

Second Edition

Volume
3

Second Edition

Volume 3

Manipal Manual of Clinical Anatomy

Competency Based Undergraduate Curriculum for the Indian Medical Graduate

Highlights of the Book

- Complete coverage of General Anatomy, Gross Anatomy, Osteology, Histology, Embryology and Genetics in three volumes
- Every chapter clearly highlights the learning objectives for the students and matching them with NMC guided competencies
- Nearly 1500 high quality-coloured illustrations, including 2-dimensional images for understanding the anatomy and simple line diagrams to enable presentation of topics/answers in structured subjective examinations
- High quality of photomicrograph of histology slides which are supplemented by schematic illustrations which would help the students while drawing the same in their histology practical record book
- Clinical correlations of the anatomical region being highlighted in green boxes immediately after the description of the topic. This would help the students to correlate the anatomy what they have learned with its clinical applications
- Nearly 220 appropriate case scenarios are included to facilitate self-study and discussion, aimed to sensitize the students to clinical relevance of anatomy and would make learning anatomy a joyful experience
- Just before the exam, adequate tabulations, Flowcharts, Mnemonics which help the students to prepare for their examination
- A detailed list of possible questions for the theory examination, list of possible OSPE/spotter's questions for the practical examination and histology spotter's exams identification notes
- Microscopic anatomy descriptions matching with function (physiology) and biochemistry for integration of basic medical sciences
- More than 1000 high yield, application based multiple-choice questions (MCQs) that will aid in preparation for competitive postgraduate entrance tests and USMLE Step I examination

Sampath Madhyastha is an alumnus of Kasturba Medical College, Manipal and former Additional Professor of Anatomy, Kasturba Medical College, Mangalore (Manipal Academy of Higher Education) and is currently the Program Director of Postgraduate Studies in the department of Anatomy, Faculty of Medicine, Kuwait University, Kuwait. He has been teaching Human Anatomy to students of Medicine, Dentistry and Allied Health Science courses for the past 25 years in India and abroad. He is vastly experienced in understanding, designing and delivery of anatomy curriculum at both undergraduate and postgraduate levels. His international experience is reflected in this manual and makes it very special and distinctive. His *Manipal Manual of Anatomy for Allied Health Science Courses* is the most preferred book for allied health science courses in India and abroad. He is an outstanding teacher and won the heart of thousands of medical students in India. He has been awarded 'Good Teacher Award' many times instituted by Kasturba Medical College, Mangalore. Apart from teaching, Dr. Madhyastha is actively involved in research in the field of neuroscience. He has published more than 70 research papers in reputed national and international journals. He is the recipient of many independent research grants offered by Indian Council of Medical Research (ICMR). He has guided many doctoral theses in Manipal Academy of Higher Education. He has involved many undergraduate medical students in ICMR sponsored students' research. He has been awarded the prestigious Dr TMA Pai Gold medal for excellence in medical research.



M Chakrapani is a renowned physician with three decades of experience in teaching and patient care. Currently he is a Professor of Medicine at Kasturba Medical College, Mangalore (Manipal Academy of Higher Education), India. He is the former Associate Dean and Director of Research at Kasturba Medical College, Mangalore. He is currently the unit head of Medicine III at Kasturba Medical College, Mangalore. His area of expertise is Insulin resistance, Machine learning in Medicine Apart from his teaching and patient care commitments, he has immensely contributed to medical research by publishing original research articles in national and international reputed journals. He has many awards to his credit and to name a few are gold medal for best outgoing medical graduate, good teacher award, distinguished alumni awards. Above all his academic achievements he is a great human being.



