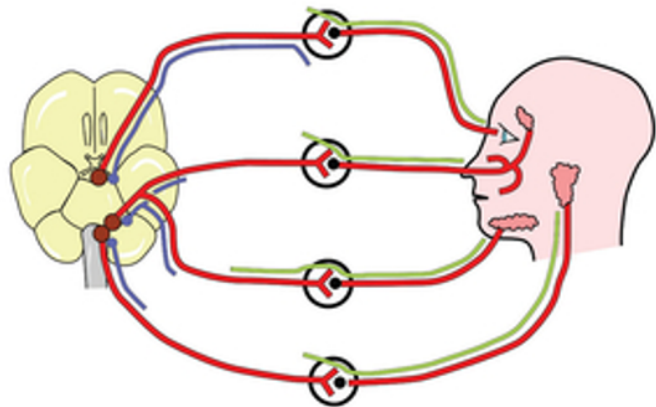
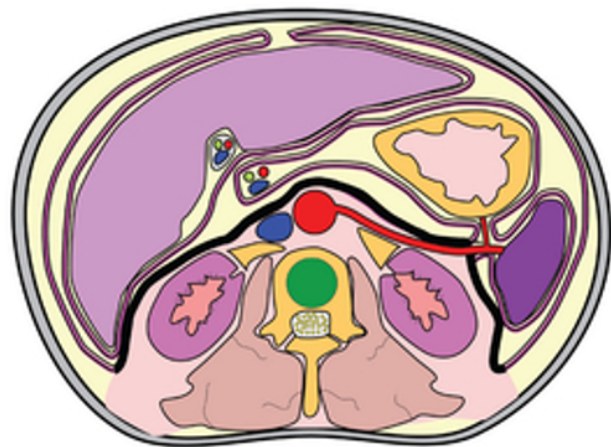
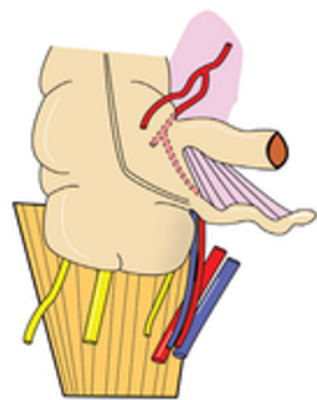
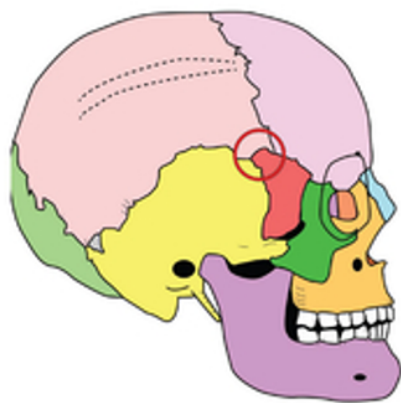


ROBERT H. WHITAKER

A VISUAL GUIDE TO CLINICAL ANATOMY



WILEY Blackwell

A Visual Guide to Clinical Anatomy

A Visual Guide to Clinical Anatomy

Robert H. Whitaker, MA, MD, MCHIR, FRCS

University of Cambridge
Cambridge, UK

WILEY Blackwell

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Preface

Robert H. Whitaker

It is easier to say what this book is not, rather than what it is. It is definitely not a textbook or an atlas but simply a series of images that I have used for teaching over the last 30 years as an Anatomy Lecturer and Demonstrator in The University of Cambridge, UK. The images have also been used for numerous lectures, courses and meetings elsewhere.

Each image is designed to give a synopsis of anatomical and clinical information about an individual topic or clinical condition for both medical students and those in clinical practice. I have drawn each image myself using *Adobe Illustrator*, a graphics programme that I can recommend to all aspiring anatomical artists.

Anatomists have often been accused of teaching students too much detail that is not clinically relevant and I have been very much aware of this. I have strived only to teach anatomy that will be pertinent to their varied clinical careers and constantly endeavoured to find easy ways to learn and remember the vast amount of information that anatomy comprises.

I make no apology for a lack of neuroanatomy as it is outside my field. There is relatively little embryology amongst these images but six concise podcasts in embryology in the form of lectures with images can be found on www.instantanatomy.co.uk (a subscription website) which includes a panacea of descriptive anatomy. www.instantanatomy.net is a free, similar website with fewer lectures. I also make no apology that you will find duplication of both illustrations and text on two or more images throughout. This is intentional as often the same information is needed for any individual teaching slide.

I would be delighted if some of you wish to use the images in this book for your own lectures or teaching and you are very welcome to do so with an acknowledgement.

I am most grateful to Mr John Fergus FRCS who very kindly helped me to check every image for anatomical and clinical accuracy. I took advice from a team of experts for the sections on the heart (Professor John Wallwork, CBE, FRCS, FMedSci), the eye (Mr. Nick Sarkis, FRCS) and ear, nose and throat (Mr. Roger Gray, FRCS). To each of them I am eternally grateful.

Robert H. Whitaker
2020

Foreword

By Professor Harold Ellis

Human Anatomy is intrinsically interesting - surely everyone likes to know how he or she is constructed. However, it is, of course, of immense practical importance to people in the healing professions. Just as the London taxi driver needs to learn “the knowledge” of the streets of the metropolis, so health workers need to know what lies below their palpating fingers. Of course, surgeons need to be especially competent anatomists.

The early anatomy textbooks had no or few illustrations, and these were mostly crude and grossly inaccurate. In 1543 came a revolution; the publication by the young anatomist Andreas Vesalius, of Padua, of “*De Humani Corpora Fabrica*”, (the structure of the human body). Its revolutionary contribution was not so much the text but the magnificent illustrations – good enough and often still used today. Interestingly, there is still debate about who some of these anonymous artists were.

Good teachers of Anatomy, without exception, can produce clear and accurate diagrams; those that are most appreciated are ones that the student can reproduce. Robert H. Whitaker, a retired urologist and now Anatomy teacher, is well known for his Anatomy texts and his lectures, which are illustrated by his own clearly reproducible illustrations. This new publication will prove useful to both undergraduate and graduate students in reinforcing their anatomy studies. I only wish a book like this had been available all those years ago, when I was an Anatomy student!

Professor Harold Ellis, CBE, DM, MCh, FRCS
*Emeritus Professor of Surgery, University of London; Clinical Anatomist,
Guy's Campus London SE1 1US, UK*

Foreword

By Professor Sir Roy Calne

I have known Robert H. Whitaker for nearly 50 years as a surgical colleague, friend and fellow artist working together at Addenbrooke's Hospital in Cambridge, UK. We have shared Surgical Grand Rounds, Committee Meetings and many other hospital and social activities. We have an underlying mutual respect. With the production of this unique anatomical book he has introduced us to a new approach to teaching in that it is neither an atlas nor is it a textbook. When you delve into this beautifully illustrated book you will be impressed with its fund of knowledge and bright, colourful images.

Robert has produced some 920 annotated anatomical images that provide a concise synopsis of what is important for students and others to know and retain in order to undertake safe and competent clinical practice in any branch of medicine. These clear and beautiful images are a feat indeed!

A knowledge of anatomy is as relevant today as it was a century ago and I remember a comment I made in the Christmas Edition of the British Medical Journal many years ago when endoscopic surgery was in its infancy, that there was a risk of endoscopic surgeons not being able to get out of trouble with an open operation if they did not have an accurate working knowledge of the anatomy of the region.

Each image tells a story of a particular aspect of anatomy and its relevance to clinical practice. This brings the subject to light and its beautiful presentation makes it interesting, enjoyable and memorable.

