PART 2

Sage Helix360™

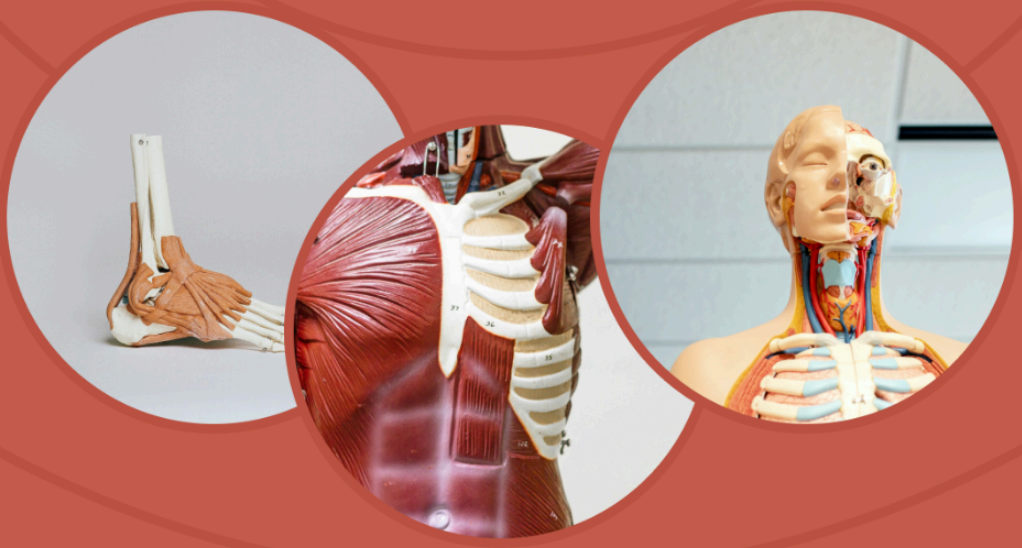
EDITION 1

INSTITUTE AND UNIVERSITY EXAMS | NEET / NEXT EXAMS

BLUEPRINT FOR EXAM SUCCESS

ANATOMY
COMPENDIUM

As per the Competency-Based Medical Education Curriculum (NMC)



BRIEF NOTES FOR COMPETENCIES

VIVA QUESTIONS WITH ANSWERS

SHORT QUESTIONS & ANSWERS

LONG QUESTIONS & ANSWERS

MCQS WITH EXPLANATIONS

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A Comprehensive Guide for Anatomy

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This first edition of the *Anatomy Compendium* has been carefully crafted to provide a thorough and up-to-date resource for students and educators in the field of Anatomy. The contents have been reviewed by experts to ensure accuracy and relevancy, reflecting current knowledge and practices in Anatomy education.

Dedication

This book is dedicated to all students and educators who strive for excellence in the field of Anatomy . May this guide serve as a reliable companion on your journey of discovery and learning.

Revision

Updates and revisions for subsequent editions will be made available as necessary to ensure that the material remains current and continues to meet the evolving needs of Anatomy education.

For suggestions and feedback, please contact Sage Helix 360 at sage.edu.in@gmail.com

Disclaimer

Preface

Welcome to **Anatomy Compendium** by Sage Helix 360, your comprehensive companion for conquering NEET UG and PG examinations.

Why Choose This Book?

We, at Sage Helix 360, have meticulously crafted this book to provide you with a learning experience that is both **comprehensive and strategic**. We understand the demands of competitive exams like NEET UG and PG. Here's what sets this book apart:

Exam-Oriented Content: Every chapter is meticulously structured to align perfectly with NEET UG and PG exam patterns. You'll find a strategic blend of question formats including **Viva Questions with Answers, Short Questions and Answers, Long Questions and Answers, Multiple Choice Questions (MCQs).** This diverse range of questions reflects the actual exam format, allowing you to practice and familiarize yourself with the types of questions you'll encounter.

