. Subsequently, *Essentials of Forensic Medicine and Toxicology* (1973) written by Dr KS Narayan Reddy has served the purpose. At present, many standard books by Indian authors are available in the market. However, with more than 38 years of experience in the subject, I believe that it is not possible to include all possible types of medicolegal cases in one book.

That is why, I feel immense pleasure for writing this Foreword. Dr Putul Mahanta, who has been one of my beloved students and now active and dedicated teacher of the specialty of forensic medicine, has taken pain to include maximum problems in the subject. I congratulate him.

I hope, this book will provide knowledge and information on forensic medicine and toxicology to the medical students, doctors, lawyers, investigators and law enforcement authorities, apart from fulfilling the mission of the author.

PC Sarmah DFM MD (Forensic Medicine and Toxicology)
LLB FICFMT FIAFM

Professor and Head
Department of Forensic Medicine and Toxicology
Sikkim Manipal Institute of Medical Sciences
Gangtok, Sikkim, India
Formerly Head
Department of Forensic Medicine and Toxicology
Gauhati Medical College
Guwahati, Assam, India

FOREWORD

Forensic Medicine is a vast and ever-challenging subject. It is a unique subject, where undergraduates, postgraduates and faculty alike have to keep pace with developments not only in medicine but also in law. Recent changes in Transplantation of Human Organs and Tissues Act, 1994, Preconception and Prenatal Diagnostic Techniques Act, 1994, Medical Termination of Pregnancy Act 1971 and several other laws have been so wide ranging that an informed commentary is necessary on them.



Similarly, on medicine front, a number of new technologies, especially covering DNA sciences, are coming up almost on a monthly basis. So much so that there are about 20 journals, indexed by PubMed, dedicated to forensic medicine and toxicology alone. Moreover, even all of them combined are not able to include all information, with the result that much research relevant to forensic medicine are being published in journals dedicated to other specialties. One can imagine the daunting task a postgraduate student faces in keeping pace with these latest developments.

I have always felt that this country has lacked a genuine postgraduate book in forensic medicine, which provides the latest information in law and medicine to the overburdened postgraduate student. Thankfully, Dr Putul Mahanta, a senior faculty and a highly dedicated person in our profession, has taken up this challenge and has come out with just the right type of book that was always in my mind. Dr Mahanta, whom I know for more than a decade, has worked in foreign country on an advisory basis. He regularly updates himself with the latest knowledge in forensic medicine and toxicology by reading the latest journals and has put together all the latest materials in his book.

I have gone through the contents of this book and I am quite satisfied that it contains all relevant chapters. Dr Mahanta has taken care to put on board a number of medical and legal luminaries from across the country, so that the book could be enriched by their combined experience. I wholeheartedly recommend this book to all undergraduates, postgraduates, researchers and faculty members of forensic medicine. I wish Dr Mahanta good luck in his endeavor.

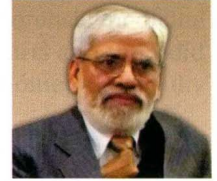
Anil Aggrawal MD

Director and Professor
Department of Forensic Medicine
Maulana Azad Medical College
New Delhi, India

FOREWORD

It gives me immense pleasure in writing the foreword of the *Modern Textbook of Forensic Medicine and Toxicology* edited by Dr Putul Mahanta. Dr Mahanta is known for his dedication to the field of forensic medicine, and I am overwhelmed at the hard work done by him in bringing out this book. He has been successful in inviting many renowned personalities of forensic medicine in India to write in this book and review the chapters.

I wish him all success in his endeavor and hope this book will prove very useful to undergraduate as well as postgraduate students of Forensic Medicine.



RK Gorea BSc MD PhD DNB

College of Medicine
Salman Bin Abdul Aziz University
Al Kharj, Saudi Arabia

Chief Adviser Indo-Pacific Academy of Forensic Odontology
President, Indo-Pacific Academy of Forensic Nursing Science
President, Society for Prevention of Injuries and Corporal Punishment

PREFACE

While I was pursuing my postgraduation, I felt the want of a good textbook on forensic medicine and toxicology with beautiful photographs, colorful illustrations, tables, flow charts and the valid references for faster and better comprehension. The problem prevailed when I joined the faculty as a member.

While I was abroad, I have seen many foreign books on our profession that have been written elaborately, explained with beautiful illustrations and flushed with plenty of high-resolution photographs. They also cite the references, which are essential for the readers to understand the source of the text.

Thus, the idea of writing a book, shaped in my mind, a decade ago.