Professor Sir Roy Calne, MA, MS, FRS, FRCS, FRCP
*Emeritus Professor of Surgery, University of Cambridge and Addenbrooke's
Hospital, Cambridge CB2 0QQ, UK*

About the Author

Robert H. Whitaker, MA, MD, MChir, FRCS, FMAA graduated from Selwyn College, Cambridge before undertaking his clinical training at University College Hospital, London. He spent a year at Johns Hopkins Hospital, Baltimore in the Urological Research Laboratories before returning to the St Peters Hospital Group in London to train as a urologist. He was a Senior Lecturer at the London Hospital Medical School before being appointed as a Consultant Urological Surgeon at Addenbrooke's Teaching Hospital in Cambridge, UK in 1973.

He spent 20 years practising mostly paediatric urology during which time he co-founded the British Association of Paediatric Urologists. He was an examiner for the Primary FRCS and later the MRCS at all four Colleges of Surgeons in the UK and a Hunterian Professor at the Royal College of Surgeons of England in 1973. He retired in 1990 to teach anatomy in the Department of Anatomy in Cambridge for the next 30 years. He is an Honorary Fellow and Examiner for the Medical Artists' Association of Great Britain and was awarded the Farquharson Teaching Award by the Royal College of Surgeons of Edinburgh in 2013. He was awarded the St Peter's Medal of the British Association of Urological Surgeons in 1994 and was made an Honorary Member of the European Society of Paediatric Urology in 2019.

Robert H. Whitaker is author of the anatomy textbook *Instant Anatomy*, now in its fifth edition (co-authored by Neil Borley), and has anatomy teaching websites – www.instantanatomy.net and www.instantanatomy.co.uk

Cambridge, UK
2020

SECTION 1

Upper Limb

- 1.1 General Anatomy, 2
- 1.2 Shoulder and Arm, 13
- 1.3 Axilla, Brachial Plexus and Nerve Lesions, 31
- 1.4 Elbow and Forearm, 52
- 1.5 Wrist and Hand, 62

1.1 General Anatomy

SURFACE ANATOMY

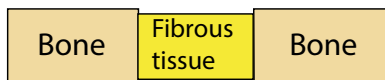
Function of any bone:

- To give form
- For muscle attachments
- Movement
- Protection of internal organs
- Metabolic
 - Calcium, phosphorus
 - Haemopoiesis

CLASSIFICATION OF JOINTS 1

FIBROUS

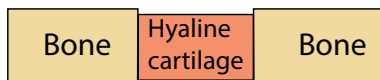
Skull sutures
Interosseous membranes
Inferior tibiofibular
11th, 12th costotransverse



CARTILAGINOUS

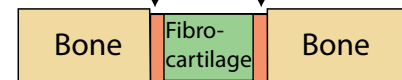
Primary

Costochondral
1st sternochondral
Spheno-occipital



Secondary

Midline symphyses
Intervertebral
Hyaline cartilage



SYNOVIAL

ATYPICAL SYNOVIAL

Articular surface covered with fibrocartilage
Temporomandibular
Sternoclavicular
Acromioclavicular
2-7 Sternochondral



TYPICAL SYNOVIAL

Articular surface covered with hyaline cartilage
All other synovial joints



CLASSIFICATION OF JOINTS 2

● PLANE

Tarsus and carpus



Gliding

● HINGE

Interphalangeal



Flexion
Extension

● MODIFIED HINGE

Knee



Flexion
Extension
Rotation with
flexed knee

● CONDYLOID

Metacarpophalangeal

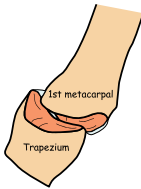


Flexion
Extension
Adduction
Abduction
Circumduction

MOVEMENTS IN SYNOVIAL JOINTS

● SADDLE CONDYLOID

1st Carpometacarpal

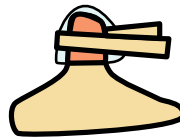


Flexion
Extension
Adduction
Abduction
Circumduction
"Controlled" rotation
= opposition

● PIVOT

Both ends of radius
Atlanto-axial

Rotation
(Uni-axial)



