

Volume 3

Volume 3

Volume 3

Exam-Oriented **Anatomy** Questions and Answers **Second Edition**

Medical Council of India has reduced the duration of First Year MBBS by 6 months and introduced new pattern of questions which include long answer questions, short notes, short answer questions, clinical problems and multiple choice questions. Students are expected to know all the topics as well as specific information and minute, relevant details having clinical importance.

There is no source for the definition and the extent of contents of the various terms used in the theory questions. The author has extensively discussed these terms with eminent anatomists in India and attempted to define these terms. He is aware of the limitations and has high regard about others' views.

This four-volume book attempts to provide unique solutions to these problems for the benefit of the readers studying human anatomy and preparing for their examinations.

Contents of the Four Volumes	
Volume 1	• Abdomen
• General Anatomy	• Pelvis
• General Histology	Volume 3
• Lower Limb	• Head
• Upper Limb	• Neck
	• Face
Volume 2	Volume 4
• General Embryology	• Brain
• Genetics	• Thorax

Salient features of the four volumes

- The book is written using short and simple sentences.
- Four types of questions are discussed: LAQs (Long Answer Questions), SN (Short Notes), SAQs (Short Answer Questions), and OLA (One Line Answers).
- The information given in italics is the information required to answer the MCQs.
- The answers are written in the form of points by using indentation.
- Tables are introduced to save the time and display the information for immediate reference for the students and examiners.
- The relevant, simple, linear informative diagrams are drawn with the respective colours.
- Important key words, which help to memorize the subject without taxing the memory, are given.
- At the end of the book separate indexes have been given.

Shoukat N Kazi MS (Anatomy), DTCD, BSc, LLB

is currently Principal, Dr Tasgaonkar Medical College and Research Centre, Karjat, and has been Principal, Prasad Institute of Medical Sciences, Lucknow, UP. He has served as Professor of Anatomy at Rajashree Medical Research Institute, Bareilly; SRM Medical College Hospital and Research Centre, Chennai; Chennai Medical College Hospital and Research Centre, Trichy; Dr DY Patil Medical College, Pimpri; and Dr DY Patil Vidyapeeth (Deemed to be University), Pimpri, Pune.

Dr Kazi is one of the popular and enthusiastic teachers of anatomy. He started his teaching profession from 1986 and dedicated completely from 1996. He has coached thousands of students.

He makes the subject very simple and appealing to the students. His efforts are to make the subject memorable. He constantly updates himself academically, spiritually and socially. He has special interest in implementing new methods of learning. His mission is to reach all the medical students and make them anatomyphilic. He is a strong positive thinker and motivator.

Students from all over world attend his Kazi Medical Classes, Pimpri, for studies. It is equipped with histology slides, bone sets, models of all topics of gross anatomy and embryology.

He was called as a guest speaker in 46 colleges in Maharashtra, Karnataka, Uttar Pradesh, Gujarat, Kerala and Tamil Nadu; about 8000 students who took the benefit of his guest lectures. He has conducted over 13 workshops of one to five day interactive sessions on various anatomic regions, benefitting about 2000 students.



CBS Publishers & Distributors Pvt Ltd

4819/XI, Prahlad Street, 24 Ansari Road, Daryaganj, New Delhi 110 002, India
E-mail: delhi@cbspd.com, cbssubs@airtelmail.in; Website: www.cbspd.com
New Delhi | Bengaluru | Chennai | Kochi | Kolkata | Mumbai
Bhopal | Hyderabad | Jharkhand | Nagpur | Patna | Pune | Uttarakhand

ISBN: 978-93-

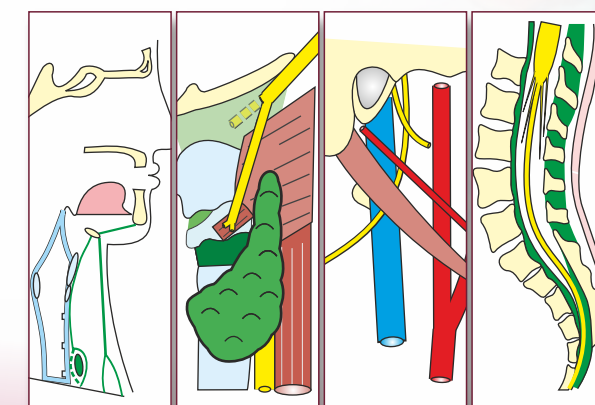
Exam-Oriented **Anatomy** Questions and Answers

Second Edition

Kazi



Exam-Oriented **Anatomy** Questions and Answers **Second Edition**



Head
Neck
Face



Available free on **CBSiCentral App**
High-value animation videos of human anatomy

Shoukat N Kazi



Dedicated to Education
CBS Publishers & Distributors Pvt Ltd

Volume **3**

Exam-Oriented

Anatomy

Questions and Answers

Second Edition

□ **Head**

□ **Neck**

□ **Face**

Shoukat N Kazi MS (Anatomy), DTCD, BSc, LLB

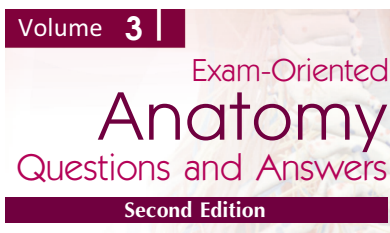
Principal, Dr Tasgaonkar Medical College and
Research Centre, Karjat, Maharashtra
Ex-Principal, Prasad Institute of Medical Sciences
Banthara, Lucknow (UP)
Ex-Professor

Rajshree Medical Research Institute, Bareilly
SRM Medical College Hospital and Research Centre, Potheri, Chennai
Chennai Medical College Hospital and Research Centre, Trichy
Dr DY Patil Medical College, Pimpri, Maharashtra
Dr DY Patil Vidyapeeth (Deemed to be University), Pimpri, Pune



CBS Publishers & Distributors Pvt Ltd

New Delhi • Bengaluru • Chennai • Kochi • Kolkata • Mumbai
Hyderabad • Jharkhand • Nagpur • Patna • Pune • Uttarakhand



Disclaimer

Science and technology are constantly changing fields. New information, research and experience broaden the scope of knowledge. The author has tried his best in giving information available to him while preparing the material for this book. Although all efforts have been made to ensure optimum accuracy of the material, yet it is quite possible some errors might have been left uncorrected. The author, the publisher and the printer will not be held responsible for any inadvertent errors or inaccuracies.