- **Effective Learning Tools:** We believe in empowering your learning through clear and concise explanations. The book incorporates **crisp explanations, well-labelled diagrams, and strategically placed tables** to enhance your understanding and retention of key concepts. Visual aids are a powerful tool for grasping complex information, and we've utilized them extensively to make your learning journey more engaging.
- **Self-Assessment and Reinforcement:** We understand the importance of testing your knowledge. Each chapter concludes with a comprehensive question bank encompassing MCQs. The answer keys, complete with explanations, offer valuable insights into your strengths and weaknesses. By actively engaging with these questions, you'll solidify your understanding and identify areas that require further practice.

We wish you the very best in your academic journey and a fulfilling career in the medical field.

The Sage Helix 360 Team

Acknowledgements

Creating a comprehensive educational resource such as *Anatomy Compendium* is a monumental task that requires the dedication, expertise, and collaboration of many individuals. We would like to extend our sincere gratitude to everyone who contributed to the making of this book.

Sage Helix 360

We are also profoundly grateful to **Sage Helix 360** team for their pivotal role in the publication and design of this guide.

- **Publishing Team:** We thank our publishing team for their steadfast support throughout this project. Their coordination, project management, and adherence to deadlines have been vital in bringing this book to life. Their understanding of the academic market and their ability to navigate the complexities of publishing have been invaluable.
- **Editorial Team:** Our editorial team deserves special recognition for their tireless efforts in refining the content of this guide. Their thorough reviews, insightful suggestions, and keen eye for detail have enhanced the accuracy and readability of the material. Their commitment to maintaining the highest editorial standards has ensured that this book is both authoritative and student-friendly.
- **Design Team:** The design team at Sage Helix 360 has played a crucial role in creating a visually appealing and user-friendly layout for this book. Their creativity, technical skills, and attention to visual detail have resulted in a design that complements and enhances the educational value of the content. Their innovative approach to incorporating diagrams, charts, and illustrations has made this guide an engaging and effective learning tool.

Contributors and Reviewers

We would like to acknowledge the contributions of numerous **subject matter experts** and **peer reviewers** who have provided their valuable feedback during the development of this guide. Their expertise has been instrumental in validating the accuracy and relevance of the content. Their constructive feedback has ensured that this guide meets the educational needs of its intended audience and reflects the latest advancements in the field of Anatomy

Students and Educators

Finally, we extend our heartfelt thanks to the **students and educators** who have provided insights, suggestions, and feedback throughout the creation of this guide. Your experiences and perspectives have been crucial in shaping a book that is not only comprehensive but

also practical and relevant to your needs. We hope that this guide will serve as a valuable resource in your studies and teaching, and that it will inspire a deeper understanding and appreciation of Anatomy .

Conclusion

In closing, the *Anatomy Compendium* is the result of a collaborative effort, and we are immensely proud of what we have achieved together. We hope that this guide will serve as a cornerstone for Anatomy education, helping students to navigate and excel in this complex field.

With profound gratitude,

The Team at Sage Helix 360

AN 8

Features of individual bones (Upper Limb)

AN 8.1

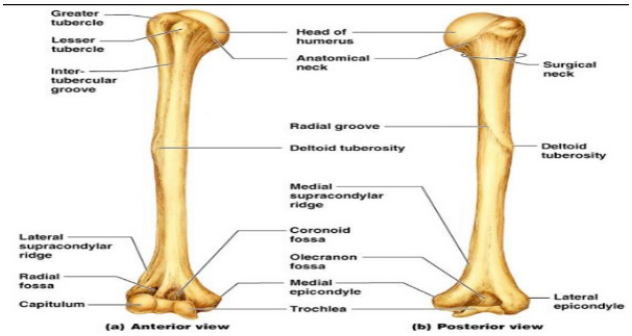
Identify the given bone, its side, important features & keep it in anatomical position