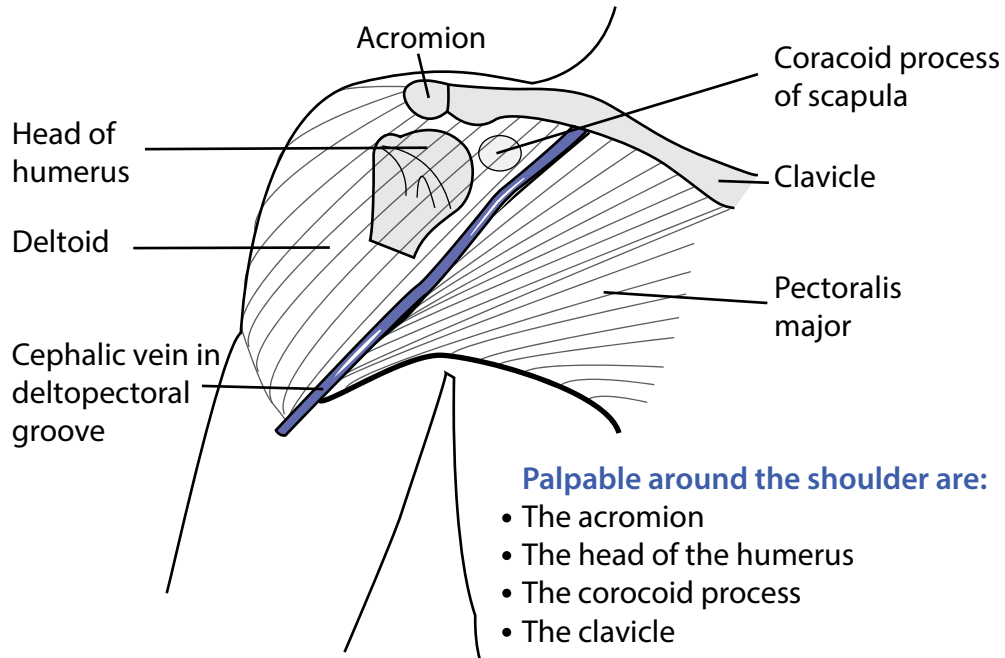
● BALL AND SOCKET

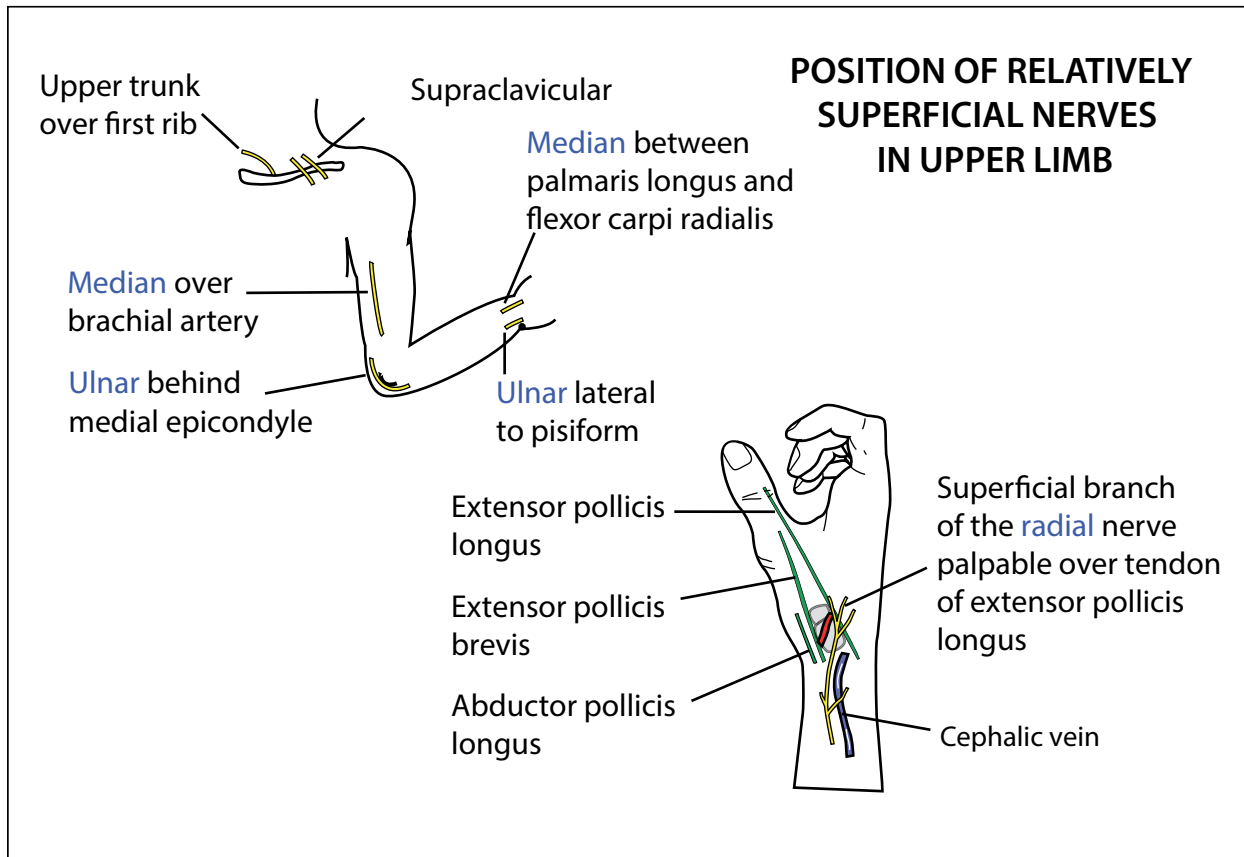
Hip
Shoulder
(Sternoclavicular and
Talocalcaneonavicular
many features of one)



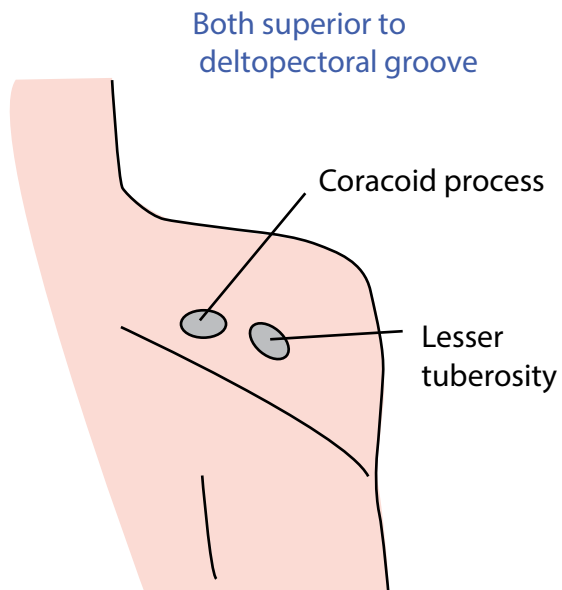
Flexion
Extension
Adduction
Abduction
Circumduction
"Free" rotation

LANDMARKS AROUND SHOULDER



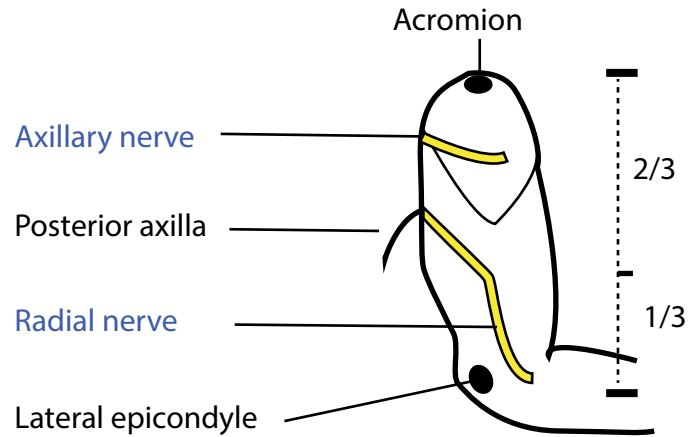


PALPABLE STRUCTURES IN THE UPPER LIMB



- Acromioclavicular joint
- Medial and lateral epicondyles
- Olecranon
- Head of radius
- Anconeus (posterior to olecranon)
- Radial and ulnar styloid processes
- Dorsal (Lister's) tubercle of radius
- Hook of hamate
- Biceps tendon and aponeurosis
- Brachial, radial and ulnar pulses

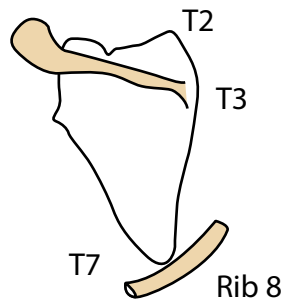
VULNERABLE NERVES IN THE ARM



RADIAL NERVE

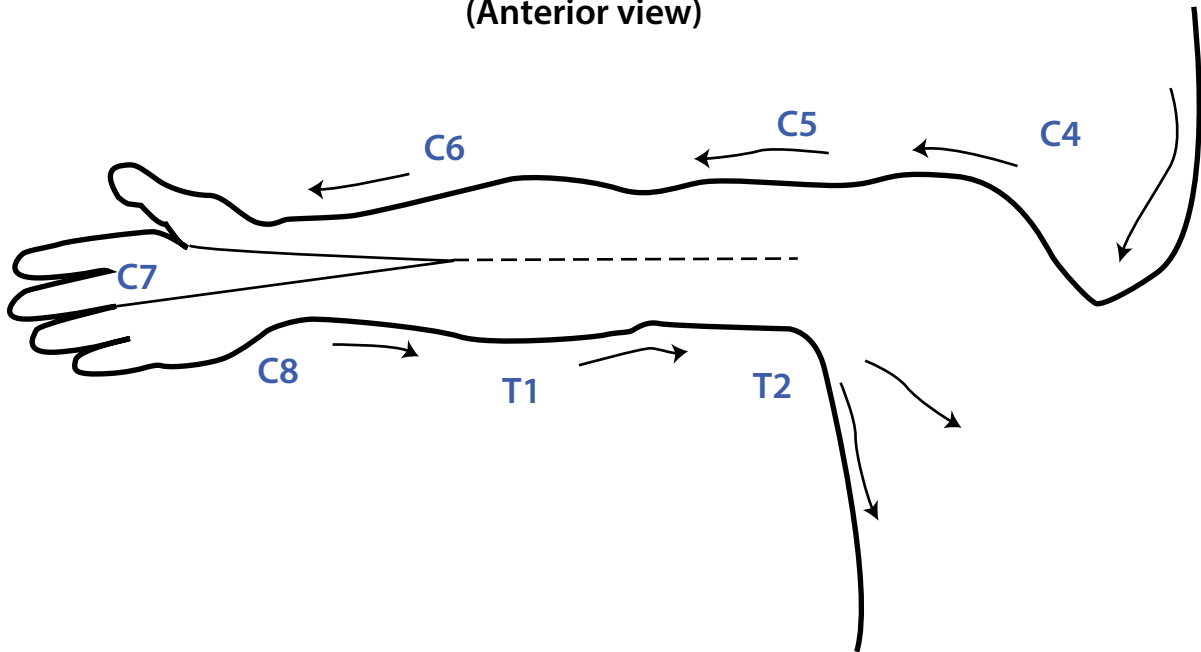
Passes from where the posterior axilla meets the arm to a point $2/3$ down a line from acromion to the lateral epicondyle then it passes anterior to the lateral epicondyle