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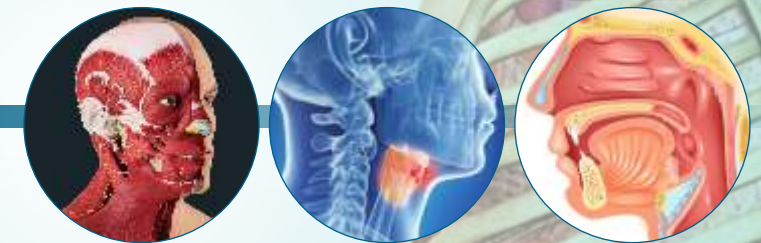
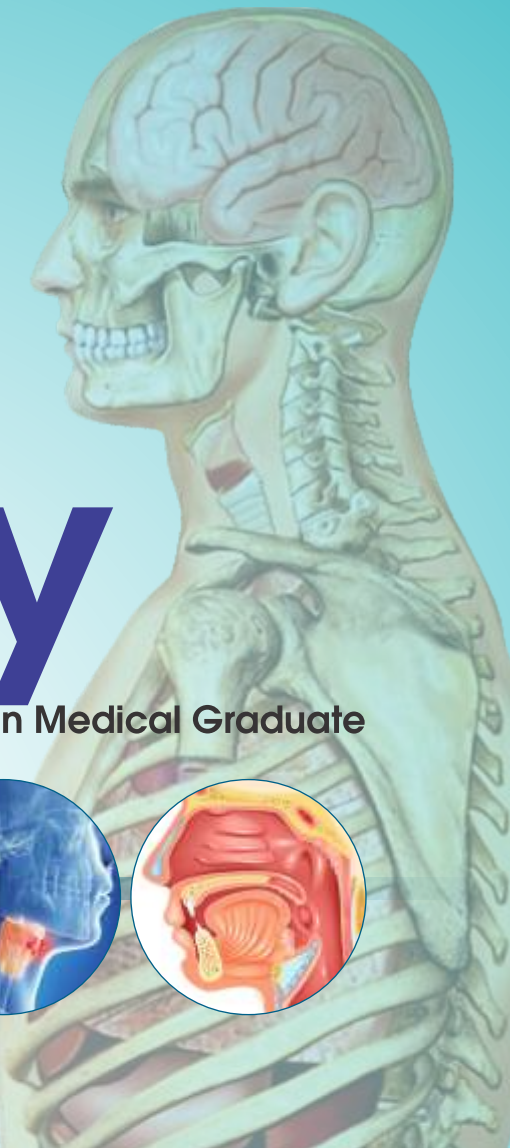
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Volume 3

Manipal Manual of Clinical Anatomy

Competency Based Undergraduate Curriculum for the Indian Medical Graduate



- Head and Neck
- Central Nervous System

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- Central Nervous System



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Manipal Manual of
**Clinical
Anatomy**

