

III. SKELETAL SYSTEM

BONY THORAX

CN: Use the same colors as were used on Plate 22 for true ribs, thoracic vertebrae, demifacets, and transverse process facets. Use bright colors for A-C. (1) Color the anterior view of the bony thorax. Color each rib completely before going on to the next. (2) Color the posterior

view in the same manner. (3) Color the lateral view of the bony thorax. (4) When coloring the drawings of a rib and the sites of articulation, note that the rib facets (drawn with dotted lines) are to be colored even though they are on the underside of the rib.

STERNUM:*

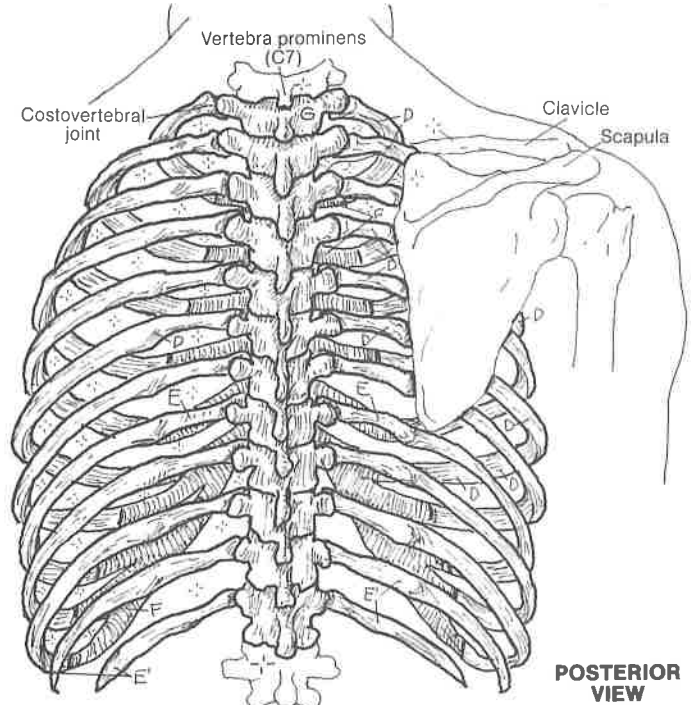
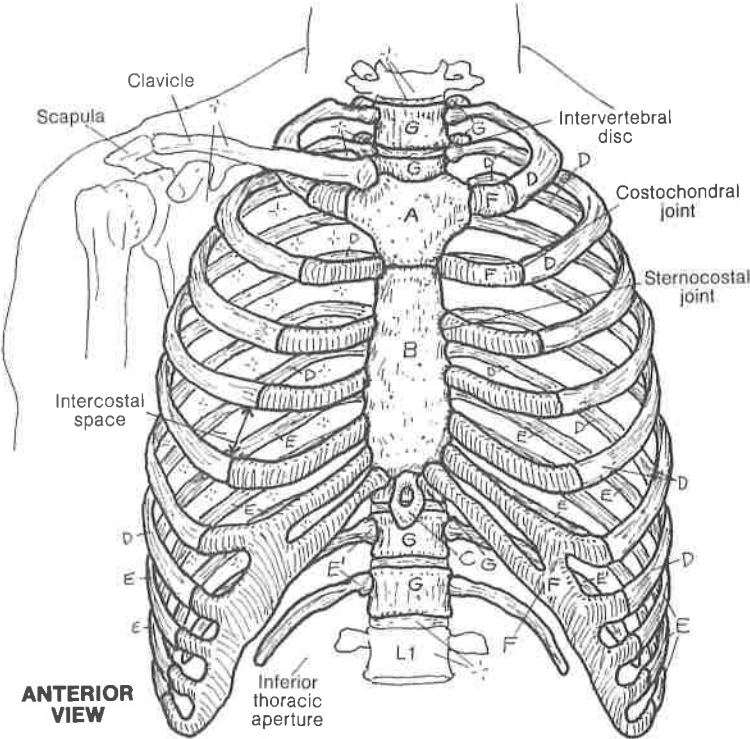
- MANUBRIUM_A
- BODY_B
- XIPHOID PROCESS_C