ISBN: 978-93-90046-12-6

Copyright © Author and Publisher

Second Edition: 2021

First Edition: 2005

All rights reserved. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system without permission, in writing, from the author and the publisher.

Published by Satish Kumar Jain and produced by Varun Jain for

CBS Publishers & Distributors Pvt Ltd

4819/XI Prahlad Street, 24 Ansari Road, Daryaganj, New Delhi 110 002, India.

Ph: 011-23289259, 23266861, 23266867 Fax: 011-23243014 Website: www.cbspd.com
e-mail: delhi@cbspd.com; cbspubs@airtelmail.in

Corporate Office: 204 FIE, Industrial Area, Patparganj, Delhi 110 092

Ph: 011-4934 4934 Fax: 011-4934 4935 e-mail: publishing@cbspd.com; publicity@cbspd.com

Branches

- **Bengaluru:** Seema House 2975, 17th Cross, K.R. Road, Banasankari 2nd Stage, Bengaluru 560 070, Karnataka
Ph: +91-80-26771678/79 Fax: +91-80-26771680 e-mail: bangalore@cbspd.com
- **Chennai:** 7, Subbaraya Street, Shenoy Nagar, Chennai 600 030, Tamil Nadu
Ph: +91-44-26260666, 26208620 Fax: +91-44-42032115 e-mail: chennai@cbspd.com
- **Kochi:** 42/1325, 1326, Power House Road, Opp. KSEB, Power House, Ernakulam 682018, Kochi, Kerala
Ph: +91-484-4059061-65 Fax: +91-484-4059065 e-mail: kochi@cbspd.com
- **Kolkata:** No. 6/B, Ground Floor, Rameswar Shaw Road, Kolkata 700014 (West Bengal), India
Ph: +91-33-2289-1126, 2289-1127, 2289-1128 e-mail: kolkata@cbspd.com
- **Mumbai:** PWD Shed, Gala No. 25/26, Ramchandra Bhatt Marg, Next to JJ Hospital, Gate No. 2 Opp. Union Bank of India, Noorbaug, Mumbai 400009, Maharashtra, India
Ph: +91-22-24902340/41/42 Fax: +91-22-24902342 e-mail: mumbai@cbspd.com

Representatives

- | | | | | | |
|--------------------|--------------|--------------------|--------------|----------------------|--------------|
| • Hyderabad | 0-9885175004 | • Jharkhand | 0-9811541605 | • Nagpur | 0-9421945513 |
| • Patna | 0-9334159340 | • Pune | 0-9623451994 | • Uttarakhand | 0-9716462459 |

Printed at Nutech Print Services, Faridabad, India

To

My parents

Late Haji Nizamsaheb K Kazi

Late Hajjan Mrs Jainnabbi N Kazi

My wife Kamartaj

For tolerating my preoccupation

And my daughter Sadiya

For understanding me

And

Students

For appreciating my way of teaching and
providing me a continuous stimulus to write the book

Foreword to the Second Edition

Prof SN Kazi's *Exam-Oriented Anatomy*, 2nd edition, is going to compete with all other books on the subject available in the market. It is not only simple, digestible and very attractive but also exceptionally informative and rich into the extent that even heavy textbooks do not carry so much information. I have great respect for him, for his dedication and lust for writing book. I wish him all the best.



Dr Nafis Ahmad Faruqi

Professor
Department of Anatomy
Jawaharlal Nehru Medical College
Aligarh Muslim University, Aligarh, UP
India

Foreword to the First Edition

Prof SN Kazi's book is intended to help medical students rapidly master complex intricacies of human anatomy that is essential to clinical care.

This book was written to fulfill the need for a brief, but readable, summary of the relevant anatomy, with succinct notes on applied anatomy wherever indicated. It addresses the diverse and mounting need of medical students preparing for professional examinations. The text will not only enhance the knowledge to an extent sufficient to satisfy the examiners but will also equip the readers with the necessary understanding of applied anatomy for future practice. A recurring problem in medical education is the common inability of the students to relate the large body of factual knowledge to practical application in their future clinical training. A commendable endeavour has been made by Prof Kazi to bridge the gap between rote anatomy and clinical relevance. The mnemonics and humour in this book do not intend any disrespect for anyone, rather they are employed as an educational device, as it is well known that the best memory techniques involve the use of ridiculous association. Stephen Goldberg in his unique book titled "Clinical Neuroanatomy Made Ridiculous Simple" has already demonstrated their efficacy superbly.

Books	LAQs	SAQs	SNs	Keywords	Line diagrams	Tables
Above diaphragm	93	20	156	91	254	47
Below diaphragm	47	38	125	49	254	47

This book is not designed to replace standard reference textbooks, but rather is to be read as a companion text before appearing in an examination. This will enable the student to gain an overall perspective of essential anatomy.

My best wishes for the success of this endeavour which merits appreciation.

