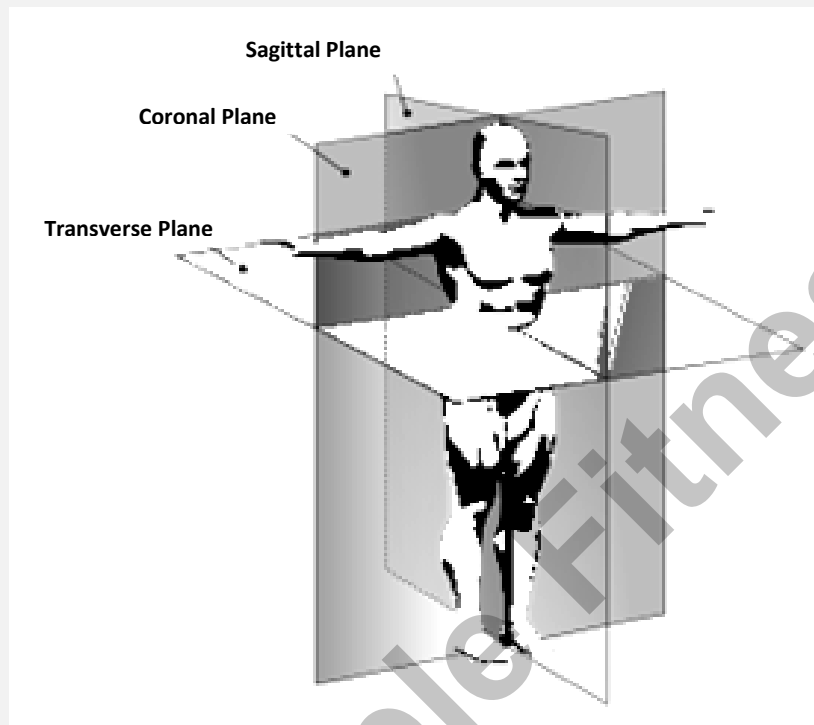


ANATOMY

ANATOMICAL POSITIONS and PLANES



Anterior – Towards the front of the body.

Posterior – Towards the back of the body.

Distal – Away from the body or any point of reference, or from the point of attachment or origin.

Proximal – Closer to the body or any point of reference, or to the point of attachment or origin.

Medial – Situated towards the midline of the body.

Lateral – Position farther from the midline of the body.

Inferior – Away from the head or lower surface of a structure.

Superior – Towards the head or situated above.

Transverse /Axial / Horizontal plane is parallel to the ground, which separates the superior from the inferior or the head from the feet.

Coronal / Frontal plane is perpendicular to the ground, which separates the anterior from the posterior or the front from the back

Sagittal / Lateral plane is a Y-Z plane, perpendicular to the ground, which separates left from right.

Upper Extremity (UE): Shoulders, Chest, Arms, Hands, etc

Lower Extremity (LE): Hips, Legs, Ankle Foot , etc

ANATOMICAL DIRECTIONS

Range of Motion (ROM): The distance and direction a joint can move between the flexed and extended position (see *flexion and extension below*). This can also be the act of attempting to increase the distance through therapeutic exercise and/or stretching for physiological gain.

Flexion - Bending movement that decreases the angle between two parts. Bending the knee or elbow are examples of flexion. Flexion of the hip or shoulder moves the limb forward (towards the front of the body).

Extension - The opposite of flexion; a straightening movement that increases the angle between body parts. The knees are extended when standing up. When straightening the arm, the elbow is extended. Extension of the hip or shoulder moves the limb backward (towards the back of the body).

Hyperextension – Extending the joint beyond extension.

Abduction - A lateral movement that pulls a structure or part away from the midline of the body. Raising the arms to the sides is an example of abduction.

Adduction - A medial movement that pulls a structure or part towards the midline of the body, or towards the midline of a limb. Dropping the arms to the sides, or bringing the knees together, are examples of adduction.