This book has been aimed to cover the needs of undergraduate as well as the postgraduate students by following the whole curriculum as per Medical Council of India (MCI). I hope it would be useful not only for the students and the doctors working in rural hospitals who deal in the maximum number of medicolegal cases, but also for the faculty of our fraternity, besides students pursuing careers in Dentistry, Ayurvedic and Homeopathic professions.

The book contains 52 chapters along with a number of useful proforma as Annexures. A good number of new topics such as forensic osteology; forensic odontology; human rights, custodial torture and deaths; crime scene investigation and techniques in museum, have increased the depth and width of the book. All the text illustrations are updated with recent advancement on forensic medicine.

Special emphasis has been given to the upcoming concepts such as biomedical waste management, human experimentation, DNA profiling and related issues.

I sincerely hope this book will serve the intent and help the readers to learn the subject. All the positive critiques will be my strength for further improvement of this book.

Putul Mahanta

ACKNOWLEDGMENTS

Writing any book is a mammoth job. It would not have been possible to write this book without the help and support of the distinguished people around me.

As many as 35 experts, both national and international, have contributed materials of the book, including some illustrations. I sincerely hope that these contributions will definitely benefit the readers. I would like to take this opportunity to thank Prof PC Sarmah, Prof RK Gorea, Prof Anil Aggrawal, Prof Sanjoy Das, Prof CB Jani, Prof TK Bose, Prof Mukesh Yadav, Prof R Chaliha, Prof HK Mahanta and Prof Manjula Bai KH.

Prof SI Barbhuiyan, Prof BC Roy Medhi, Prof Kailash Bhatta, Prof KC Das, Prof Rupak Gogoi, Dr Dilip Goswami and Dr PK Thakuria were my constant source of inspiration.

Dr Adarsh Kumar, Dr AJ Patowary, Dr Vijayanath V, Dr Prabir Kr Dev, Dr Gunajit Das, Dr Deepanjali Medhi, Dr Vijayamahantesh SN, Dr Asad U Khan, Dr Anil Garg, Dr Akash Deep Aggarwal, Dr Anku Moni Saikia, Dr Deepjyoti Kalita, Dr Kaustav Bairagi, Dr Chaithra V, Dr Sunit Kr Joshi, Dr Imran Sabri, Dr YN Singha, Dr Yogender Malik, Dr Anurupa Choudhury, Dr Pooja M Puri, Dr Madhab Ch Rajbongshi, Dr Shouvanik Adhya, Dr P Malik, and Dr Raktim Pratim Tamuli deserve my deepest gratitude for providing meliorate text materials, illustrations and photographs.

I especially thank Professor Sir Alec Jeffreys, pioneer of DNA fingerprinting, for allowing me to publish his First DNA fingerprints.

Detailed chapter reviews were accredited to help me establish the necessary changes required for the book, and I am extremely grateful to Prof Ajoy Kr Gupta of KPC Medical College, West Bengal, Prof NK Hazarika, Prof KL Talukdar and Prof Joydev Sarma, from Gauhati Medical College for reviewing Medical Law, Ethics and Medical Negligence; Food Poisoning, the Forensic Osteology chapters respectively.

I had to implore and borrow some of the photographs that appear in this book from my colleagues, and I am grateful to them for their support. They are acknowledged on the respective pages. I am extremely grateful to my colleagues Dr MK Singha, Dr Kanika K Barua, Dr SJ Deka, Dr Richa Pandey, Dr NM Kakati, Dr NK Das, Dr Arnab Pratim Baruah, Dr Nayan Moni Pathak, Dr Mrinal Haloi, Dr Arpan Mazumder, Dr (Mrs) Renuka Rongpharpi and Dr Dhritiman Nath for proofreading.

Dr Khanindra Mohan Soud, Dr SMI Kabir, Dr Mamata Devi Haloi, Dr Manoj Kr Baishya, Dr Ved Prakash Gupta, Dr Biswadeep Paul, Dr Arup Kr Das, Dr Gautam Nath, Dr Braja Gopal Das, Dr Aditya Madhab Baruah, Dr Debarshee Chakraborty, Dr Noor Jahan Ahmed, Dr Sainjalee Halflongbar, Dr Dipankar Thakuria, Dr Arunav Borah and Dr Smritimala Sarmah deserve special thanks for their persistent support and encouragement.

I am especially grateful to Shri Jitendar P Vij (Group Chairman), Mr Ankit Vij (Managing Director) and Mr Tarun Duneja (Director-Publishing) of M/s Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, India, for their expertise in the shaping, collation and illustration