Prof (Dr) Mahdi Hasan

MBBS, MS (Hons.), FICS, FAMS, PhD, DSc, FNA

Professor Emeritus

INSA Senior Scientist, Department of Anatomy

Chhatrapati Shahuji Maharaj Medical

University (King George's Medical University)

Lucknow, UP (India)

Formerly

Professor and Chairman, Department of Anatomy and

Founder Director

Interdisciplinary Brain Research Center

Dean, Principal and Chief Medical Superintendent Jawaharlal Nehru Medical College, Aligarh

Muslim University, Aligarh, UP (India)

Foreword to the First Edition

All the medical colleges in the state of Maharashtra were affiliated to eight different conventional universities in the state up to 1997. After the establishment of Maharashtra University of Health Sciences in the state in 1998, all of them were affiliated to this single state level university. Previously syllabi and pattern of examination were different but the new pattern (1 + 1½ + 2 years) of curriculum recommended by the Medical Council of India while the conventional universities were following the old (1½ + 1½ + 1½ years) pattern. First time in the examination, LAQ, SAQ and MCQ patterns were introduced by MUHS. On the background of the reduced duration for both students (for learning) and teachers (for teaching) of I MBBS, there was a need for examination-oriented revision book.



It is really a great pleasure for me to introduce this book on human anatomy written by one of my ex-colleagues, Dr SN Kazi. I have gone through the manuscript of this book which adequately covers the subject. Usually students have to purchase separate books for anatomy, histology, embryology, general anatomy, genetics, etc. Dr. Kazi has tried to cover all these branches in simple language with the help of computerized line diagrams. It is designed to meet the need of the undergraduate exam going students. Most of the information are given in tabular forms, easy to compare and remember and clinical applications of the subject have been touched adequately.

The book speaks the long experience of the author in the subject and will minimize the stress and strain of a medical student during pre-examination period. I congratulate the author for this venture and wish the book great success.

Shingare PHMS

Professor and Head
Department of Anatomy
Grant Medical College and
Sir J J Group of Hospitals
Byculla, Mumbai
Director of Medical Education and Research,
Maharashtra
Ex-Dean, Faculty of Medicine, North Maharashtra University
Ex-Controller of Exam, MUHS, Nashik
Ex-Chairman, BoS Preclinical, MUHS, Nashik
Member of BoS Preclinical Faculty of
Medicine and Faculty of Dentistry, MUHS
Ex-Vice Dean UG, Grant Medical College, Mumbai
Ex-Vice Dean PG, Grant Medical College, Mumbai

Preface to the Second Edition

I am very much excited to present the 2nd edition. Initially I thought it will not take much time, but as I started preparing for the 2nd edition, new ideas start clouding in my mind and the ideas went on increasing.

In the last 15 years, I received many feedbacks about inadequate answers, too much simplicity of the text, too many mnemonics. I reviewed various books on memory techniques and came with various ideas. I am happy to share the experiences of teaching in different parts of country. In north and central part of India, the main barrier is writing skills. The students are either from Hindi medium or language of regional medium. The immediate challenges after joining medical course is communication and managing vast syllabus.

I have made an attempt to write in very simple language. In the first reading only, the student should be able to understand the contents. I have used the symbols for most of the words. It is rightly said "A picture is equal to thousands of sentences. A cartoon is worth of thousands of pictures". **Visual memory** works better for the pictures than the texts. **Colours** have deep impact than black and white. Kinesthetics have far more effect as compared to auditory and visual. Combined effects of auditory, visual and kinesthetic have profound effect on memory.

A sincere attempt is made not only to give the contents of the subject, but also to make the student remember the subject by using various techniques. The author has attended the lectures of the many anatomists, studied the delivery of lectures. He has picked up the concepts and presented in the form of book. The book is collections of techniques used by well-known anatomists of India.

Memory Technique

1. **Association memory**
 - A. **Day-to-day examples:** City bus for ascending and descending tracts.
 - B. **Association of letters**
 - a. After "C" to recollect the nuclei of cerebellum.
 - b. ABCD for the normal constrictions of oesophagus
 - c. **Ruffini** for **red** and **Krause** for **cold** receptor. This was contributed by **Dr Nandedkar madam**, a senior anatomist from AFMC.
 - C. Association of digit 10 for 4 important information of oesophagus.
 - a. Length of oesophagus
 - b. Constrictions of oesophagus
 - c. Opening in diaphragm at 10th thoracic vertebra
 - d. First mark on the paediatric Ryles tube.
2. **Use of one's hand for representation of various structures and relations**
 - A. Branches of splenic artery
 - B. Intermuscular spaces
 - C. Use of 3 fingers for transpyloric plane at lower 1st lumbar
 - D. Branches of basilar artery
 - E. Tributaries of coronary sinus
3. **Framing the rules for registration of information**
 - A. Rule of alternate framed by honorable late Padmashree Dr Mahdi Hasan to
 - a. Recollect the

- I. Paired and unpaired branches of abdominal aorta
- II. Peritoneal and retroperitoneal structures.
- b. Dropping the alternate letters to recollect the names of extrapyramidal tracts.
- B. Use of juggle “Carotico parotico Tonsilii Tympani” to complete the distribution of glossopharyngeal nerve. This is contributed by famous anatomist and surgeon Dr Kadasne, author of many textbooks.
- C. Use of fingers to differentiate to walls of artery and vein. This is contributed by Dr Krishna Garg madam, editor of world famous textbook *BD Chaurasia’s Human Anatomy*.
4. Link technique
5. Meaning of words
 - A. Dura—hard, durable B. Dia—in between
6. Peg technique Mnemonic—Laila Loves Majnu for the branches of lateral cord of brachial plexus.
7. Simile: Course of hepatic artery represented by badly driven nail. Referred from Surgical Synopsis.
8. Picture mnemonic to represent Cri du chat syndrome.
9. Stories
 - A. A girl from South and boy from Chandigarh had friendship in Jaipur. They got married in Jaipur but marriage could not survive because of different culture and food habit. They got divorced. Boy went back to Chandigarh and got married in own community. This story is appealing for origin, course and distribution of accessory nerve. The story was fabricated by Dr Aruna Mukherjee, a well-known anatomist.
 - B. A story of water pipe for the course of internal pudendal artery.
10. Text in simple English.
11. Things added with religious sentiments: Dr Mysorekaran eminent, Professor of AFMC, used to teach functions of thalamus by giving simile of thalamus to God Nandi and cerebrum with Lord Mahadev.
12. The concept of **mind mapping**, introduced by Tony Buzan, is used to depict the branches of brachial plexus.
13. Use of celebrities
 - A. Mary Kom—action of serratus anterior
 - B. Ajay Devgn for overriding of horse to make understand the features of Fallot’s tetralogy.
14. Use of key **advertisements** as the keywords—**PRO V** for features of Fallot’s tetralogy.
15. Use of airplane and navies for reminding suprascapular artery and nerve, above and below the suprascapular ligament.
16. Use of pictures of anatomy students whose passion is body building. A photo of Wasim Khan is used to display the actions of sternal and clavicular head of pectoralis major.
17. Fruit of pine tree to show pineal body.
18. Use of symbols and pictures of muscles to boost the memory.