8.1.1

Detail Overview

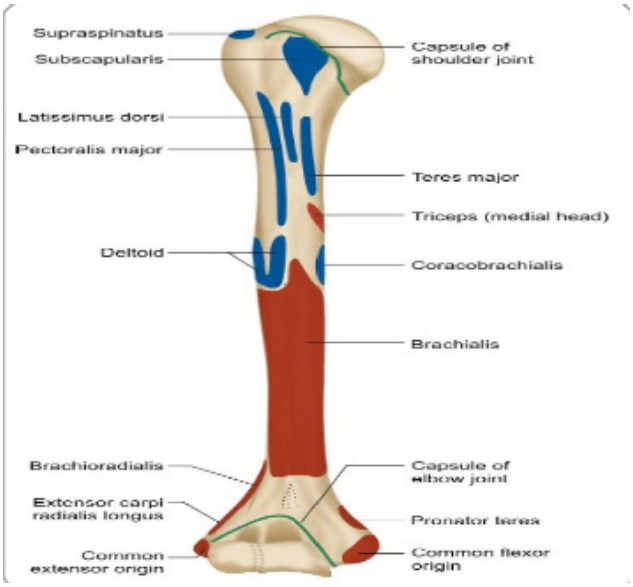
For the anatomical position: The Standard anatomical position. You stand erect, arms at the sides with palmar surfaces facing the fore. Feet are placed as far as shoulder distance apart. This is the position that best describes the position of the bones and features for this section.

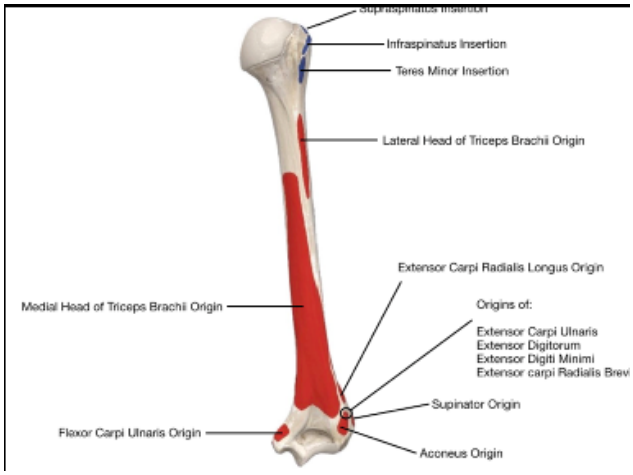
Upper Limb Bones: Arborius Humurus:



Humerus:
Side: Single bone on each side of the body.
Location: Forms the upper arm.

Important Features:
Proximal end: Head - articulates with the glenoid cavity of the scapula; Greater tubercle - attachment for muscles; Lesser tubercle - attachment for muscles.
Shaft: Smooth, rounded, with spiral ridge for muscle attachment.
Distal end: Medial and lateral epicondyles - attachment for forearm muscles; Trochlea and capitulum - articulates with radius and ulna.