LEFT SCAPULA

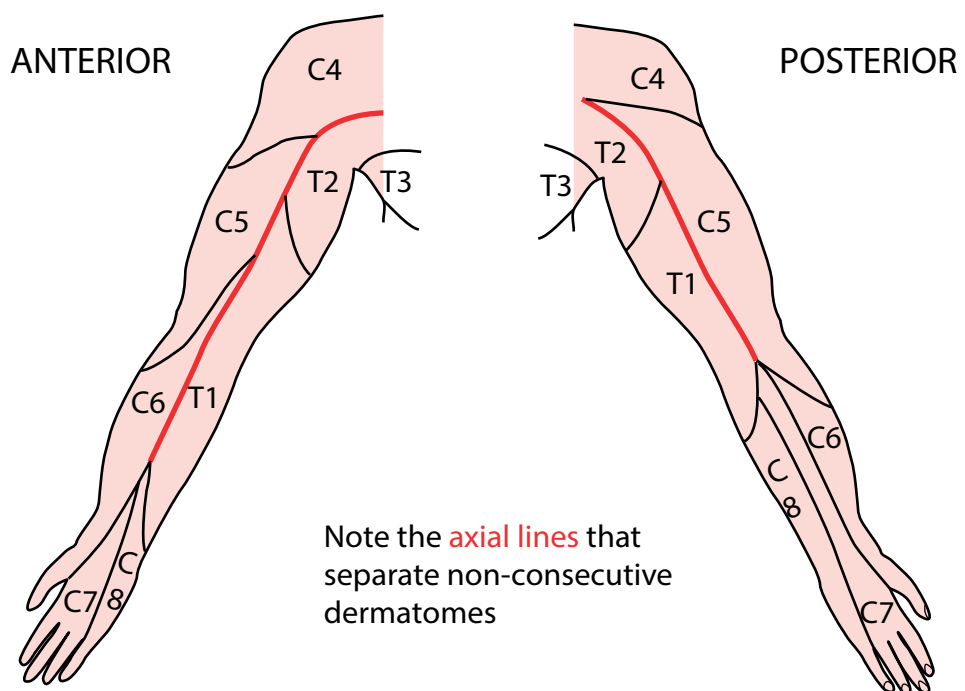


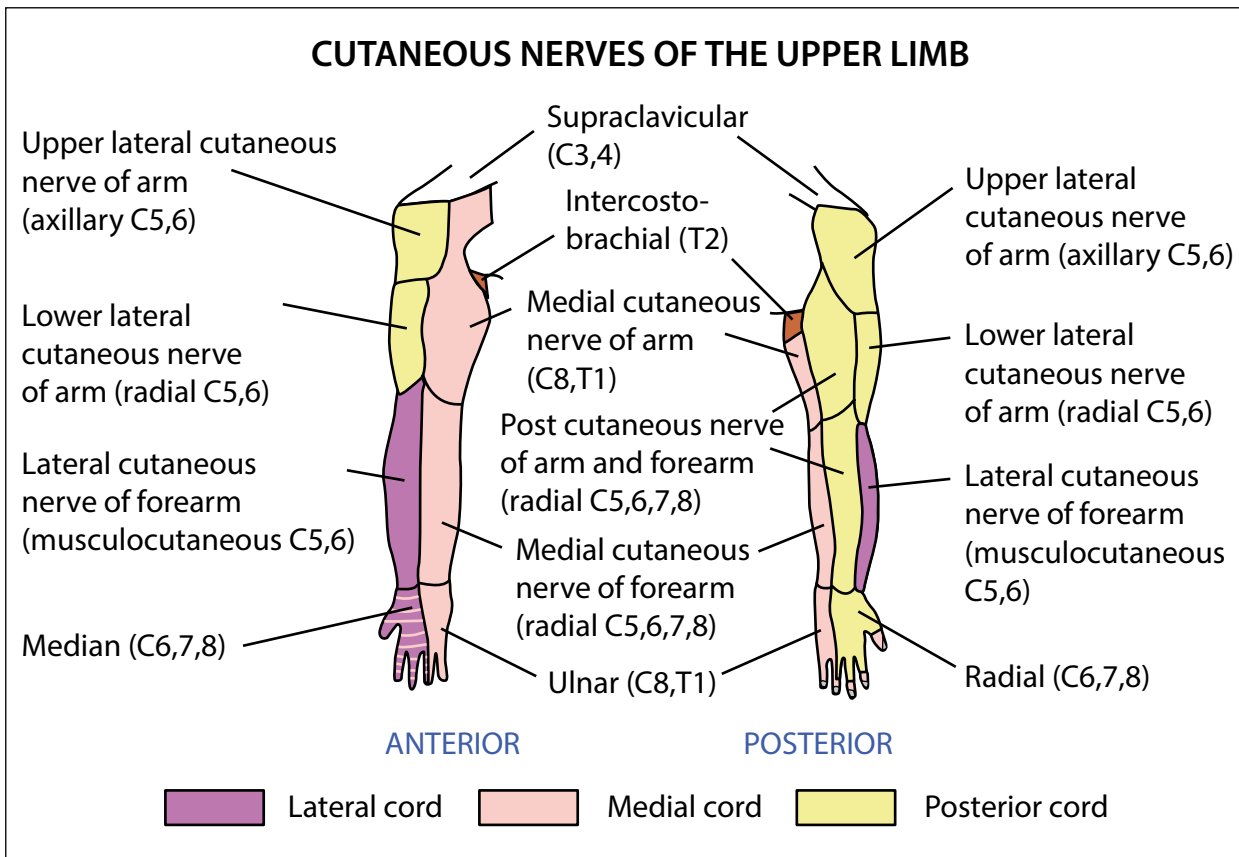
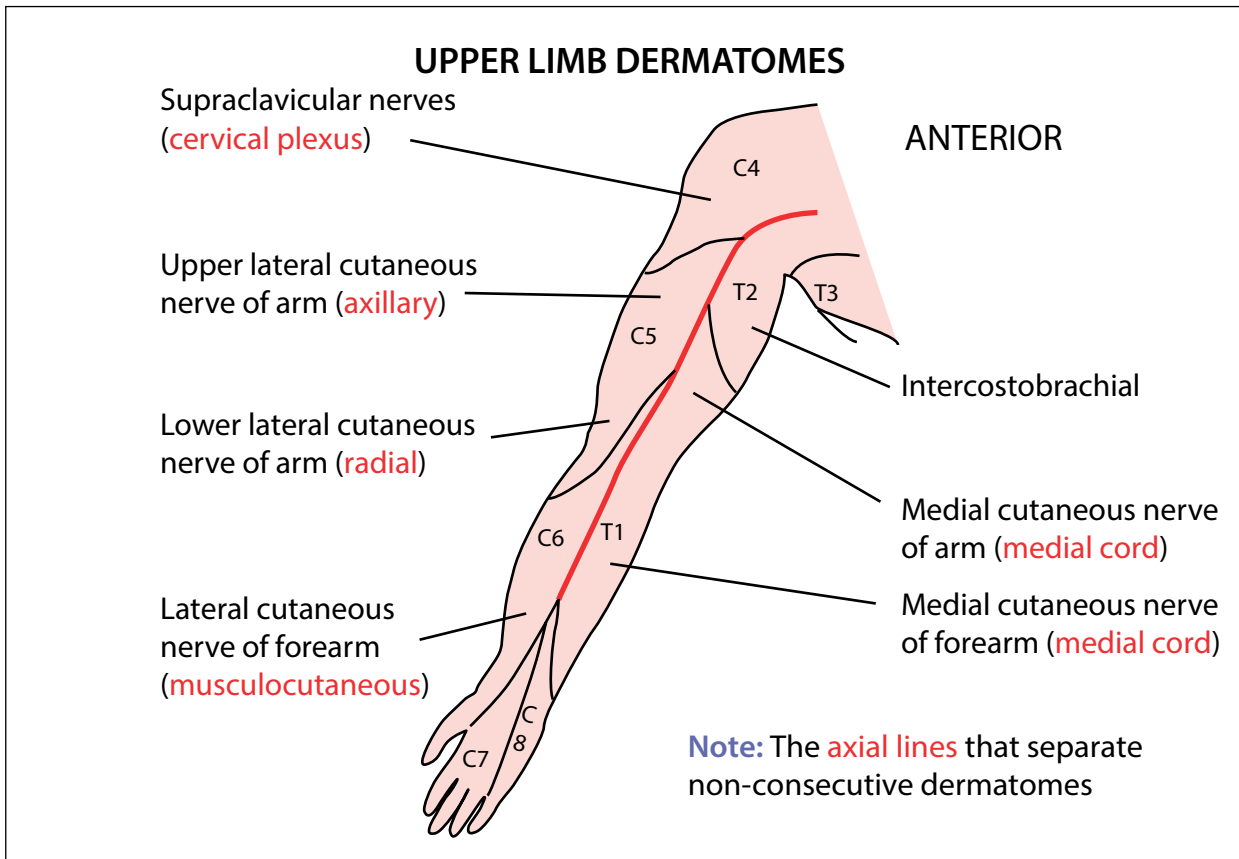
- Covers half the ribs 2-7
- 8th rib is first below
- Upper border at T2
- Medial spine at T3
- Lower border at T7