It was a feedback from the passed-out students that there is mismatch between what is taught in applied anatomy in the first year and what is expected in clinical posting. To fill up the gap, the author has reviewed the applied anatomy from physician, general surgeon, ENT surgeon, ophthalmologist, orthopaedic surgeon, and geneticist. The author has reviewed various regions from senior anatomists.

All the feedback has been meticulously rectified.

Separate boxes are introduced for the understanding of the subject and for memorization.

Acknowledgements to the Second Edition

I recollect the days, when I determined to write for the second edition. I thought of getting all the books of anatomy that are freely available and accessible. I collected books from all the old book bazar in Delhi, Mumbai, Pune, Pimpri, Lucknow, Ahmedabad, Rajkot. I am very much thankful to Dr TC Singel, Professor, Department of Anatomy, Zydus Medical College, who took me to various old bookstores in Ahmedabad and made them available. He also lent me the library books. It was a great help. I could get the books which are not available in any of the college library. I am very much grateful to him.

I cannot afford to forget the continuous encouragement given by Mr Bhagwan Yadav, Chairman, Managing Director, Prasad Institute of Medical Sciences, Lucknow.

Scanning of the book was done by our office staff, namely Prajakta, Rhutuja. I am thankful to them. I need to mention the name of Mr Rehan Ansari, (HR, Prasad Institute of Medical Sciences, Lucknow) who got the books scanned in a very short time.

There were vital technical issues, because of which I was handicapped. The problems were resolved by my nephew, Mr Wahab Kabir Kazi. I am very much thankful to him.

The basic suggestions of diagrams were made by a corel artist Mr Sanjay, CBS Publishers & Distributors. I am thankful to him.

I am really lucky to have the contributions from many professors.

To start with, Mrs Jasmine Naik drew some of the diagrams in corel draw but because of her child's health she could not continue. The work was continued by Mrs Zeenat Shaikh. She really put her heart in diagrams. She learnt all the intricacies of anatomy subject and gave her 100% to make the diagrams right. She is very much concerned for the success of the book.

The repeated editing of the text and layout of diagrams, sequencing of questions, was done untiringly by Miss Parveen Shaikh and Mrs Jyoti Dhage. In addition to editing, Miss Parveen Shaikh has kept an eye on all the activities and coordinated in a very efficient way. They are the backbones of the book, without their help, the quality of the book was not possible. I am really blessed to have the staff, namely Miss Parveen Shaikh, Mrs. Jyoti Dhage and Mrs Zeenat Shaikh. Mrs Maya Bhujbal, and Mr Uday Jadiye, who have helped in minute layout of the book.

I am indebted for the help my brother Mr Kabir Kazi has extended to me. He has helped me in organizing guest lectures, workshops and made me tension free to write the book. It was a continuous support to me.

The continuous inspiration and motivation was given by my brothers Mr Shikandar, Allabaksh and Najir Kazi.

The technical support was given by Mr YN Arjuna Senior Vice-President—Publishing, Editorial and Publicity, and his team. He has understood me and helped without any hesitation.

The real financial help was extended by Mr Satish Kumar Jain, CMD, CBS Publishers & Distributors. His help was stress bursting to me. The quality of the book has reached only because of his timely help, and the patience he has shown to me. We have very good bonding for so many years.

I am really thankful from the bottom of my heart to Mr Varun Jain, Director, who is dynamic in implementing various technology in the books. The animation of neuroanatomy and upper limb and abdomen is being introduced, only because of his initiation. I owe him a lot.

The real tolerance and patience were given by my better half Mrs Kamartaj and my daughter Miss Sadiya. I did not give any time and attention to family activities. I appreciate their understanding.

Special Thanks

I am extending my sincere and special thanks to the following persons, without whom the book would not have been completed.

- **Dr PH Shingare**, Professor and Head, Department of Anatomy, Grant Medical College, Mumbai, has meticulously corrected the text and has given solutions to diagrams. He has tolerated my disturbance at odd hours in his busy schedule.
- **Dr (Mrs) Kanaklata Iyer**, Professor of Anatomy at Somaiya Medical College, Sion, Mumbai, has really given a breakthrough to the problems of diagrams. She has helped out rightly by sparing her valuable time through her busy schedule by taking keen interest. She has contributed diagrams of gross anatomy of abdomen, inferior extremity and general embryology.
- **Dr Savgaonkar**, Professor of Anatomy at BJ Medical College, Pune, has drawn histology diagrams of abdomen section. He being my close friend, understood the difficulties and offered his help by completing the diagrams in very short time.
- **Dr Anjali Dhamangaonkar**, Associate Professor, in Anatomy at GS Medical College, Mumbai, has contributed to the general embryology diagrams. It was very difficult for her to give some time. But her desire to help me has solved the problems.
- **Dr Manvikar Purushottam Rao**, Lecturer in Anatomy at Dr DY Patil Medical College, Pimpri, has drawn some of the diagrams of general histology. He is the main push for animation work.
- **Dr Kadasne DK**, the author of *Kadasne's Textbook of Anatomy (Clinically-oriented)*, has allowed me to use some of the diagrams from his book.
- **Dr Umarji**, Professor and Head, Department of Anatomy, Krishna Institute of Medical Sciences, Karad, has drawn a few diagrams of general anatomy.