Competency based Undergraduate Curriculum for the Indian Medical Graduate

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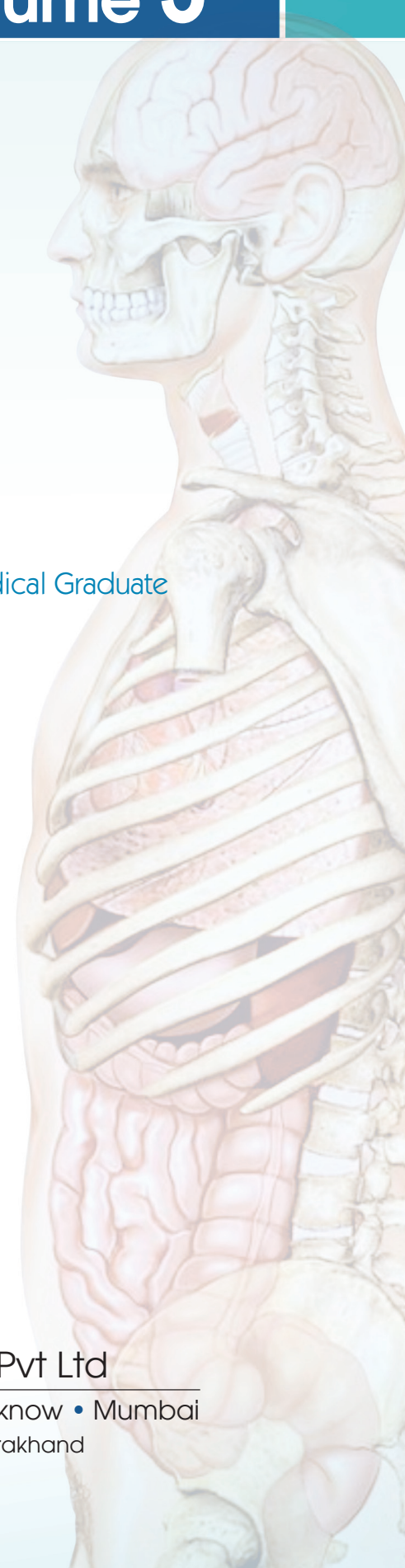
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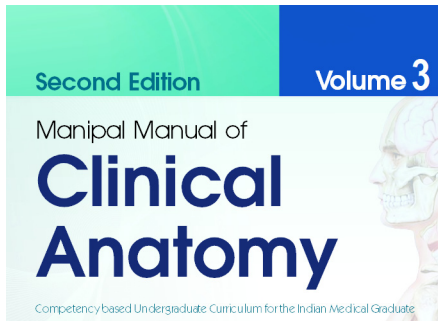
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Foreword



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It is a pleasure to write the Foreword to Dr Sampath Madhyastha's *Manipal Manual of Clinical Anatomy*. Dr Sampath's willingness to share his knowledge with his students and his ability to simplify content make this book unique. Moreover, he has provided both horizontal and vertical integration in keeping with the requirements of competency based medical education. To write a book that is having both comprehensiveness and clarity requires considerable expertise. Dr Sampath, with his vast experience as a concerned teacher, has this expertise to make a daunting task look easy. I applaud him for his conscientious efforts to promote student learning through his book. He has paid attention to details while highlighting important concepts with a clinical context in a lucid manner.

I am certain that this book will be an invaluable asset as a superb learning resource to every student of anatomy.

 28 Dec. 2022

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Preface to the Second Edition

The preface to the first edition began with advocating for a revision of undergraduate medical curriculum especially in Anatomy which was long due. The previous curriculum was overloaded with information where the students were expected to learn anatomy from many textbooks (general anatomy, gross anatomy, histology, embryology, genetics, neuroanatomy) during their short academic period of approximately ten months. Further the evaluation process was also focusing mainly on recalling the information rather than testing the critical thinking ability of the students or their application skills. Hence, the first edition of *Manipal Manual of Clinical Anatomy* attempted to address these issues where all branches of human anatomy was presented in just two volumes without diluting the contents. Further the manual had a lot of case scenarios which enabled the students to apply their anatomy knowledge in clinical practice. The vast number of clinically oriented MCQs further enhanced the critical thinking and problem-solving skills of the students. The first edition of *Manipal Manual of Clinical Anatomy* (2014) was unique and first among the many anatomy textbooks in many aspects. There was mixed response among the anatomy fraternity, majority in support of our view while others cautioned about early exposure of clinical anatomy for the first-year medical students. The National Medical Commission (NMC) during 2019 introduced competency-based curriculum to undergraduate medical students which was perfectly matching with our previous thoughts. Thanks to NMC for a well thought and designed curriculum which is expected to be a game-changer in undergraduate medical education. The NMC further encouraged the academicians and policymakers to introduce more interactive teaching and learning approaches as well as evaluation methods which test the application skills of the students. This is an initial step in overhauling the medical curriculum which was long due. There is a further need to integrate the pre- and paraclinical subjects with the clinical subjects. At present there is a thick barrier between the subjects with a poor integration. The second edition of *Manipal Manual of Clinical Anatomy* tries to address these issues, especially breaking the barrier between the subjects by highlighting the integrations in clinical notes and case scenarios. Based on the feedback from the eminent anatomists and based on NMC suggested competency based curriculum, the *Manipal Manual of Clinical Anatomy* is now revised thoroughly and presented as a second edition. The second edition has more elaborated tissue and organ histology which was inadequate in the first edition. Hence, the book is presented in three volumes.