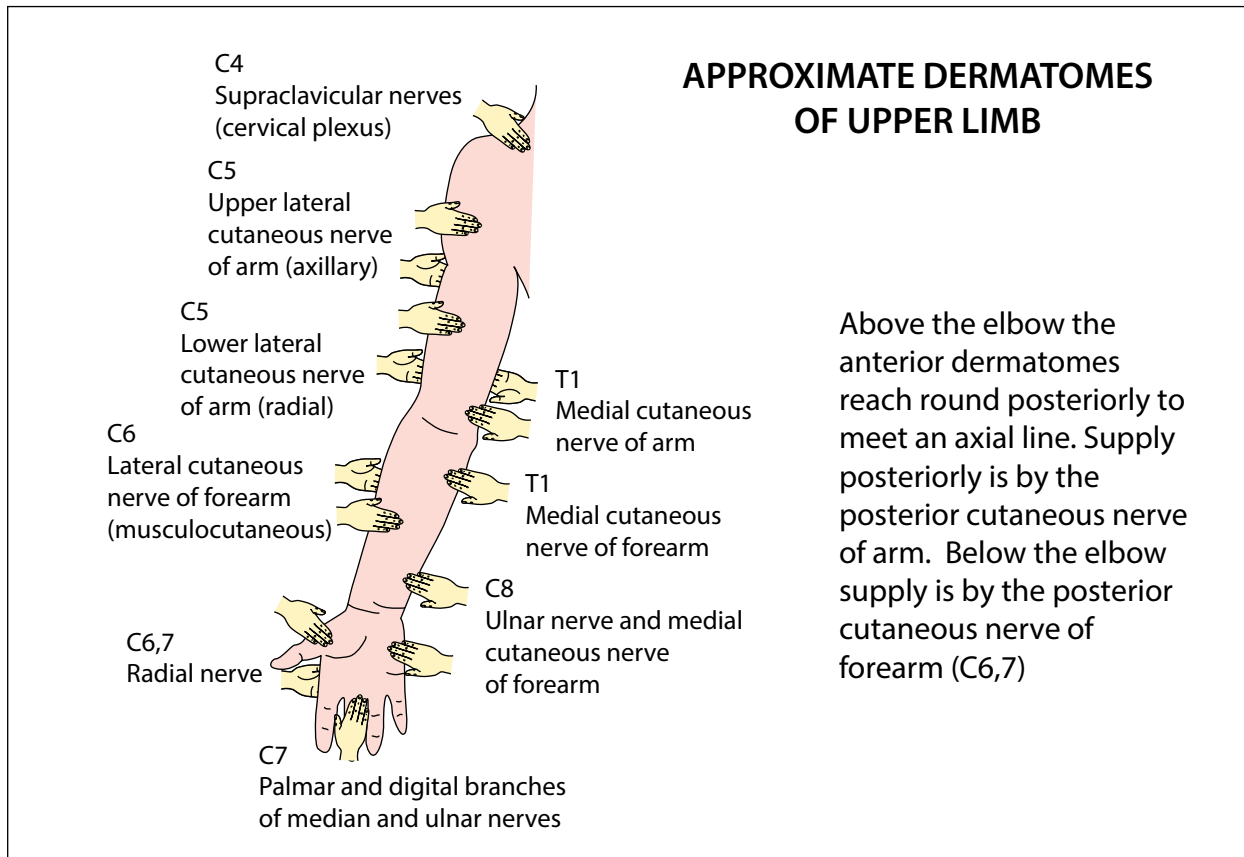
DERMATOMES IN THE OUTSTRETCHED UPPER LIMB (Anterior view)



UPPER LIMB DERMATOMES







SEGMENTAL NERVE SUPPLY IN UPPER LIMB

SHOULDER:

Flexion/abduction/lateral rotation	C5
Extension/adduction/medial rotation	C6,7,8

ELBOW:

Flexion (biceps reflex)	C5,6
Extension (triceps reflex)	C6,7,8

FOREARM:

Pronation	C7,8
Supination	C6

WRIST:

Flexion/extension	C7,8
-------------------	------

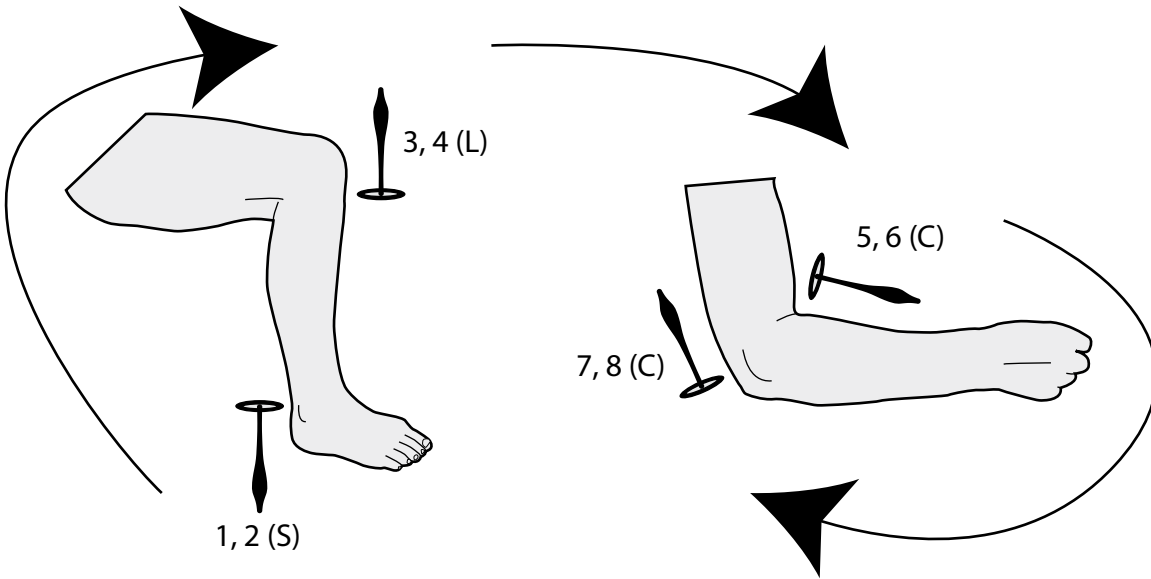
FINGERS/THUMB (LONG TENDONS):