12 RIBS:*

- 7 TRUE_D
- 5 FALSE_E
- (2 FLOATING)_{E'}

COSTAL CARTILAGE (10)_F

THORACIC VERTEBRA (12)_G

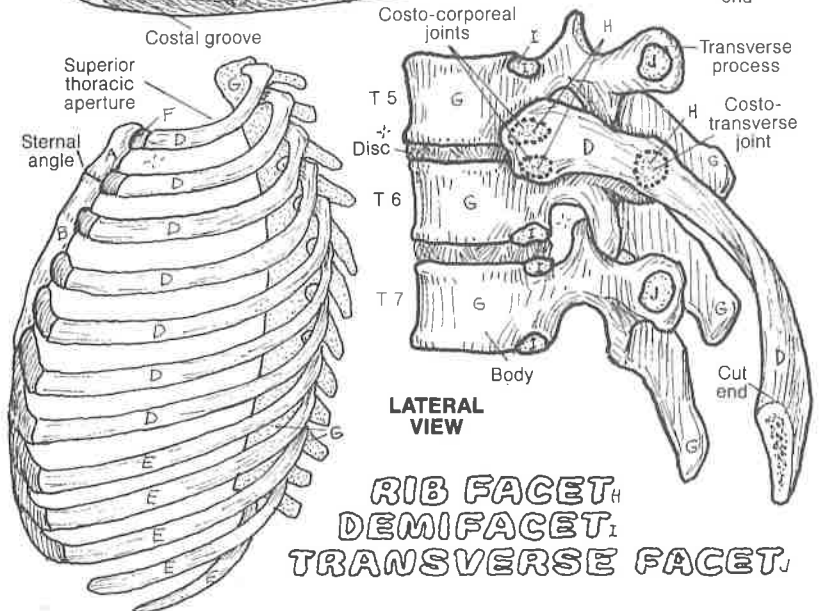
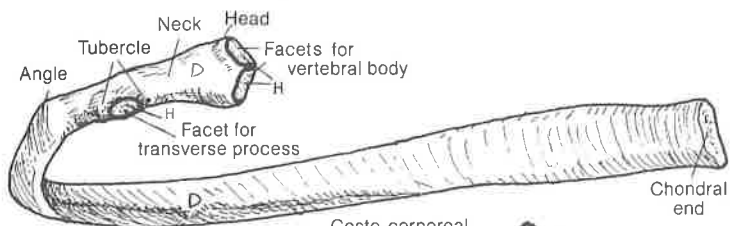


ANTERIOR VIEW

POSTERIOR VIEW

The *bony thorax* is the skeleton of the chest, representing a fairly mobile set of structures important to respiration and harboring the heart, lungs, and other significant organs. The superior thoracic aperture (thoracic inlet; often incorrectly termed thoracic outlet in a clinical context) transmits the esophagus, trachea, nerves, and important ducts and vessels. The inferior thoracic aperture is virtually sealed by the thoracic diaphragm. The space between ribs is the intercostal space, and contains three layers of muscle and fascia, and intercostal vessels and nerves. Collective rib movement is responsible for about 25% of the respiratory effort.