Sampath Madhyastha

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Preface to the First Edition

The anatomy curriculum for the medical undergraduate students is a matter of debate in India since many years with medical education experts calling for restructuring/reframing of the same. Unfortunately, no substantial measures were implemented in the past in revising the syllabus and the student evaluation process. Most of the recommended books are loaded with excess of information for the undergraduate understanding with every new volume creating a 'curriculum hypertrophy'. At present, most of the standard recommended books for all branches of anatomy (general anatomy, gross anatomy, osteology, embryology, histology and neuroanatomy) accumulates to approximately 2500 pages with the students having to assimilate this 'information influx' in less than one academic year. Though opinions differ regarding the ideal duration of the study course in Anatomy, the basic need is to tackle the 'curriculumomegaly'. The *Manipal Manual of Clinical Anatomy* has embraced and matched this task to a great extent after continuous discussions with physicians, surgeons and senior anatomists. With exception of histology, all other branches of anatomy are succinctly covered in 1000 pages without any 'dilution' of the subject content, merely by omitting additional information that is not warranted at an undergraduate level.

The objectives that are clearly identified in each area after thorough discussions with experts will enable both teachers and students to focus on key issues of every topic. Currently, strong views are emerging that traditional methods of teaching anatomy as practiced by most medical schools have limitations in development of application skills of such knowledge in clinical practice. The teaching methodologies and student evaluations are mainly focused on memorizing and recalling the stringent course and relations of human body parts with no value-addition in development of application skills. The *Manipal Manual of Clinical Anatomy* discusses the clinical relevance immediately after elaboration of the gross anatomy, which greatly aids the students in correlation of anatomy with the clinical application. Clinical case scenarios that are carefully designed to emphasise the importance of anatomy could be further elaborated for problem-based learning. These clinical case scenarios are placed immediately after clinical relevance boxes, so that the students can discuss the cases in groups where the teacher can act as a facilitator. Medical schools that follow the systemic rather than regional anatomy approach for integrated teaching will also be benefited by these case studies. Developmental events (embryology) are briefly summarized with more emphasis on birth defects and their embryological basis. Multiple choice questions are designed on the basis of clinical application of anatomy, which would help them in future competitive postgraduate entrance tests.

The *Manipal Manual of Clinical Anatomy* is hereby offered as a genuine attempt to view Human Anatomy in a new dimension. Your suggestions and feedback are welcome to improve this Manual to meet the requirements of the students and make the learning of anatomy an enjoyable experience.

2015

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My sincere thanks to Dr M Chakrapani, Professor of Internal Medicine, Kasturba Medical College, Mangaluru, India, for his ample assistance and editing of the clinical case scenarios. It is always a great learning experience for me, and I appreciate his consideration in devoting his precious time for this book. I am indebted to my editorial board who are eminent anatomists from various parts of India. Their valuable input has taken this manual to the next level. Without their support this would not have been possible. My special thanks to Dr Prameela MD, Associate Professor, Department of Anatomy for her meticulous editing of every chapter.

It is my duty to acknowledge my teachers who had a major role in building my teaching career. I am indebted to Mr Seetharam Bhat, Dr SN Somayaji, Dr Ramachandra Bhat, Dr Ullas Kamath, Dr Chitra Prakash Rao, Dr K Lakshminarayana Bairy (Dean, RAK Medical & Health Sciences University, UAE), Dr K Ramnaryan (*former* Vice Chancellor of Manipal University, India).

I pay my sincere gratitude to my in-laws, my wife Dr Prashanthi Madhyastha and my adorable son Pradhan Madhyastha who is the source of my inspiration.

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Sampath Madhyastha

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