Flexion/extension	C7,8
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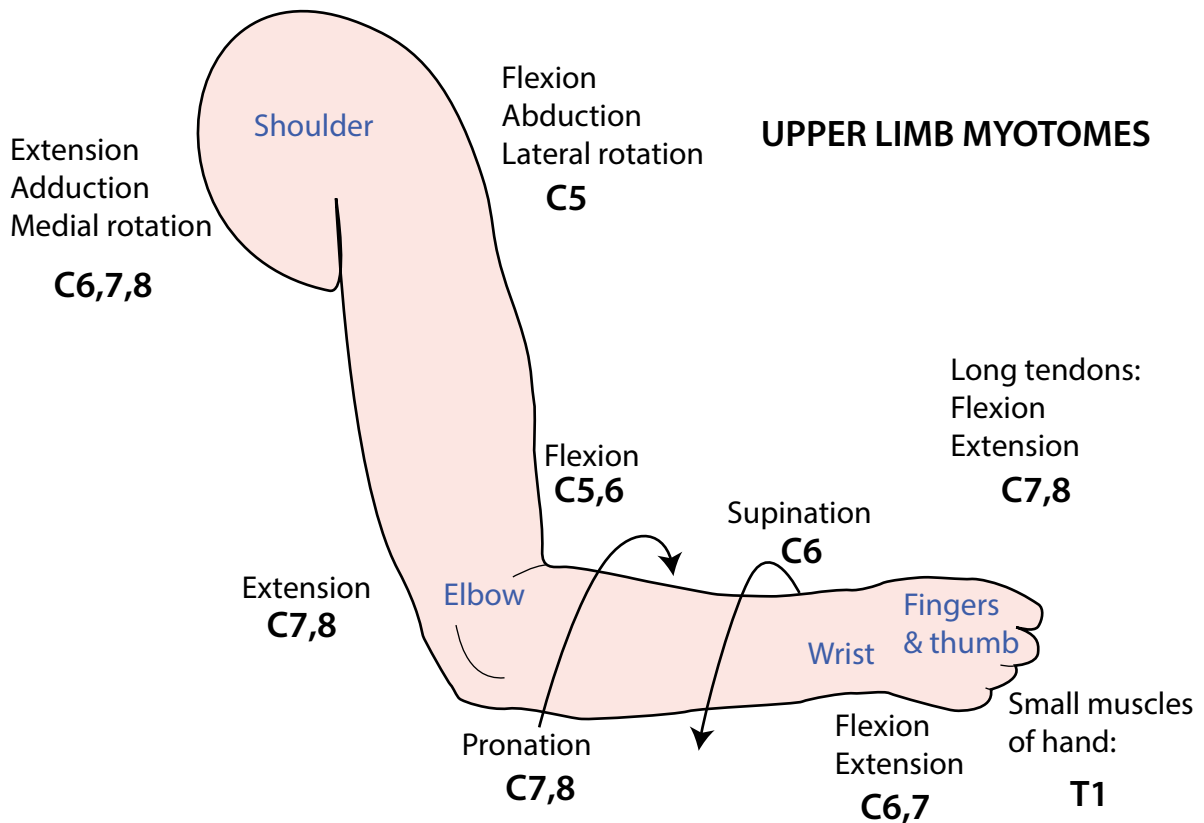
HAND (SMALL MUSCLES):