Shoukat N Kazi

Contributors



Arudyuti Chowdhury MS, DGO

Associate Professor, SRM Medical College, He was my roommate at SRM Medical College, Chennai. Dr Arudyuti Chowdhury is constant motivators. He has helped me in all the activities. His word of suggestion is important for me.



Ashok Kumar Rawat MS (Ortho)

Assistant Professor, Department of Orthopedics, Associate Professor, Prasad Institute of Medical Sciences, Lucknow.

He has helped in giving fine touch of applied aspects of joint.



Gangane

Professor and Head, Department of Anatomy, Medical College, Navi Mumbai. Thank you very much for finding time for approving the contents.

Jyoti Kulkarni

Professor in Anatomy in Nepal

She has gone meticulously in all the texts and diagrams of books and given valuable suggestions. The quality of the book is definitely improved because of her suggestions. I am very much obliged and thankful for her help.



Manvikar

Professor and Head, Department of Anatomy, Padmashree, Dr DY Patil Medical College, Pimpri, Pune. Thanks very much for giving genetic inputs.

MC Srivastav

Medical Superintendent and Associate Professor of Medicine, Prasad Institute of Medical Sciences, Lucknow. He is kind enough to add EKG changes in blockage of coronary arteries.

Murugan Kutty Gopalan

BSc, MBBS, DMA (USA)



Head, Departments of Medical Illustrations, Digital Health, Clinical Skills Simulation Center and Telemedicine, Amrita Institute of Medical Sciences and Research Center, Kerala, India. He is involved in the **Simulation-Based Medical Education** in giving training in various clinical skills. He is intensely working on introducing new generation **Medical Haptics, Robotic Surgery, Cardiac-Neuro-Ortho interventional Simulaids** for the super-specialty branches in Medicine and Surgery. He has won several regional, national and international awards for his innovative illustrative works.

All histology diagrams of 2nd edition are fabricated by Dr Gopalan. Apart from contributions to the book, he is my very close friend, whose door I can knock for any help any moment. I am heavenly blessed to have a friend like Dr Gopalan.

He is courageously fighting his health issue like a warrior. I know him since last 15 years. He is very much energetic. The energy and enthusiasm have increased many folds after he met his health issue. I think adverse situations boost his energy. I do not know from where he gets energy to do such activities. I pray God to give him long healthy life.



Nayana Karodpati

Professor (ENT, DYPMC), Pimpri, Pune

She edited the text and added the topics which are of clinical importance. Hearty thanks for the help.



P Vatsalaswamy MD

Director of DYPMC, Pimpri, Pune

In spite of her busy administrative activities and family commitments, she could spare time and could help me. I am very much obliged.

She has reviewed superior extremity. She has gone in details of each word of text and given the feedback.



Salamat Khan

Professor of Surgery, Prasad Institute of Medical Sciences, Lucknow. Dr Salamat Khan has voluntarily helped me in reviewing applied anatomy of limbs, abdomen, head, neck, face, thorax, and brain. He has gone word to word and

gave the suggestions. I salute him for his help.



Sunita Nayak

Assistant Professor

All India Institute of Medical Sciences, Patna



Ubaidur Rehman

Medical Superintendent, Prasad Institute of Medical Sciences, Lucknow. He has helped in updating ophthalmology chapters. I was lucky to be associate with him.



Vaishali Bharambe MD, PhD

Ex-professor, DY Patil Medical College, Pimpri, Pune

Presently she is working as a Professor and Head, Symbiosis Medical College, Pune. She was very much busy in preparation of PhD. In spite of her hectic schedule, she could review the diagrams of lower limb. I owe her.



Vinod Kathju

Former additional Principal, Dr SN Medical College, Jodhpur

I am very much thankful for his kind guidance and contribution

Contents

<i>Foreword to the Second Edition</i> by Dr Nafis Ahmad Faruqi	<i>iv</i>
<i>Foreword to the First Edition</i> by Prof (Dr) Mahdi Hasan	<i>v</i>
<i>Foreword to the First Edition</i> by Shingare PH	<i>vi</i>
<i>Preface to the Second Edition</i>	<i>vii</i>

