TERMS USED TO DESCRIBE BONE MARKINGS

Developed by:
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Define Bone Markings

- Identifying Features on Bones
- “Marks” Each Bone as Unique

DEPRESSIONS AND OPENINGS
FORAMEN
• Round Hole in Bone for Blood Vessels and Nerves
• Example: Supraorbital Foramen

FOSSA
• Depression in Bone into Which Another Bone Fits (Forms Joint)
• Example: Mandibular Fossa
• Which #?
• 10

MEATUS
• Tubelike Canal in Bone
• Example: External Auditory Meatus
• Which #?
• 11
NOTCH

- V-like Depression in Bone
- Example: Supraorbital Notch
- Allows passage of supraorbital vessels & nerves.

PROCESSES

- Extensions of Bone
- 2 Groups: THOSE THAT FIT INTO JOINTS & THOSE TO WHICH MUSCLES ATTACH.
  - THOSE THAT FIT INTO JOINTS-2 TYPES
    - HEAD & CONDYLE
      - Rounded Bump That Usually Fits into a Fossa on Another Bone Forming a Joint
      - Example: Mandibular Condyle
      - C or E
      - C: what is E?

HEAD

- Large, Rounded Distinct End of a Long Bone
- Fits into a Depression on Another Bone Forming A Joint
- Example: Head of Femur
  - Fits into acetabulum of os coxae (pelvis)
THOSE TO WHICH MUSCLES ATTACH

- EPICONDYLE
- SPINE (SPINOUS PROCESS)
- TROCHANTER
- TUBEROSITY

EPICONDYLE

- Bump Above a Condyle for Muscle Attachment
  - CONDYLE-Rounded Bump That Usually Fits into a Fossa on Another Bone Forming a Joint (Example: Mandibular Condyle)
- Example: Epicondyles of Femur

SPINE (SPINOUS PROCESS)

- Sharp, Pointed Process
- for Muscle Attachment
- Example: Spine of Vertebra
TROCHANTER
- Large Bump for Muscle Attachment
- Example:
  - Trochanters of Femur

TUBEROSITY
- Small Bump for Muscle Attachment
- Example:
  - Tibial Tuberosity

Processes-OTHERS
- BODY
  - Main Portion of a Bone
  - Example:
    - Body of Vertebra
• **SINUS**
  - Cavity Within Bone
  - Example:
    • Frontal Sinuses

**BONE MARKINGS OF INDIVIDUAL BONES: THE SKULL**

**FRONTAL BONE**

• **SUPRAORBITAL FORAMEN**
  - “Hole/Notch Above Orbit”
  - 2
  - May Be a Foramen/May Be a Notch (Varies)
FRONTAL BONE
• FRONTAL SINUSES
  – Cavities Within Frontal Bone (Above Orbits)
  – Usually 2 (One Above Each Orbit) But Varies

TEMPORAL BONE
• Note: 2 Temporal Bones Means 2 Each of These Bone Markings

TEMPORAL BONE
• MASTOID PROCESS
  – Projection of Bone Just Behind Ear
  – Contains Mastoid Air Cells (Small Sinuses That Communicate With Middle Ear Rather Than Nose)
TEMPORAL BONE

• EXTERNAL AUDITORY MEATUS
  – "External Ear Canal"
  – Tube That Extends into the Temporal Bone From the External to Middle Ear

TEMPORAL BONE

• STYLOID PROCESS
  – Slender Spike of Bone That Extends Downward From the Temporal Bone

TEMPORAL BONE

• MANDIBULAR FOSSA
  – Depressed Area in the Temporal Bone into Which the Mandible Fits
TEMPORAL BONE

- ZYGOMATIC PROCESS
  - The Portion of the Temporal Bone That Joins the Zygomatic Bone
  - Zygomatic Arch = Zygomatic Process (Temporal Bone) + Zygomatic Bone

OCCIPITAL BONE

- FORAMEN MAGNUM
  - "Large Hole"
  - The Hole Through Which the Spinal Cord Enters the Cranial Cavity

- OCCIPITAL CONDYLES
  - 2 Oval Shaped Bumps on Either Side of the Foramen Magnum (Where Skull Joins Vertebral Column)