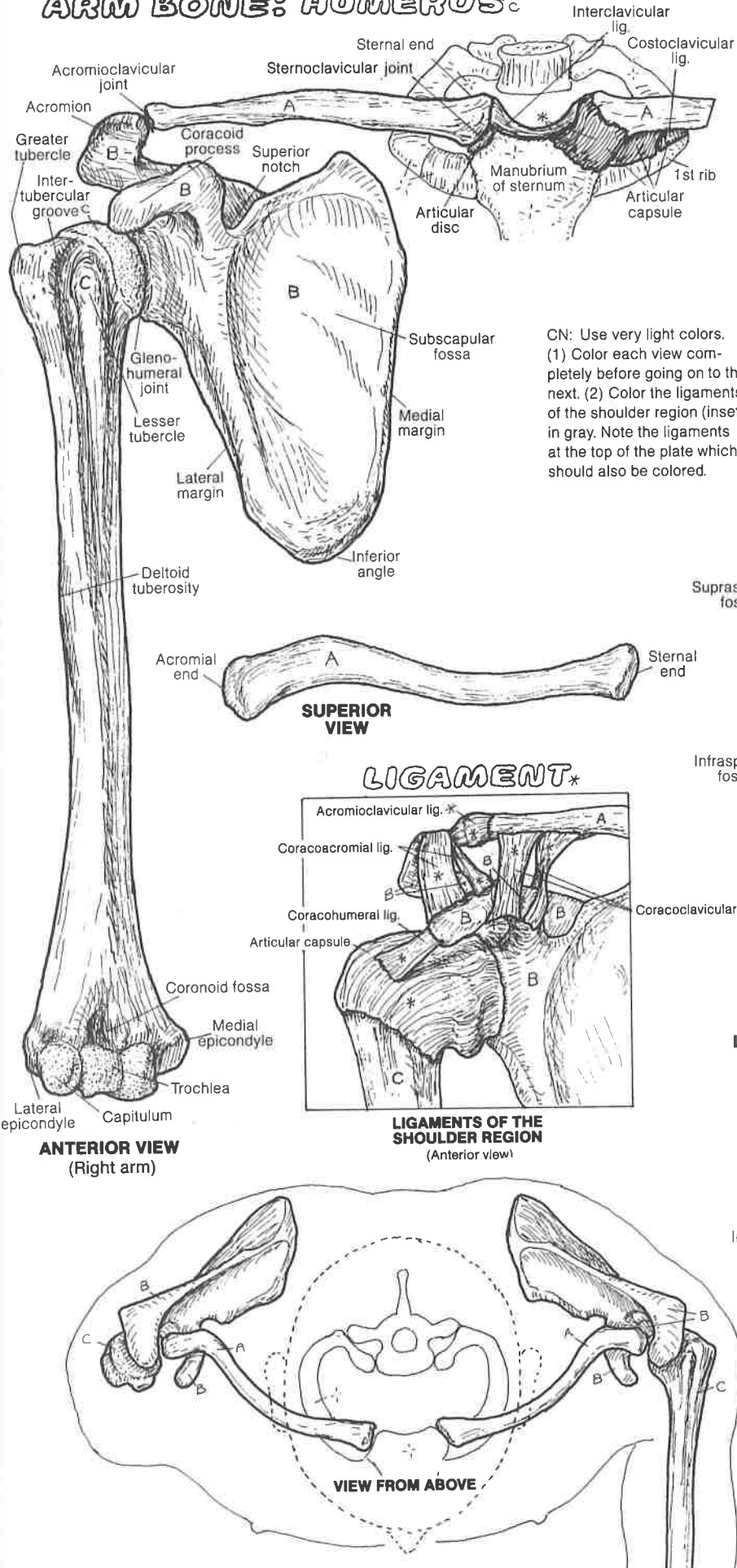
The fibrocartilaginous joint between the *manubrium* and the *body* of the *sternum* (sternal angle, sternomanubrial joint) makes subtle hinge-like movements during respiration. The xiphoid makes a fibrocartilaginous (xiphisternal) joint with the body of the sternum. The *sternum* is largely cancellous bone containing red marrow. The *costal cartilages*, representing unossified cartilage models of the anterior ribs, articulate with the sternum by gliding-type synovial joints (sternocostal joints; except for the first joint, which is not synovial). All ribs form synovial joints with the thoracic vertebrae (costovertebral joints). Within each of these joints, the rib (2 through 9) forms a synovial joint with a *demifacet* of the upper vertebral body and with a demifacet of the lower body (costocorporeal joints). In addition, the tubercle of the rib articulates with a cartilaginous *facet* at the tip of the transverse process of the lower vertebra (costotransverse joint). Ribs 1, 10, 11, 12 each join with one vertebra instead of two; ribs 11 and 12 have no costotransverse joints. *True ribs* (1-7) articulate directly with the sternum. *Ribs* 8-12 are called *false ribs*; ribs 8-10 articulate indirectly with the sternum (via cartilages connecting to the 7th costal cartilage); ribs 11 and 12 (also called *floating ribs*) end in the muscular abdominal wall.



RIB FACET_H
DEMIFACET_I
TRANSVERSE FACET_J

**PECTORAL GIRDLE: CLAVICLE^A SCAPULA^B
ARM BONE: HUMERUS^C**

The mobility of the upper limb is largely dependent upon the *pectoral girdle* whose only bony attachment to the axial skeleton is via the sternoclavicular joint (saddle type synovial joint with disc). Distally, the *clavicle* articulates with the acromion of the *scapula* (acromioclavicular joint, a gliding type synovial joint). The clavicle forces the scapula backward and outward, creating the shoulder; in its role as a strut, it is subject to fracture. The scapula is moored to the axial skeleton by muscles, giving it considerable mobility on the upper back (scapulo-thoracic motion). Largely packaged in muscle, the scapula fractures infrequently. The supraspinatus muscle/tendon passing under the acromion and coracoacromial ligament is subject to irritation (impingement syndrome). The glenoid fossa of the scapula is shallow, and the glenohumeral joint (shoulder; ball and socket, synovial) is relatively insecure. The glenohumeral ligaments/joint capsule are lax, and are reinforced by a musculotendinous cuff. Given these "rotator cuff" muscles, the *humerus* has excellent mobility at the shoulder joint. The humerus is vulnerable to fracture at the surgical neck, mid-shaft, and medial epicondyle.



CN: Use very light colors. (1) Color each view completely before going on to the next. (2) Color the ligaments of the shoulder region (inset) in gray. Note the ligaments at the top of the plate which should also be colored.