Head, Neck and Face

1. Introduction and Osteology	3	
SN-1	Bones of the skull	3
SN-2	Pterion	4
SN-3	Suprameatal triangle (MacEwen's triangle)	5
SN-4	Mastoid process	6
SN-5	Styloid process	7
SN-6	Foetal skull	8
SN-7	Fontanelle (fonticuli)	9
SN-8	Emissary veins	11
OLA-1	Enumerate structures within parotid salivary gland	12
SN-9	Foramina of middle cranial fossa	12
SN-10	Superior orbital fissure	14
SN-11	Inferior orbital fissure	15
SN-12	Arteries and nerves related to ramus of mandible	16
SN-13	Name the muscles attached to mandible	17
SN-14	Spine of sphenoid	18
SN-15	Lateral pterygoid plate	19
SN-16	Jugular foramen	19
SN-17	Anterior longitudinal ligament	20
SN-18	Posterior longitudinal ligament	21
SN-19	Dens (odontoid process)	21
SN-20	Foramen lacerum	22
SN-21	Foramen magnum	22
SN-22	Maxilla	24
SN-23	Hyoid bone	27
OLA-8	What is stye (hordeolum)?	31
OLA-9	What is chalazion?	31
SN-24	Modiolus	31
LAQ-1	Scalp	32
OLA-10	Why do the wrinkles of face tend to gap?	37
OLA-11	In supranuclear lesion of facial nerve, only the lower part of the face is paralysed. Why the upper part of face is spared?	37
LAQ-2	Muscles of face	37
SN-25	Sensory nerve supply of the face	40
LAQ-3	Facial vein	41
OLA-12	Why the facial muscles are called "muscles of facial expression"?	43
OLA-13	What is the nerve supply of facial muscles?	43
SN-26	Deep facial vein	43
SN-27	Dangerous area of face	44
OLA-14	What are the constituents of lacrimal apparatus?	45
OLA-15	What are the structural differences between lacrimal gland and serous salivary gland?	45
OLA-16	D/L microscopic structure of serous demilune	46
OLA-17	Enumerate the difference between serous and mucus acini	46
OLA-18	What are serous demilunes?	46
OLA-19	Where do we get myoepithelial cells in the body? How will you identify them?	47
OLA-20	What are the functions of saliva?	47
LAQ-4	Lacrimal apparatus	47
OLA-21	What is dacryocystitis?	50
OLA-22	What is nature of lacrimal gland?	50
OLA-23	What are the parts of lacrimal gland?	50
SN-28	Orbicularis oculi	51
OLA-24	Enumerate the branches of facial artery on the face	51
LAQ-5	Facial nerve	52
SN-29	Upper and lower motor neuron lesions of facial nerve	57
SN-30	Lower motor neuron lesion of facial nerve	57
SN-31	Upper motor neuron lesion	58
OLA-25	What are the functions of buccinator muscle?	58
2. Scalp, Temple and Face	30	
OLA-2	Why the infections of superficial fascia of scalp causes more pain?	30
OLA-3	Why are sebaceous cysts and seborrhoea more frequently associated with the scalp?	30
OLA-4	What is the "dangerous area of scalp" and why is it called so?	30
OLA-5	What is "safety valve haematoma"? How the haemorrhage from the blood vessels of scalp is arrested?	30
OLA-6	Why the wounds of face bleed profusely?	31
OLA-7	What are the modifications of palpebral fascia?	31

3. Side of the Neck**59**

- LAQ-6 Investing layer of deep cervical fascia 59
- SN-32 Applied anatomy of deep fascia of neck 62
- SN-33 Suprasternal space (space of Burns) 63
- SN-34 Pretracheal fascia 64
- SN-35 Prevertebral fascia 66
- SN-36 Carotid sheath 67
- OLA-26 Name the muscles forming floor of the posterior triangle 68
- OLA-27 Name the boundaries of posterior triangle of neck 69
- LAQ-7 Posterior triangle 69
- LAQ-8 Subclavian triangle 72
- SN-37 Omohyoid 75
- SN-38 Great auricular nerve 75
- SN-39 Sternocleidomastoid 76
- SN-40 External jugular vein 77
- LAQ-9 Accessory nerve 79

4. Back of the Neck**82**

- OLA-28 What is the cause of neck rigidity in meningitis? 82
- LAQ-10 Suboccipital triangle 82
- SN-41 Suboccipital nerve 84
- SN-42 Greater occipital nerve 85

5. Contents of Vertebral Canal**87**

- SN-43 Ligamentum denticulatum 87
- SN-44 Lumbar puncture 88
- SN-45 Enumerate the cranial nerves 89
- SN-46 Trapezius 91
- SN-47 Important events taking place at C6 vertebra 92

6. Cranial Cavity**94**

- OLA-29 Why the bleeding or pus collection beneath the pericranium is not extensive? 94
- OLA-30 Why is it not advisable to feel both the carotid pulsations simultaneously? 94
- OLA-31 Cephalohydrocoele 94
- OLA-32 Cephalhaematoma 94
- SN-48 Define venous sinuses and enumerate different venous sinuses 94
- LAQ-11 Cavernous sinus 96
- SN-49 Superior sagittal sinus 99
- OLA-33 What is the clinical importance of sigmoid sinus? 100
- SN-50 Sigmoid sinus 101
- OLA-34 State the types of cells in adenohypophysis and their secretions 102
- SN-51 Development of hypophysis cerebri 102
- LAQ-12 Hypophysis cerebri 103
- OLA-35 Lesions of optic chiasma 106
- SN-52 Diaphragma sellae 106
- SN-53 Falx cerebelli 106
- SN-54 Falx cerebri 108
- SN-55 Tentorium cerebelli 108
- SN-56 Middle meningeal artery 110
- LAQ-13 Oculomotor nerve 112
- SAQ-1 Weber's syndrome 115
- LAQ-14 Trochlear nerve 115
- LAQ-15 Abducent nerve 116

- SN-57 Meckel's cave (trigeminal cave) 118
- SN-58 Trigeminal neuralgia (tic douloureux) 118
- OLA-36 Inferior sagittal sinus 119
- OLA-37 Confluence of sinuses 119
- SN-59 Trigeminal ganglion (semilunar or gasserian ganglion) 119

7. Contents of the Orbit**121**

- SN-60 Nasociliary nerve 121
- SN-61 Short ciliary nerves 122
- OLA-38 What is squint (strabismus)? 123
- SN-62 What is Tenon's capsule? 123
- OLA-39 What is the mode of blood supply of optic nerve? 123
- SN-63 Palpebral (canthal) ligaments 124
- LAQ-16 Extraocular muscles 124
- SN-64 Ciliary ganglion 129
- OLA-40 What happens in case of unilateral ocular muscle paralysis? 130
- OLA-41 Why the paralysis of extraocular muscles causes diplopia? 131
- OLA-42 What is conjugate movements of eyes? 131
- OLA-43 What is nystagmus? 132
- SN-65 Orbital nerve 132