Internal rotation (or *medial rotation*). Inward rotary movement around the axis of the bone. Internal rotation of the shoulder or hip would point the toes or the flexed forearm inwards (towards the midline).

External rotation (or *lateral rotation*). External rotary movement around the axis of the bone. It would turn the toes or the flexed forearm outwards (away from the midline).

Elevation - Movement in a superior direction. Shrugging or bringing the shoulders up is an example of elevation.

Depression - Movement in an inferior direction, the opposite of elevation. Pushing the shoulders down is an example of depression.

Pronation - Internal rotation the hand or foot to face downward or posterior. Pronating the foot is a combination of eversion and abduction.

Supination - External rotation of the hand or foot to face upward or anterior. Raising the inside or medial margin of the foot.

Dorsiflexion – Movement at the ankle of the foot superiorly towards the shin. The up position of tapping the foot.

Plantarflexion – Movement at the ankle of the foot inferiorly away from the shin. Pointing the foot downward.

Eversion – Moving the sole of the foot away from the median plane or outward.

Inversion - Moving the sole of the foot towards the median plane or inward.

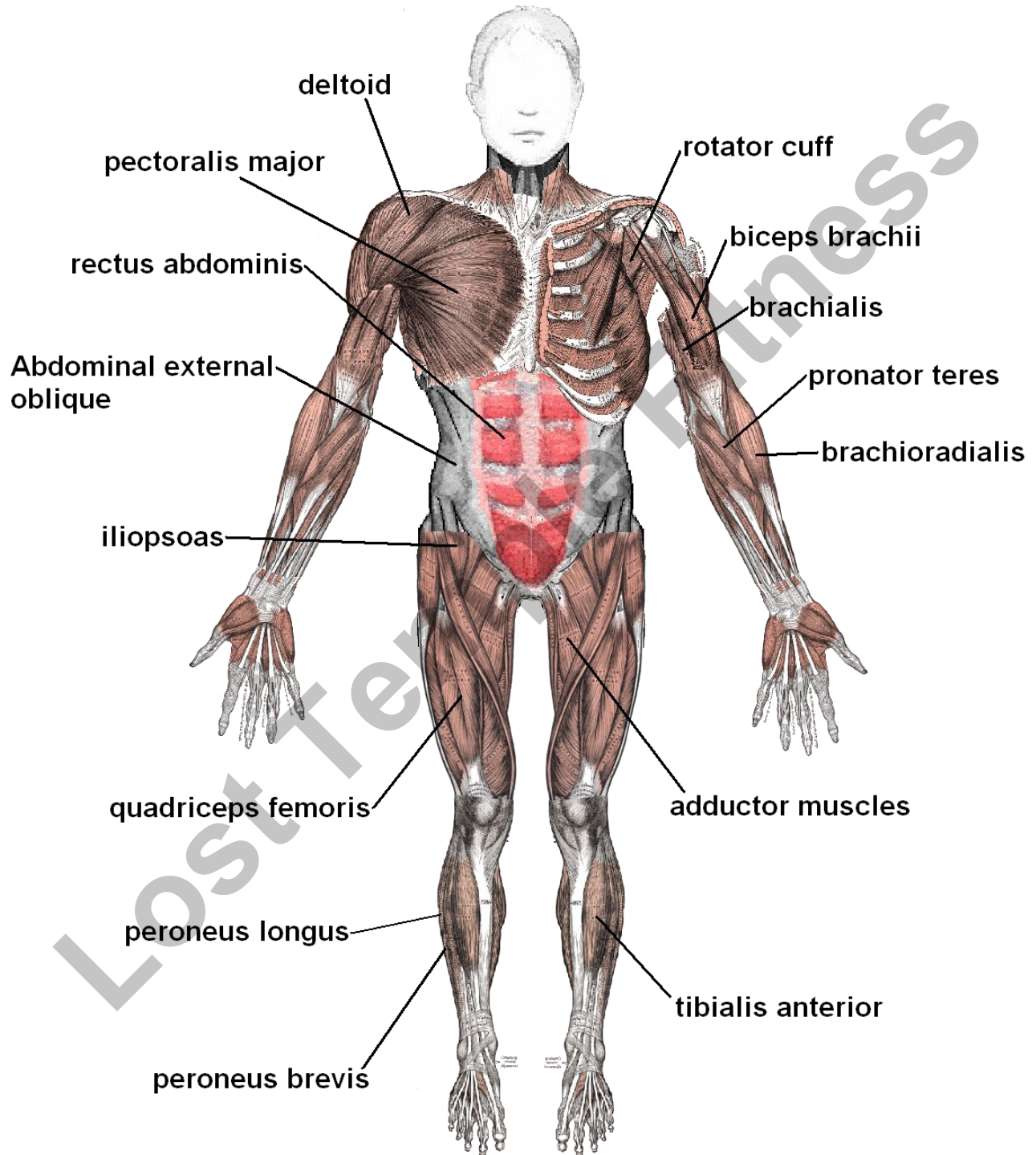
Ipsilateral – Same side of the body

Contralateral – Opposite side of the body

MUSCLES

Grey's Anatomy

ANTERIOR



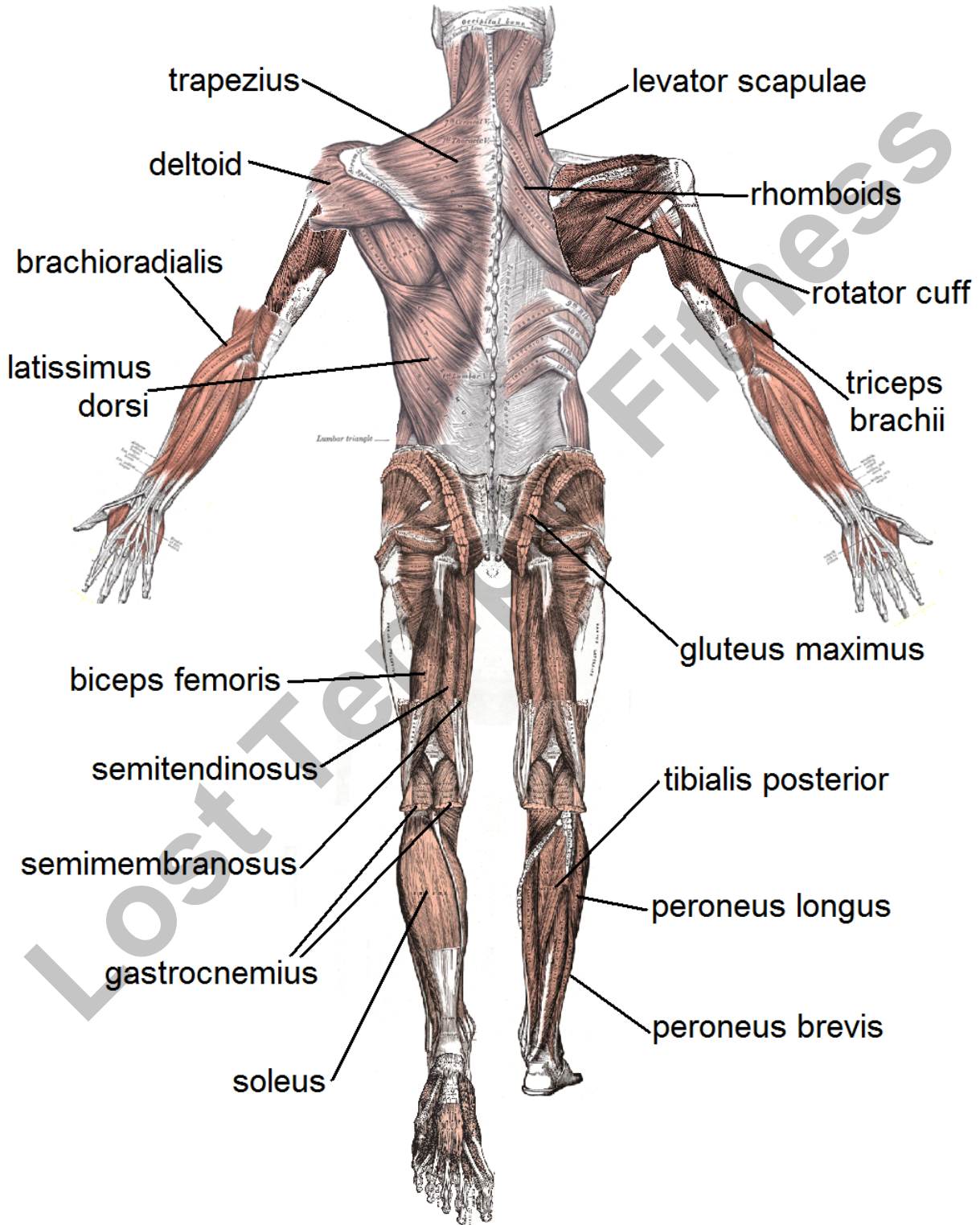
LOST TEMPLE FITNESS

Muscle Name (AKA)	Joint Action
Pectoralis major	Shoulder flexion, adduction, internal rotation
Deltoid (anterior)	Shoulder abduction, flexion, internal rotation
Rotator cuff (SITS) Supraspinatus Infraspinatus Teres minor Subscapularis	Shoulder: Supraspinatus: Abduction Infraspinatus: External rotation Teres minor: External rotation Subscapularis: Internal rotation
Biceps brachii	Elbow flexion; Forearm supination
Brachialis	Elbow flexion
Pronator teres	Elbow flexion; Forearm pronation
Brachioradialis	Elbow flexion
Tensor fasciae latae	Hip flexion, medial rotation & abduction
Gracilis*	Hip adduction & internal rotation; Knee flexion & internal rotation
Adductor muscles Adductor magnus, longus & brevis	Hip adduction
Tibialis anterior	Ankle dorsiflexion; foot inversion
Peroneus brevis	Ankle plantarflexion; Foot eversion
Peroneus longus	Ankle plantarflexion; Foot eversion
Rectus femoris (quadriceps femoris)	Hip extension (esp. when knee is extended); Knee flexion
Vastus medialis	Knee extension (esp. when hip is flexed)
Vastus lateralis	Knee extension (esp. when hip is flexed)
Sartorius	Hip flexion & external rotation; Knee flexion & internal rotation
Pectineus	Hip adduction
Iliopsoas, Psoas, Iliacus	Hip flexion & external rotation
Abdominal external oblique	Trunk lateral flexion
Rectus abdominis	Trunk flexion & lateral flexion
Abdominal internal oblique	Trunk lateral flexion

