## Upper Limb, Back and Chest

| **General vertebrate Limb Design** | Vertebrate limbs have a common theme in their structure; Proximal, middle and distal segments. Preaxial and postaxial border (front and back edges) and dorsal and medial surfaces (top and bottom). Limbs are attached to the body wall via ‘girdles’ – pectoral (scaoula and clavicle) for upper limbs and pelvic (pubis, ilium and ischium) for lower limbs. Dorsal muscles elevate, ventral muscles depress. |
| **Human Specialisations** | In humans, paired limbs appear as slight elevates of ectoderm in the lateral plate at around week 4. Extensions of ventral (hypaxial) body wall forms the limb musculature, hence, limb musculature is ventral in origin. Dorsal limb musculature attaches to the vertebral column, or the scapula, clavicle, ribs or sternum. Limb rotations in humans ‘modify’ the actions of the muscles. Dorsal elevators and ventral depressors of the limb become dorsal extensors and ventral flexors. |
| **Nerve Supply** | Limb musculature is supplied by ventral rami of spinal nerves. In the spinal cord; dorsal horns contain cell bodies of sensory neurons. Ventral horns contain cell bodies of motor neurons. Each neuron gives rise to a single axon. Axons of grey matter neurons emerge segmentally from the spinal cord. The dorsal (sensory) and ventral (motor) nerve roots join to form mixed spinal nerves. These emerge from the intervertebral foramina. Ventral primary rami supply muscles of the trunk, limbs and skin. These rami branch into dorsal and ventral branches which then respectively supply dorsal and ventral originating muscles. |
| **Anatomy of the Upper Limb** | Arm = proximal segment  
Forearm = middle segment  
Hand = distal segment  
Connected to the trunk by the pectoral girdle which consists of the scapula and the clavicle. The scapula is a flat bone that is posterior to the chest wall and is held in position by muscles. Most lateral point is the acromium process, has many angles and borders. Ventral piece is the corticoid. |
| **The Clavicle** | The clavicle is a long bone, it is the first to appear in an embryo and the last to ossify (via intramembranous ossification). It is the most frequently fractured bone in the body. This is possibly because of the double curve shape. Subcutaneous throughout length (can be felt by owner (heheh) all the way along). The clavicle forms a rigid strut between the scapula and the arm, it suspends the arm from the body. The joints along the clavicle are the sternoclavicular and acromioclavicular joints. These do not have nice sockets and hence are known as ‘gliding points’. The articulating surfaces are nearly flat against one another. |
Humerus

The humerus is the long bone in the proximal segment (the arm).

Radius and Ulna

Radius is lateral, ulna is medial. These segments are the middle segment of the upper limb (the forearm. These articulate with the humerus and each other. They are bound together by an interosseous membrane (type of joint) which is a very tough connective tissue sheet. It has transmit forces and provides muscle attachment transmits through hand then radius, then ulna, then humerus. Permits rotation as well.

Trapezius

The trapezius originates at the back of the skull (along the nuchal lines) and the cervical and upper thoracic spines. It inserts at the clavicle and the spine of the scapula. It helps keep the shoulders braced and the upper limb suspended.

Latissimus Dorsi

The latissimus dorsi originates from the T6 to T12 vertebrae, the lower 3-4 ribs, the iliac crest, the thoracolumbar fascia and inferior angle scapula. These insert anteriorly into the humerus. These act to depress the shoulder and adduct and extend the arm.