8. Anterior Triangle of the Neck**133**

- SN-66 Platysma 133
- SN-67 Muscular triangle 133
- SN-68 Occipital artery 134
- LAQ-17 Digastric triangle 135
- SN-69 Digastric muscle 137
- LAQ-18 Carotid triangle 138
- SN-70 External carotid artery 141
- SN-71 Lingual artery 143
- OLA-44 Enumerate the branches of facial artery in neck 143
- OLA-45 Why is facial artery tortuous? 144
- SN-72 Facial artery 144
- OLA-46 Structures passing between external and internal carotid arteries 145
- SN-73 Sites of anastomosis of external and internal carotid arteries 145
- SN-74 Ansa cervicalis (ansa hypoglossi) 146
- SN-75 Superior laryngeal nerve 147
- OLA-47 What is the effect of pressure damage to internal laryngeal nerve, external laryngeal nerve and recurrent laryngeal nerve? 148
- SN-76 Anterior jugular vein 148

9. Parotid Region**150**

- OLA-48 Why does opening of the jaw cause pain in mumps? 150
- OLA-49 How the parotid gland is removed surgically? 150
- LAQ-19 Parotid gland 150
- SN-77 Parotid duct (Stenson's duct) 155

10. Temporal and Infratemporal Regions**158**

- OLA-50 Give the branches of 1st part of maxillary artery 158
- SN-78 Maxillary artery 158

- LAQ-20 Infratemporal fossa 161
 LAQ-21 Temporomandibular joint 164
 SN-79 Factors responsible for the stability of temporomandibular joint 169
 SN-80 Articular disc of TM joint (meniscus) 170
 SN-81 Sphenomandibular ligament 170
 LAQ-22 Muscles of mastication 171
 SN-82 Pterygoid venous plexus 173
 SN-83 Lateral pterygoid muscle 174
 LAQ-23 Mandibular nerve 176
 SN-84 Inferior alveolar (dental) nerve 180
 SN-85 Otic ganglion 181
- 11. Submandibular Region 183**
- SN-86 Relations of hyoglossus muscle 183
 SN-87 Mylohyoid muscle (oral diaphragm) 184
 SN-88 Carotid nerve 184
 OLA-51 What are the parts of submandibular gland? 185
 OLA-52 Where is the opening of submandibular duct? 185
 OLA-53 Why the incision for removal of submandibular gland is placed more than 1" below the angle of mandible? 185
 LAQ-24 Submandibular gland 186
 SN-89 Submandibular lymph nodes 188
 SN-90 Histology of submandibular gland 189
 SN-91 Submandibular ganglion 191
 SN-92 Hyoglossus muscle 192
- 12. Deep Structure in the Neck 194**
- OLA-54 What forms right lymphatic duct? 194
 LAQ-25 Scalenus anterior 194
 SN-93 Anastomotic sites of carotid and subclavian arteries 197
 OLA-55 Why superior thyroid artery is ligated close to superior pole and inferior thyroid artery away from the inferior pole in thyroidectomy? 197
 OLA-56 What are the lining epithelial cells of thyroid gland? 197
 OLA-57 What are parafollicular cells? What do they secrete? 198
 OLA-58 What is the colloid in thyroid follicles made up of? 198
 OLA-59 State the two types of cells in parathyroid gland? What does the parathyroid gland secrete? 198
 OLA-60 Describe production of thyroid hormones from follicular cells to its release into the capillary 199
 LAQ-26 Thyroid gland 200
 OLA-61 Name the arteries supplying thyroid gland 207
 SN-94 Isthmus of thyroid gland 208
 SN-95 Thyroglossal duct 210
 SN-96 Thyroglossal cyst 211
 SN-97 Parathyroid glands 211
 SN-98 Subclavian artery 213
 SN-99 Internal jugular vein 215
 LAQ-27 Glossopharyngeal nerve 218
 LAQ-28 Hypoglossal nerve 222
 SN-100 Anterior condylar canal (hypoglossal canal) 225
 SN-101 Development of thymus 226
 LAQ-29 Describe lymphatic drainage of head, face and neck 226
- 13. Prevertebral and Paravertebral Regions 230**
- OLA-62 Where does trachea commence and terminate? 230
 OLA-63 What is tracheostomy and when is it done? What are the structures prone to injury? 230
 LAQ-30 Vertebral artery 230
 SN-102 Phrenic nerve 233
 LAQ-31 Atlantoaxial joints 235
 LAQ-32 Atlanto-occipital joints 236
- 14. Mouth and Pharynx 238**
- SN-103 Ludwig's angina 238
 SN-104 Buccinator 238
 SN-105 Uvula (small grape) 239
 SN-106 Passavant's ridge 239
 LAQ-33 Muscles of soft palate 239
 SN-107 Palatine aponeurosis 241
 SN-108 Waldeyer's ring 242
 SN-109 Palatine tonsil 243
 OLA-64 Pharyngeal tonsil 247
 LAQ-34 Pharynx 247
 LAQ-35 Inferior constrictor muscles 251
 SN-110 Pharyngobasilar fascia (pharyngeal aponeurosis) 252
 SN-111 Pterygomandibular raphe 253
 SN-112 Auditory tube 254
 SN-113 Tensor palatini (dilator tubae) 257
 SN-114 Development of palate 257
 SN-115 Cleft palate 258
 SN-116 Cleft lip 259
 SN-117 Development of oral mucosa 259
- 15. Nose and Paranasal Sinuses 261**
- OLA-65 Why are the boils of nose and ear painful? 261
 OLA-66 What is epiphora? 261
 LAQ-36 Nasal septum 261
 SN-118 Little's area or Kiesselbach's area 265
 LAQ-37 Lateral wall of nose 266
 OLA-67 Ethmoidal air sinuses 271
 SN-119 Frontal sinus 272
 OLA-68 Why is headache the commonest presentation in involvement of nose, paranasal sinuses, teeth, gums, eyes (refractory error) and meninges? 274
 OLA-69 What are the junctions of paranasal sinuses? 274
 SN-120 Paranasal sinuses 274
 OLA-70 What is the clinical importance of maxillary sinus? 276
 SN-121 Maxillary air sinus (antrum of Highmore) 276
 SN-122 Pterygopalatine ganglion 280
 LAQ-38 Maxillary nerve 282
 LAQ-39 Sphenoidal air sinus 286
- 16. Larynx 288**
- SN-123 Recurrent laryngeal nerve 288
 SN-124 Stylopharyngeus 290
 OLA-71 Give sensory nerve supply of larynx 290
 OLA-72 Movements of vocal cords. Name the muscles causing them 290
 SN-125 Vocal and vestibular folds 290
 SN-126 Rima glottidis 291
 LAQ-40 Larynx 292