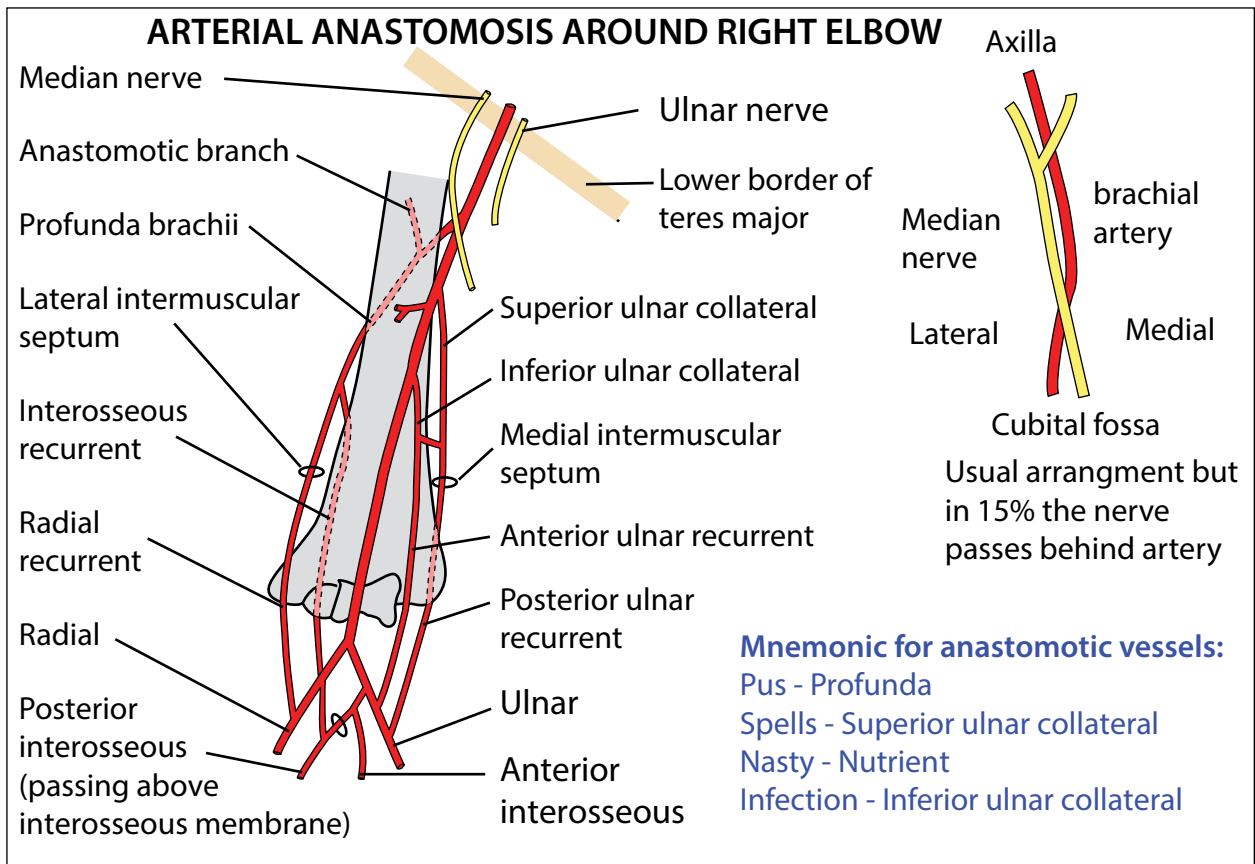
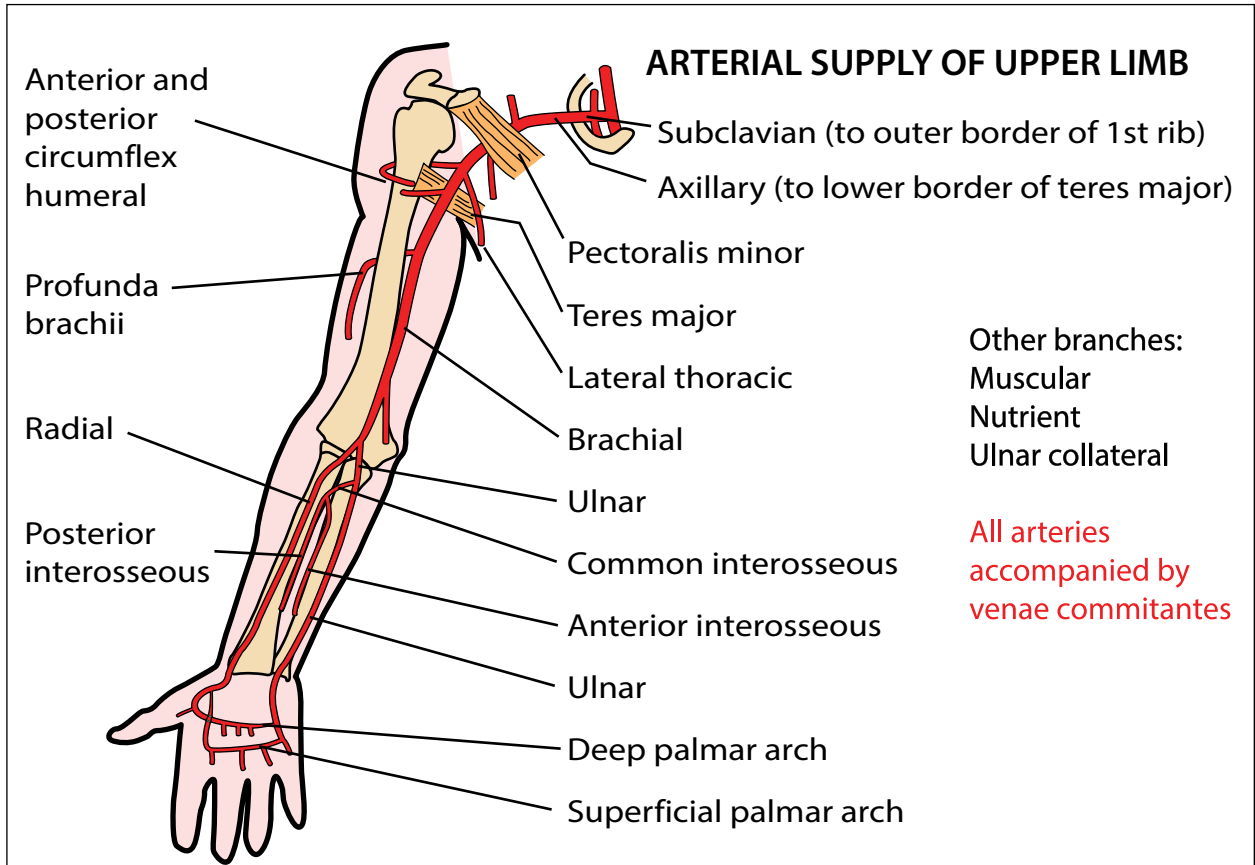
All movements	T1
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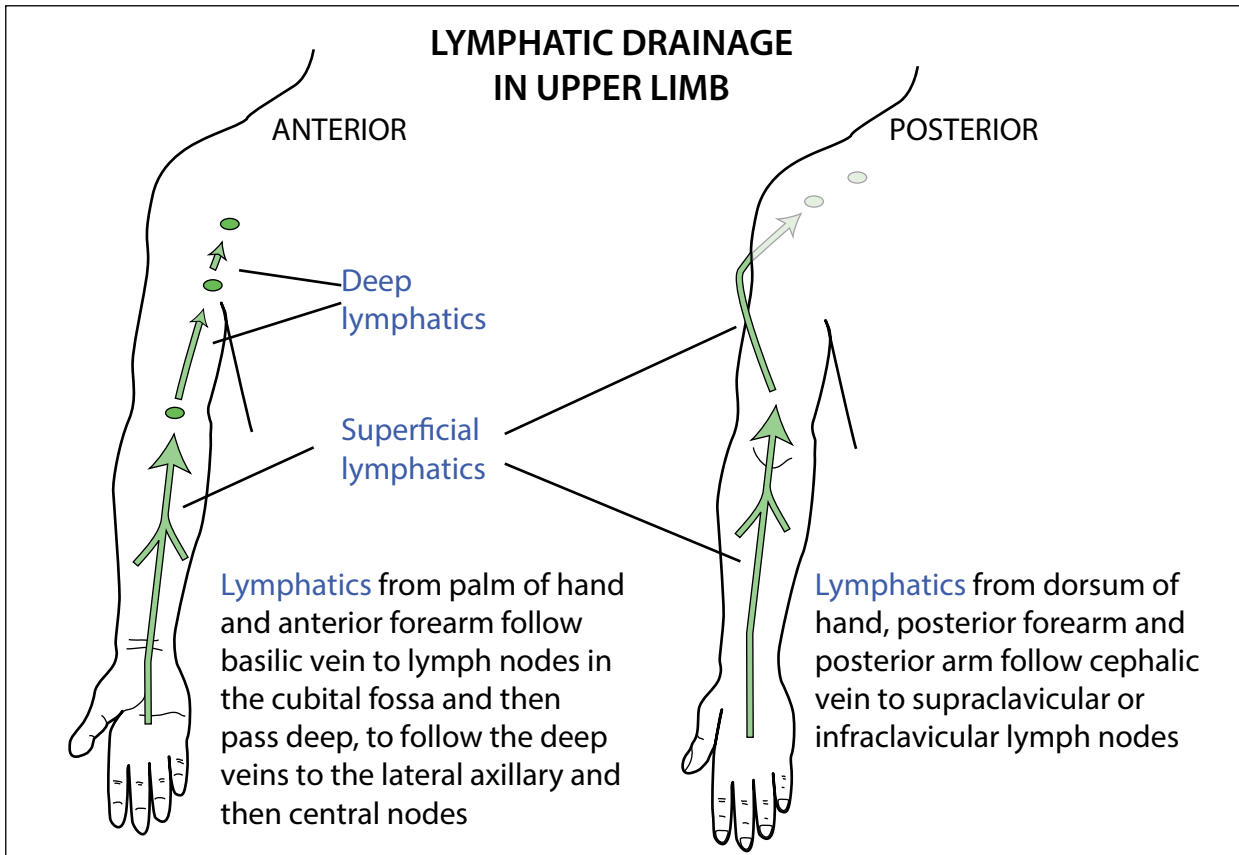
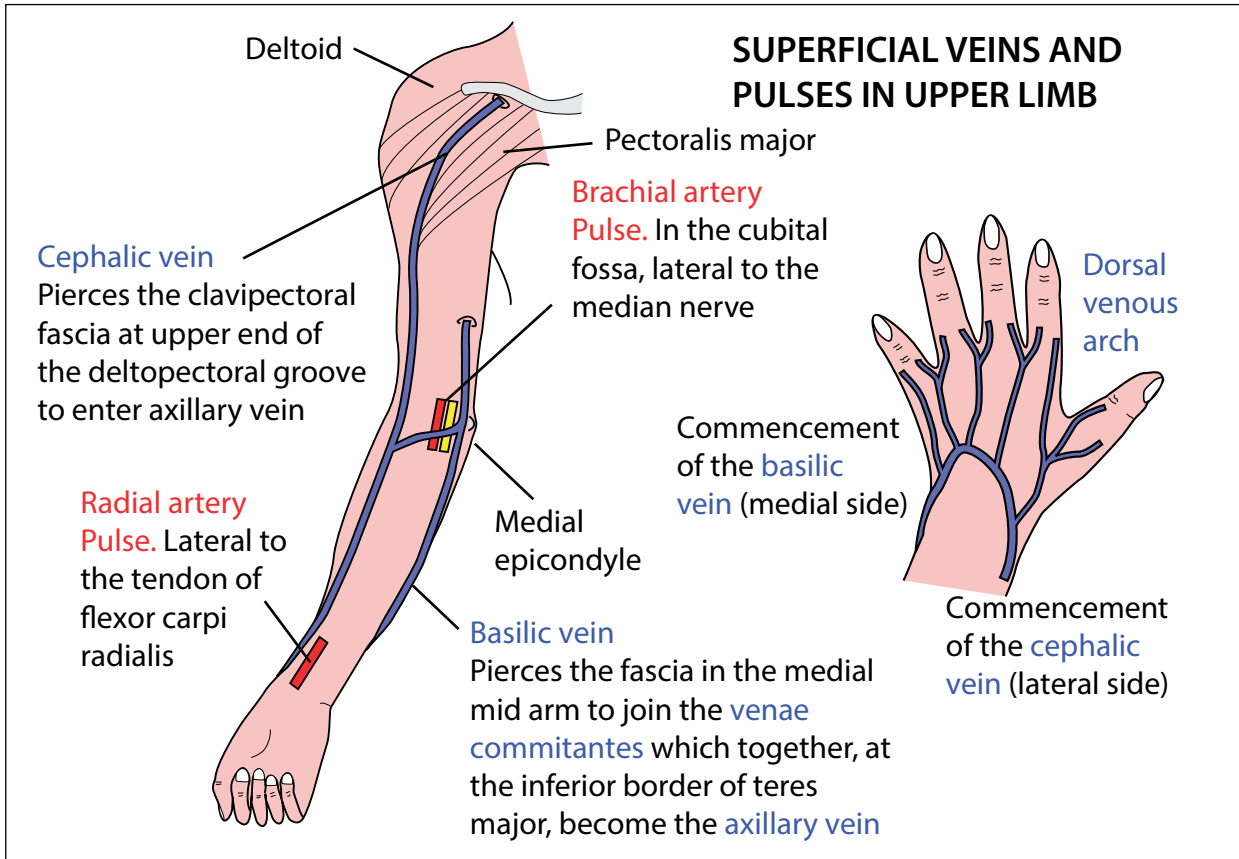
LIMB TENDON REFLEXES