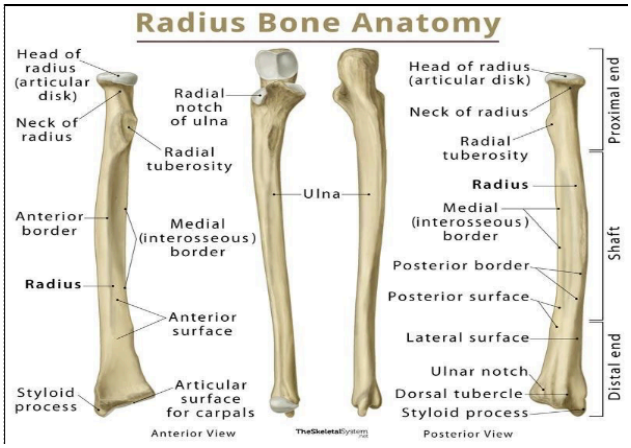




Posterior view of humerus

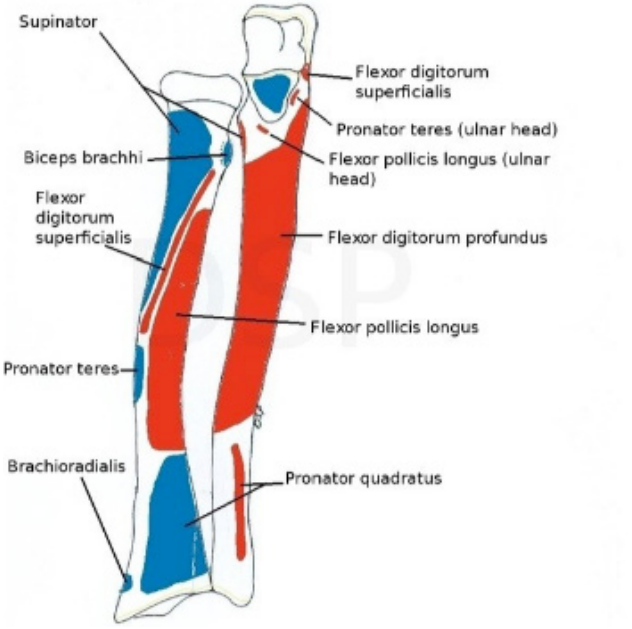
Forearm Bones:
Side: Located on the lateral side of the forearm.
Location: Forms the outer part of the forearm.

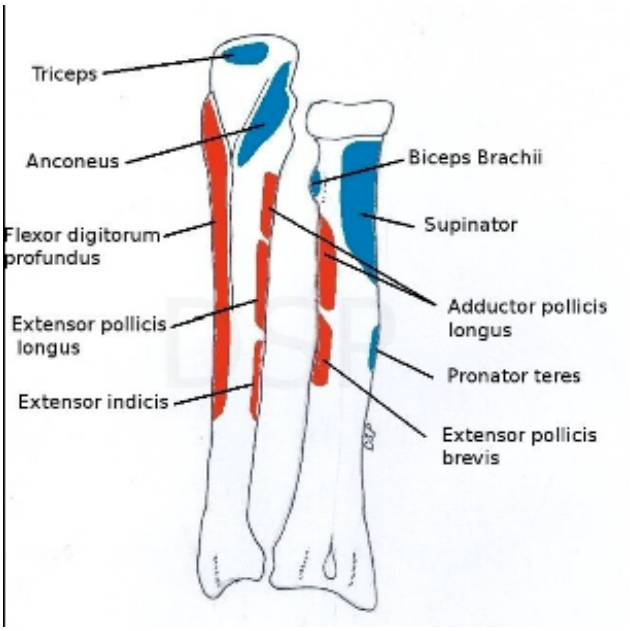
Important Features:
Proximal end: Head - articulates with the capitulum of the humerus; Radial notch - articulates with the ulna.
Shaft: Narrow triangular shape.
Distal end: Styloid process - attachment for wrist ligaments; Carpal articular surface - articulates with wrist bones.



Ulna:
Side: Located on the medial side of the forearm.
Location: Forms the inner part of the forearm.

Important Features:
Proximal end: Olecranon process - attachment for triceps muscle; Trochlear notch - articulates with the trochlea of the humerus; Radial notch - articulates with the radius.
Shaft: Triangular shape with a prominent crest.
Distal end: Styloid process - attachment for wrist ligaments; Head - articulates with the radius and wrist bones.





8.1.2

Viva Questions with Answers

1. How many bones are present in the upper limb?
Answer: The upper limb consists of 30 bone components, most of which are divided into three regions: arm (humerus), forearm (ulna and radius), and hand (27 carpal, metacarpal and phalangeal bones).

2. From an anatomical view, which side of the body does the greater tuberosity of the humerus face?
Answer: Anatomically, the greater tuberosity of humerus is directed laterally (away from midline of the body).

3. Name a more prominent structure on the ulna which is found at the back of your forearm?
Answer: Olecranon process of ulna is that structure which forms the round bony prominence at elbow and is most easily felt at the back of a person's forearm.

4. Which bone in the forearm summertime rotate inward or outward enabling pronation and supination of the hand?
Answer: The radius pivots around ulna hence allows the palm face down which is pronation and palm facing up which is done at supination stage.

5. What is the name of the small bump on the wrist end of the radius that can be noticed particularly on the thumb neck section?
Answer: Radial styloid process, this is the anterolateral palpable prominence at the wrist joint involving the radius in anatomical position.