- SN-127 Cricoid cartilage 295
- SN-128 Thyroid cartilage 296
- SN-129 Inlet of larynx 297
- SN-130 Thyrohyoid membrane 299
- SN-131 Cricothyroid muscle 300
- SN-132 Posterior cricoarytenoid 300
- SN-133 Piriform fossa 300

17. Tongue 302

- OLA-73 Why genioglossus is called 'safety muscle'? 302
- OLA-74 Name the muscles required for changing the shape of the tongue 302
- OLA-75 What is the effect of bilateral paralysis of genioglossus? 302
- OLA-76 Why jugulo-omohyoid node is called 'lymph node of tongue'? 302
- OLA-77 Name different types of papillae present on dorsum of tongue and give their functions 302
- SN-134 Define a lingual papilla. State its four types, salient features, differences and functions of each 304
- OLA-78 Which lingual papilla does not contain taste buds? 304
- OLA-79 What are Von Ebner's, and Nuhn's glands? 305
- OLA-80 State the two types of epithelia found in lip and explain why these epithelia are found there 305
- OLA-81 What is vermilion zone, border? 305
- SN-135 Vagus nerve (Alderman's nerve) in neck 305
- LAQ-41 Tongue 308
- SN-136 Occipital myotome 316
- SN-137 Circumvallate papillae 316
- SN-138 Histological features of taste buds 317
- SN-139 Foliate papillae of tongue 318
- LAQ-42 Lingual nerve 31

18. Ear 321

- SN-140 Pinna (ear) 321
- SN-141 Chorda tympani nerve 322
- SN-142 External auditory canal (external auditory meatus) 323
- LAQ-43 External acoustic meatus 325
- SN-143 Tympanic membrane 327
- OLA-82 Name the bones in the middle ear 329
- LAQ-44 Middle ear 329
- SN-144 Muscles of tympanic cavity 333
- SN-145 Spiral organ of Corti 333
- SN-146 Cochlea 335

19. Eyeball 337

- OLA-83 What is glaucoma? 337
- OLA-84 What is lamina fusca of sclera? 337
- OLA-85 What is retinal detachment? 337
- OLA-86 What is fovea centralis? 337
- OLA-87 What is blind spot? 337
- OLA-88 What is cataract? 338
- OLA-89 What is arcus senilis? 338
- OLA-90 Black eye (echymosis of the eye) 338
- OLA-91 Name the types of glands seen in eyelid. Classify them, state their mode of secretion and give their alternative names. Write the answers in a tabular form 338
- OLA-92 Enumerate the types of muscles seen in eyelid 339

- SN-147 Orbicularis oculi 339
- SN-148 Fascial sheath of eyeball 340
- SAQ-2 What is the reason of papilloedema in raised intracranial tension? 341
- OLA-93 What is the applied importance of cornea? 341
- SN-149 Cornea 342
- OLA-94 Layer of rods and cones consists of what? 343
- OLA-95 Draw pictures of rods and cones 344
- OLA-96 What are the functions of pigment epithelium of retina? 344
- OLA-97 Enumerate the neurons seen in retina 344
- OLA-98 What are the cells in outer nuclear layer, inner nuclear layer and ganglion cell layer? 344
- OLA-99 Plexuses between processes of which cells are formed in outer and inner plexiform layers? 345
- OLA-100 Layer of optic nerve fibres is formed by which processes of which cells? 345
- OLA-101 What are outer and inner limiting membranes? 345
- SN-150 Retina 345
- OLA-102 Name the different layers of eyelid 347
- OLA-103 What is the nerve supply of eyelid? 347
- OLA-104 Why the oedema in nephrotic syndrome appears first on face and eyelids? 348
- OLA-105 What is the advantage of blinking of eyelids? 348
- SN-151 Eyelid 348
- OLA-106 What is the significance of colour of conjunctiva? 349
- SN-152 Sclerocorneal junction 349
- SN-153 Give the nerve supply of iris 350
- SN-154 Give the histology feature of olfactory epithelium 351
- SN-155 Development of eye 352
- LAQ-45 Eyeball 354
- SN-156 Contents of eyeball 361
- SN-157 Compartments of eyeball 364

20. Appendix 366

- SN-158 Cervical sympathetic ganglion 366
- SN-159 Killian's dehiscence 368

21. Head, Neck and Face Embryology 369

- SN-160 First pharyngeal arch 369
- SN-161 Meckel's cartilage 371
- SN-162 Give the persistent structures of fibrous envelop of Meckel's cartilage 371
- SN-163 Second pharyngeal arch 372
- SN-164 Pharyngeal pouches 373
- SN-165 Abnormalities of pharyngeal pouches 375
- SN-166 Pharyngeal cleft 375
- SN-167 Derivatives of 4th and 6th pharyngeal arches 376
- SN-168 Ultimobranchial body (post-branchial or telobranchial body) 377
- OLA-107 What are the various developmental anomalies of face? 378
- SN-169 Development of face 378
- SN-170 Frontonasal process of embryo 380