SPHENOID BONE

- OPTIC FORAMEN
  - "Hole in Eye"
  - 2
  - Transmits the Optic Nerve (Vision) From Eye to Brain
SPHENOID BONE

• SELLA TURCICA
  – Depression in the Center of the Sphenoid Bone
  (Houses the Pituitary Gland)

SPHENOID BONE

• SPHENOID SINUSES
  – Cavities Within the Sphenoid Bone
  – Number Varies
ETHMOID BONE

- **CRISTA GALLI**
  - Upward Projection of Ethmoid Bone
  - Lies in Anterior Cranial Floor
  - Point of Attachment for the Meninges

- **CRIBIFORM PLATE**
  - Thin Plate (Anterior Cranial Floor) That Crista Galli Sets On
  - Separates the Cranial and Nasal Cavities
  - Contains Numerous Holes for Branches of the Olfactory Nerve (Smell)
  - (Branches of This Nerve Pass From Nose to Brain Through These Holes)

- **PERPENDICULAR PLATE**
  - Upper Portion of Nasal Septum (Nasal Septum is the Midline Wall in Internal Nose)
PERPENDICULAR PLATE

ETHMOID BONE

• SUPERIOR AND MIDDLE CHONCHAE (TURBINATES)
  – Upper and Middle "Ledges" in Nasal Cavities
  – Superior and 2 Middle Conchae

ETHMOID BONE

• ETHMOID SINUSES
  – Small, Spongy Cavities That Lie Within the Lateral Portions of the Ethmoid Bone
MAXILLARY BONE

- **ALVEOLAR PROCESS**
  - Arch That Contains the Teeth
- **INFRAORBITAL FORAMEN**
  - "Hole Below Orbit"
  - 2

MAXILLARY BONE

- **PALATINE PROCESS**
  - The Portion of the Maxillary Bones That Forms the Anterior
  - and Most of Hard Palate
  - Hard Palate is the Hard Portion of the Roof of the Mouth

MAXILLARY BONE

- **MAXILLARY SINUSES**
  - Cavities Within the Maxillary Bones
  - Below Orbits
  - Usually 2
    - One Below Each Orbit
    - Varies
  - The Largest of the Sinuses
MANDIBLE BONE

• MANDIBULAR CONDYLE (c)
  – Rounded Portion of Mandible That Fits Into Mandibular Fossa of Temporal Bone to Form the Jaw Joint (2)

MANDIBLE BONE

• ALVEOLAR PROCESS
  – Arch That Contains the Teeth

MANDIBLE BONE

• MENTAL FORAMEN
  – “Hole in Chin” (Outer Surface of Mandible)
  – 2
MANDIBLE BONE

• MENTAL FORAMEN

MANDIBLE BONE

• MANDIBULAR FORAMEN
  "Hole in Mandible" (Inner Surface of Mandible)
  – 2

• PALATINE BONE (HORIZONTAL PLATE)
  – Posterior portion of the hard palate

SUTURES

• Immovable Joints Between Skull Bones

• SQUAMOUS
  – Lies Along the Top Curved Edge of the Temporal Bone
  – Joint Between Temporal, Parietal, and Part of the Sphenoid Bones
SUTURES

- CORONAL (FRONTAL) (1)
  - The Joint Between Parietal and Frontal Bones
- LAMBDOIDAL (8)
  - The Joint Between Parietal and Occipital Bones
- SAGITTAL
  - The Joint Between the 2 Parietal Bones

FONTANELS (fontn nel)

- DEFINITION
  - "Soft Spots" in an Infant's Skull
    - Areas Where Ossification is Incomplete at Birth
- PURPOSE
  - Allows Compression of the Skull During Childbirth

SINUSES

- PARANASAL SINUSES (PREVIOUSLY LISTED WITH SKULL BONES)
  - "Sinuses Around Nose" (Communicate Directly (Open Into) Internal Nose)
    - FRONTAL
    - SPHENOID
    - ETHMOID
    - MAXILLARY
MASTOID SINUSES (AIR CELLS)
- Located in the Mastoid Processes of the Temporal Bones
- Small Sinuses That Communicate With the Middle Ear Rather Than the Nose