6. What is the exact number of metacarpal bones in the hand, and what is their primary purpose?
Answer: If not five, it can precisely be four, and these bones are present in the hand, and they act as connectors to the proximal phalanges of the fingers. They allow for the support of holding and manipulation purposes.

7. Which finger and which can be said to have far more phalanges than the others, including how many?
Answer: Phalanges of the thumb are the longest, with three in total; proximal, distal and terminal.

8. What is the space which lies between the radius and ulna in the forearm commonly called as?
Answer: The space that lies between the radius and ulna belongs to forearm interosseous membrane s. a.

9. What do we call the bone of the upper limb which is here sections with the scapula on the shoulder joint?
Answer: The bone of the upper limb that makes a ball and socket joint with the scapula at the shoulder is the humerus.

10. Upper limb supporting anatomical position may be established by several maneuvers. Which examine or test can be supported in this position?
Answer: For the upper limb to be assumed in anatomical position, it should be lowered down to the sides of the trunk, palms should face forward and fingers should be in contact with each other with the thumb in slight abduction.

8.1.3

Short Questions and Answers

1. Describe the three main regions of the upper limb and their associated bones.

Answer:

Arm: Contains the single humerus bone, extending from the shoulder to the elbow.
Forearm: Comprised of two paired bones, the radius laterally and the ulna medially, extending from the elbow to the wrist.
Hand: Consists of 27 smaller bones - 8 carpal bones in the wrist, 5 metacarpal bones in the palm, and 14 phalanges in the fingers and thumb.

2. Explain the anatomical position and how it helps describe the location of specific upper limb features.

Answer: The anatomical position refers to the body standing upright, facing forward, with arms hanging alongside the trunk and palms facing forward. This standardized position allows for precise and unambiguous descriptions of features on the upper limb. For example, the thumb is then considered "lateral" to the fingers, and the radial head on the elbow is located "proximally" to the wrist.

3. Discuss the key anatomical features of the humerus, including its head, neck, tuberosities, and shafts.

Answer:

Head: Smooth, rounded surface that articulates with the glenoid cavity of the scapula at the shoulder joint.
Neck: Narrowed region below the head, prone to fractures due to its vulnerable location.
Greater and lesser tuberosities: Bony bumps where muscles attach, responsible for arm movement.
Shaft: The long, cylindrical portion of the bone with anterior and posterior surfaces, ridges, and nutrient foramina for blood supply.

4. Compare and contrast the anatomical features of the radius and ulna, highlighting their roles in forearm movement.

Answer:

Radius: Thinner and shorter bone, located laterally with a head that articulates with the humerus and ulna. Its rounded distal end forms the wrist joint with the carpal bones.
Ulna: Sturdier and slightly longer bone, located medially with a prominent olecranon process at the elbow that articulates with the humerus. Its styloid process forms a projection at the wrist.
The radius rotates around the ulna during pronation and supination, allowing for turning the palm up or down.

5. Explain the different classifications of carpal bones and their contributions to wrist movement?

Answer: The eight carpal bones are categorized into proximal and distal rows. The proximal row articulates with the radius and ulna, while the distal row connects with the metacarpal bones. This arrangement allows for complex multiaxial movements of the wrist, including flexion, extension, abduction, adduction, and circumduction.

6. Discuss the importance of understanding the anatomical landmarks of the hand, including metacarpal heads and phalanges?

Answer: Identifying landmarks like the prominent heads of the metacarpal bones and the bases of the phalanges is crucial for clinical examinations. These landmarks help assess hand injuries, joint mobility, and potential deformities. Additionally, understanding the arrangement of muscles and tendons related to these bones is essential for interpreting hand function and potential nerve or muscle damage.

7. Explain the significance of the deltoid muscle, located on the shoulder, in relation to upper limb movement.

Answer: The deltoid muscle, with its anterior, lateral, and posterior fibers, is the major abductor of the arm. It also contributes to flexion, extension, and internal and external rotation of the shoulder joint. Understanding its function is crucial for diagnosing shoulder pain, weakness, and limitations in movement.

8. Discuss the role of the major nerve plexuses of the upper limb, the brachial plexus and the lumbosacral plexus, in supplying sensation and motor control.