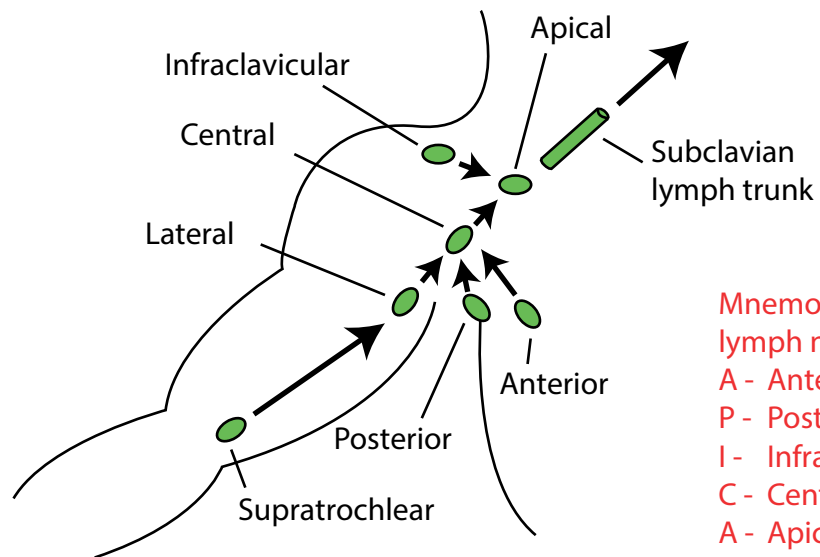
UPPER LIMB MYOTOMES







AXILLARY LYMPH NODES



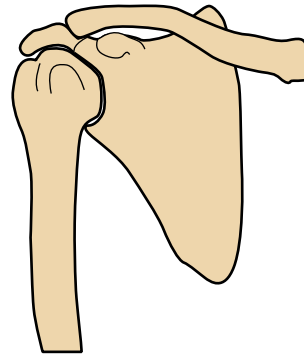
Mnemonic for axillary lymph nodes:

- A - Anterior
- P - Posterior
- I - Infraclavicular
- C - Central
- A - Apical
- L - Lateral

75% of lymphatics from the breast drain to axillary nodes. Others to internal thoracic, abdominal nodes or to other breast

1.2 Shoulder and Arm

SHOULDER JOINT (GLENOHUMERAL)

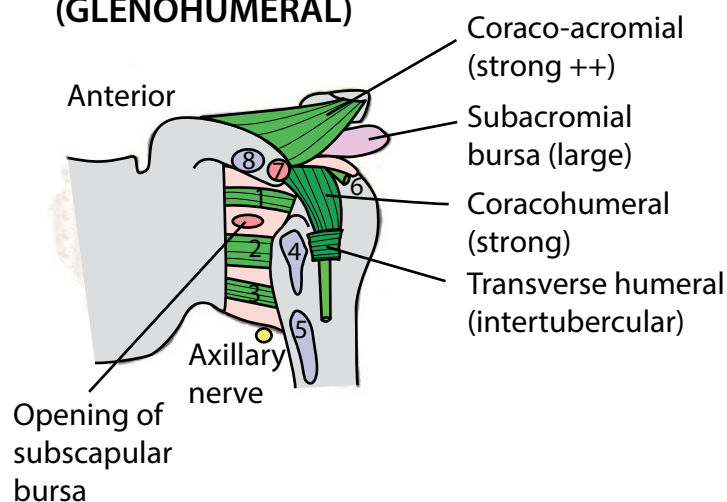


- Blood:** Circumflex humeral arteries
Nerves: Subscapular, suprascapular, axillary (Hilton's law)
Bursae: Subscapular, subacromial, infraspinatus, supraspinatus
Stability: Bones (poor), Capsule (relatively poor), Muscles +++, ligaments +++
Support: Rotator cuff (subscapularis, supraspinatus, infraspinatus, teres minor), long head biceps, triceps in abduction, muscles from chest to arm

SHOULDER JOINT (GLENOHUMERAL)

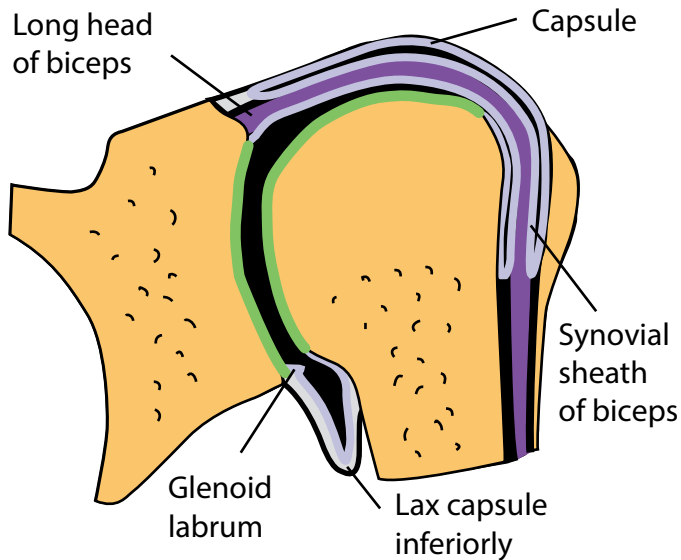
LIGAMENTS:

- 1,2,3: Glenohumeral
 Anterior: superior, middle, inferior
 (weak thickenings of capsule)
 4: Subscapularis
 5: Teres major
 6: Supraspinatus
 7: Short head biceps
 8: Pectoralis minor



Shallow glenoid fossa - deepened by **glenoid labrum**. Synovial, **Ball and socket**.
 Humeral head is 1/3 hemisphere
Capsule: Strong and taut superiorly (anti-sag), inferiorly lax and inserted lower to allow wide abduction, flexion and extension. **Synovium:** Envelops biceps tendon, communicates with bursae anteriorly and posteriorly

SHOULDER JOINT AND ROTATOR CUFF MUSCLES



Rotator Cuff Muscles:
 Subscapularis (anterior)
 Infraspinatus (posterior)
 Teres minor (posterior)
 Supraspinatus (superior)

All blend with capsule of shoulder joint

Lax capsule inferiorly allows dislocation of head of humerus inferiorly and usually anteriorly

The tendon of the long head of biceps lies within the capsule but not within the synovial membrane. It attaches to the supraglenoid tubercle

SUBACROMIAL BURSA AND PAINFUL ARC SYNDROME