ORBITS & NASAL SEPTUM

ORBITS
- Eye Sockets
- Formed By Many Cranial and Facial Bones: Frontal, Sphenoid, Zygomatic, Ethmoid, Lacrimal, Maxillary (See Previous Info)

NASAL SEPTUM
- Midline Wall in the Internal Nose (Divides the Internal Nose Into 2 Cavities)
- Formed By:
  - Bone:
    - Perpendicular Plate of Ethmoid Bone: Forms Upper Portion
    - Vomer: Forms Lower Portion
  - Cartilage (Hyaline): Forms Anterior Portion

BONE MARKINGS OF INDIVIDUAL BONES: THE SKULL

WORMIAN BONES
- Small Islands of Bone Located Within Sutures
- Highly Individual So the Number Varies
VERTEBRAE

- **BODY**
  - Flat, rounded portion
  - Anterior and medial
- **SPINOUS PROCESS**
  - Sharp, pointed, posterior, and medial projection
  - Can be felt through the skin of the back
- **TRANSVERSE PROCESSES**
  - Sharp, pointed, and lateral projections
  - 2 (left and right)
  - Note: These are markings that are common to most vertebrae

VERTEBRAE

- **SUPERIOR ARTICULAR PROCESSES**
- **INFERIOR ARTICULAR PROCESSES**
  - "Joining Processes": One Way That the Vertebrae Join Together (They Also Join By Their Bodies)
  - Superior Articular (Articulating) Processes: 2; Uppermost (Project Up)
  - Inferior Articular (Articulating) Processes: 2; Lowermost (Project Down)
- **SPINAL (VERTEBRAL) FORAMEN**
  - Hole in the Center of Each Vertebra
  - When All the Vertebrae are Joined, These Holes Create the Spinal Cavity (Houses the Spinal Cord)

STERNUM

- **MANUBRIUM**
  - Upper Portion of the Sternum
- **BODY**
  - Middle (Main) Portion of the Sternum
- **XIPHOID PROCESS**
  - Blunt, Lower Tip of Sternum
  - Composed of Cartilage That Ossifies As One Ages
- **RIBS: COSTAL CARTILAGES**
  - Cartilage (Hyaline) That Joins Ribs to Sternum
BONE MARKINGS OF INDIVIDUAL BONES: SCAPULA

• SPINE
  – Sharp Ridge on the Posterior Surface of the Scapula

• GLENOID CAVITY
  – Arm Socket: A Shallow Depression That Holds the Head of the Humerus to Form the Shoulder Joint

BONE MARKINGS OF INDIVIDUAL BONES: HUMERUS

• HEAD
  – Large, Rounded, Proximal Epiphysis
  – Medial (Fits Into Glenoid Cavity)

• The following are distal:
  – MEDIAL EPICONDYLE
  – LATERAL EPICONDYLE
  – CAPITULUM-Rounded, Lateral Knob
  – TROCHLEA
  • Rounded, Medial Knob That Contains a Depression in the Center

BONE MARKINGS OF INDIVIDUAL BONES: RADIUS

• RADIUS
  – HEAD: Proximal; Disk-Shaped
  – STYLOID PROCESS: Distal, Pointed Projection (Lateral in Anatomical Position)

• ULNA
  – OLECRANON PROCESS: Proximal, Upward Projection of the Ulna (Elbow)
  – SEMILUNAR NOTCH
    • Curved Depression
    • Proximal
  – STYLOID PROCESS
    • Distal, Pointed Projection (Medial in Anatomical Position)
    • Can Be Felt Through the Skin in the Wrist Area
BONE MARKINGS OF INDIVIDUAL BONES:

OS COXAE (COXAL/INNOMINATE)
- Each Os Coxa Bone is Composed of 3 Separate Bones That Fuse
  - ILIUM: Uppermost, Flaring Portion (Largest)
  - ISCHIUM: Lowermost Portion (Strongest)
  - PUBIS: Anterior, Medial Portion
- Markings:
  - ACETABULUM: Hip Socket; A Deep Depression that Holds the Head of the Femur to Form the Hip Joint
  - SYMPHYSIS PUBIS: Joint Between the Pelvic Bones (Pubis Portion) Anterior and Medial
    - Composed of Cartilage (Fibrocartilage)

BONE MARKINGS OF INDIVIDUAL BONES:

TRUE PELVIS: Space Between Pelvic Inlet and Pelvic Outlet
- "Basin" Portion of Pelvis (Houses Pelvic Organs)
- PELVIC INLET: Boundary That Leads Into True Pelvis
- PELVIC OUTLET: Boundary That Leads Out of True Pelvis
- FALSE PELVIS: Broad, Shallow Space Above Pelvic Inlet
- Called False Pelvis Because It's Actually Located in the Abdominal Cavity Rather Than the Pelvic Cavity

BONE MARKINGS OF INDIVIDUAL BONES: FEMUR
- Proximal
  - HEAD: Large, Rounded, Proximal Epiphysis
    - Medial ( Fits Into Acetabulum)
  - NECK: Narrow Portion Just Below the Head
    - GREATER TROCHANTER: Lateral
    - LESSER TROCHANTER: Medial
- Distal
  - MEDIAL EPICONDYLE
  - LATERAL EPICONDYLE
  - MEDIAL CONDYLE
  - LATERAL CONDYLE
BONE MARKINGS OF INDIVIDUAL BONES: TIBIA

- Proximal
  - MEDIAL CONDYLE
  - LATERAL CONDYLE
  - TIBIAL TUBEROSITY: Anterior, Medial, Rounded Bump
- Distal
  - MEDIAL MALLEOLUS
    - Distal, Medial Process
    - Can be Felt on the Inner Surface of the Ankle

BONE MARKINGS OF INDIVIDUAL BONES: FIBULA

- HEAD: Proximal and Rounded
- LATERAL MALLEOLUS
  - Distal, Lateral Process
  - Can be Felt on the Outer Surface of the Ankle

BONE MARKINGS OF INDIVIDUAL BONES: TARSALS

- CALCANEUS:
  - Heel Bone
  - Which #
    - 1
- TALUS:
  - Uppermost Tarsal
CURVES OF THE SPINAL COLUMN

- The Spinal Column is Curved (Not Straight)
- Importance:
  - Strength
  - Balance
  - Protection from Fracture
- PRIMARY CURVES: Present from Birth, Convex
  - THORACIC
  - SACRAL (PELVIC)
- SECONDARY CURVES: Develop after Birth, Concave
  - CERVICAL: Develops As Infant Learns to Hold Head Erect
  - LUMBAR: Develops As Child Learns to Walk

COMPARISON OF THE STRUCTURE AND FUNCTION OF THE HANDS AND FEET

- STRUCTURE OF THE HANDS/FEET
  - Similar
  - Hands: Carpals, Metacarpals, Phalanges
  - Feet: Tarsals, Metatarsals, Phalanges
- FUNCTION OF THE HANDS/FEET
  - Different!
  - Hands: Major Function - Manipulation of Objects (Grasping and Holding); Due to Opposing Thumb
  - Feet: Major Function - Strong Support for Body's Weight; Due to Big Toe and Arches

- LONGITUDINAL: Lengthwise Arches
  - MEDIAL
  - LATERAL
- TRANSVERSE: Crosswise Arch
SKELETAL DIFFERENCES BETWEEN MEN AND WOMEN
http://medlib.med.utah.edu/kw/osteo/forensics/sex/bonepelvsex.html

• GENERAL DIFFERENCES: Male Skeleton Larger and Heavier
• SPECIFIC (PELVIC) DIFFERENCES
  – SHAPE OF PELVIS
    • Male Pelvis: Narrow and Deep (Funnel-Shaped)
  – SIZE OF PUBIC ARCH
    • Angle Between Pelvic Bones (Anterior and Medial)
    • Male Pelvis: Public Arch < 90 Degrees
    • All Pelvic Differences Relate to Childbearing

SKELETAL DIFFERENCES BETWEEN MEN AND WOMEN
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• GENERAL DIFFERENCES: Male Skeleton Larger and Heavier
• SPECIFIC (PELVIC) DIFFERENCES
  – SHAPE OF PELVIS
    • Female Pelvis: Broad and Shallow (Basin-Shaped)
  – SIZE OF PUBIC ARCH
    • Angle Between Pelvic Bones (Anterior and Medial)
    • Female Pelvis: Public Arch > 90 Degrees
    • All Pelvic Differences Relate to Childbearing

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23