Answer: The brachial plexus, formed from nerve roots in the neck, supplies sensation and motor control to the entire upper limb. The lumbosacral plexus, located in the lower back, contributes to the innervation of the arm muscles through its lateral cord, while also supplying the lower limb. Understanding the specific branches and territories of these plexuses is essential for localization of nerve compression syndromes, pain patterns, and muscle deficits.

9. Describe the concept of referred pain in the upper limb and its potential causes.

Answer: Referred pain occurs when pain originating from an internal organ or deeper structure is perceived in a different, seemingly unrelated area. For example, heart attacks can cause pain radiating down the left arm. In the upper limb, referred pain can arise from nerve root compression in the neck or thoracic spine, affecting specific muscles or dermatomes on the arm or hand. Understanding these patterns helps with accurate diagnosis and appropriate treatment.

8.1.4

Multiple Choice Questions

1. Which of the following upper limb bones forms the lateral border of the axilla?

(A) Clavicle
(B) Scapula
(C) Humerus
(D) Radius

Answer: (C) Humerus.

Explaination: *The axillary artery and vein pass over the head of the humerus through the coracobrachial tunnel, making it the prominent landmark on the lateral border of the axilla.*

2. The head of the humerus articulates with which of the following bony structures?

(A) Glenoid Cavity Of The Scapula
(B) Acromion Process Of The Scapula
(C) Coracoid Process Of The Scapula
(D) Olecranon Of The Ulna

Answer: (A) Glenoid Cavity Of The Scapula.

Explaination: *The head of the humerus forms a ball-and-socket joint with the glenoid cavity, allowing for a wide range of motion in the shoulder.*

3. Which of the following features can be found on the medial surface of the humerus?

(A) Deltoid Tuberosity
(B) Trochlea
(C) Intertubercular Groove
(D) Radial Epicondyle

Answer: (C) Intertubercular Groove.

Explaination: *The intertubercular groove separates the greater and lesser tuberosities on the medial surface of the humerus and houses the biceps brachii tendon.*

4. The olecranon process of which bone forms the prominent bony bump at the elbow in anatomical position?

(A) Humerus
(B) Radius
(C) Ulna
(D) Cuboid

Answer: (C) Ulna.

Explaination: *The olecranon process of the ulna forms the most prominent bony bump at the elbow, articulating with the trochlea of the humerus for hinge movement.*

5. The head of the radius rotates within the radial notch of which bone?

(A) Ulna
(B) Humerus
(C) Scapula
(D) Clavicle

Answer: (A) Ulna.

Explaination: *The radial notch on the proximal ulna serves as the socket for the head of the radius, allowing for rotation of the forearm.*

6. Which of the following bony prominences is NOT located on the posterior aspect of the forearm in anatomical position?

(A) Olecranon Process
(B) Ulnar Head
(C) Radial Styloid Process
(D) Deltoid Tuberosity

Answer: (D) Deltoid Tuberosity.

Explaination: *The deltoid tuberosity is located on the lateral aspect of the humerus, not the posterior aspect of the forearm.*

7. The styloid processes of both the radius and ulna form prominent landmarks on the wrist. Which finger is located directly in line with the ulnar styloid process?

(A) Thumb
(B) Index Finger
(C) Middle Finger
(D) Ring Finger

Answer: (D) Ring Finger.

Explanation: *The ulnar styloid process aligns with the base of the fourth metacarpal, which in turn forms the base of the ring finger.*

8. The nutrient foramen of the humerus is located on which surface of the bone?

(A) Anterior
(B) Posterior
(C) Medial
(D) Lateral

Answer: (C) Medial.

Explanation: *The nutrient foramen of the humerus is located on the medial surface, providing a passage for blood vessels to enter the bone for nourishment.*

9. Which of the following muscles originates from the medial epicondyle of the humerus?

(A) Biceps Brachii
(B) Triceps Brachii
(C) Pronator Teres
(D) Deltoid

Answer: (C) Pronator Teres.

Explanation: *The pronator teres originates from the medial epicondyle of the humerus and plays a role in pronation of the forearm.*

10. The coronoid process of the ulna articulates with which bony structure?

(A) Trochlea Of The Humerus
(B) Radial Head
(C) Capitulum Of The Humerus
(D) Glenoid Cavity Of The Scapula

Answer: (C) Capitulum Of The Humerus.

Explanation: *The coronoid process of the ulna fits into the depression on the humerus called the capitulum, forming a hinge joint that allows flexion and extension of the elbow.*

11. A patient has fractured the lateral epicondyle of the humerus. This is located on which side of the humerus and which muscle insertion is most likely affected?

(A) Medial, Triceps Brachii
(B) Lateral, Biceps Brachii
(C) Posterior, Brachialis
(D) Anterior, Deltoid

Answer: B) Lateral, Ecrb

Explanation: *The lateral epicondyle is a prominent bony bump on the lateral side of the distal humerus where the origin of extensor carpi radialis brevis is affected most likely*

12. A newborn presents with a clavicle fracture. Which of these features is NOT a typical complication of this injury?

(A) Difficulty Breathing Due To Chest Wall Instability
(B) Neurovascular Compromise Of The Arm Due To Pressure On The Subclavian Artery
(C) Cosmetic Deformity Of The Shoulder
(D) Increased Risk Of Future Shoulder Dislocations

Answer: (B) Neurovascular Compromise Of The Arm.

Explanation: *While clavicle fractures can be serious, they typically don't directly compress the subclavian artery. The other options are potential complications.*

13. A patient complains of pain and weakness in the thumb due to a carpal tunnel syndrome. This is most likely caused by compression of which nerve at the wrist?

(A) Median Nerve
(B) Radial Nerve

(C) Ulnar Nerve
(D) Median Cubital Nerve

Answer: (A) Median Nerve.

Explaination: *The median nerve passes through the carpal tunnel at the wrist and supplies sensation and motor control to the thumb and other fingers.*

14. A radiograph shows a fracture of the head of the radius. Which joint is most likely affected in this case?

(A) Shoulder Joint
(B) Elbow Joint
(C) Wrist Joint
(D) Interphalangeal Joint

Answer: (B) Elbow Joint.

Explaination: *The head of the radius articulates with the ulna and humerus to form the elbow joint.*

15. In anatomical position, which of the following bones lies anterior to the scapula?

(A) Clavicle
(B) Humerus
(C) Scaphoid
(D) Lunate

Answer: (A) Clavicle.

Explaination: *The clavicle sits horizontally across the anterior chest wall, with the scapula positioned posteriorly on the back.*

16. Which bone of the upper limb demonstrates an olecranon fossa on its posterior aspect?

(A) Humerus
(B) Radius
(C) Ulna
(D) Scapula

Answer: (C) Ulna.

Explaination: *The olecranon fossa on the ulna articulates with the humerus to form the hinge joint of the elbow.*

17. A patient with a supracondylar fracture of the humerus is most likely to exhibit which deformity?

(A) S-Shaped Deformity Of The Elbow
(B) Wasting Of The Deltoid Muscle
(C) Limitation Of Wrist Extension
(D) Visible Bony Prominence On The Forearm

Answer: (A) S-Shaped Deformity Of The Elbow.

Explaination: *Supracondylar fractures often cause the elbow to bend abnormally in both flexion and extension.*

18. Which of the following bones of the upper limb exhibits a deltoid tuberosity, a roughened area for muscle attachment?

(A) Clavicle
(B) Scapula
(C) Humerus
(D) Radius

Answer: (C) Humerus.

Explaination: *The deltoid tuberosity on the humerus serves as the attachment point for the deltoid muscle, the main muscle responsible for arm abduction.*

19. A patient with a Colles' fracture of the distal radius is most likely to experience which deformity?

(A) Increased Wrist Flexion
(B) Pronation Of The Forearm
(C) Radial Deviation Of The Wrist
(D) Loss Of Grip Strength

Answer: (C) Radial Deviation Of The Wrist.

Explaination: *Colles' fractures typically cause the wrist to bend towards the thumb (radial deviation).*

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