MUSCLES

Grey's Anatomy

POSTERIOR

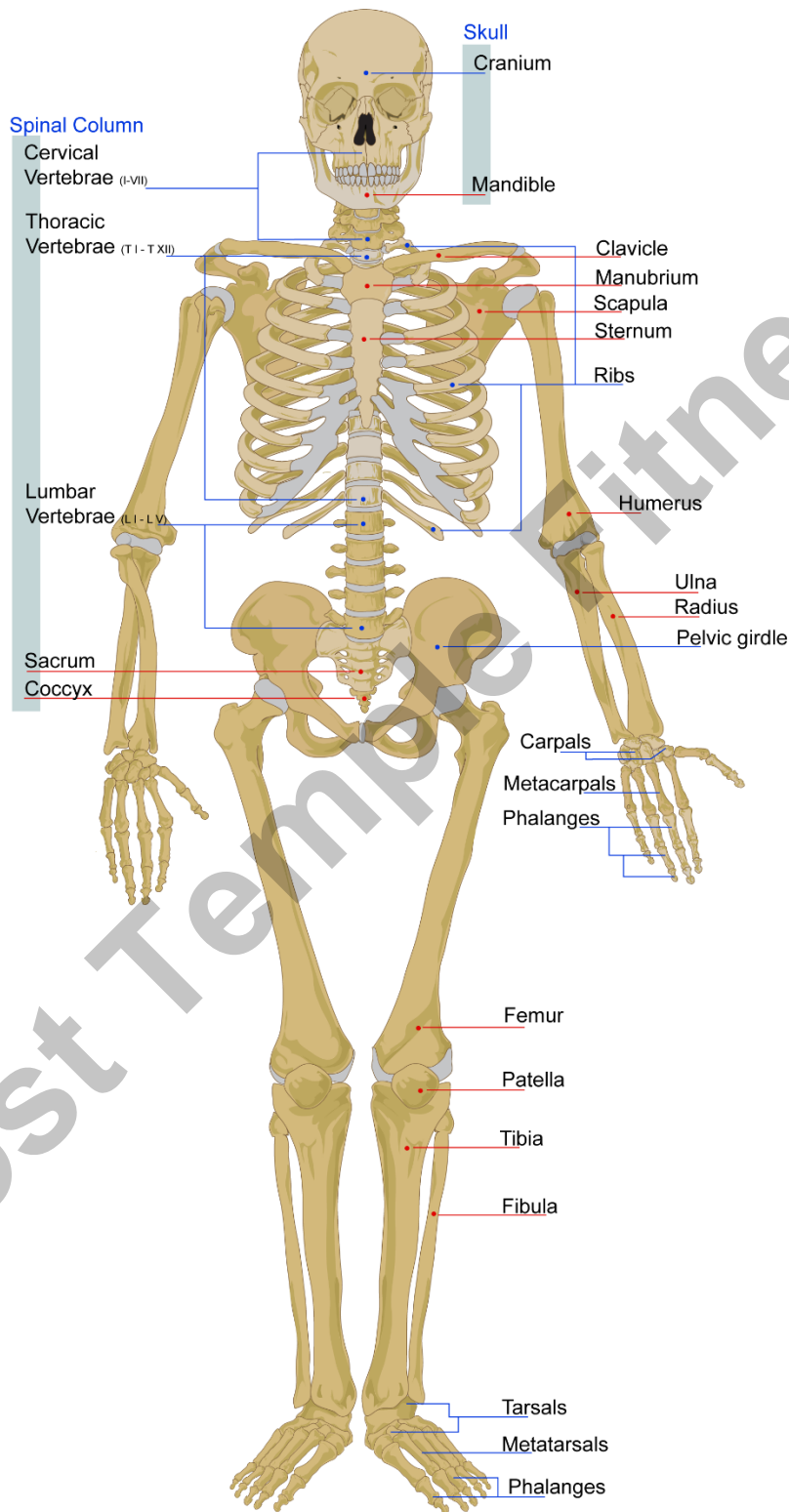


LOST TEMPLE FITNESS

Muscle Name (AKA)	Joint Action
Deltoid (posterior)	Shoulder abduction, extension, external rotation
Trapezius	Scapula or Shoulder girdle: Upper traps: Scapula elevation. Middle traps: Scapula adduction. Lower traps: Scapula depression
Levator scapulae	Scapula elevation
Rhomboids	Scapula adduction & elevation
Triceps brachii	Elbow extension
Gluteus medius	Hip abduction
Gluteus maximus	Hip extension & external rotation
Tibialis, posterior	Inversion, stabilization, assists with plantarflexion
Soleus	Ankle plantarflexion
Gastrocnemius	Knee flexion; Ankle plantarflexion
Semimembranosus	Hip extension & internal rotation; Knee flexion & internal rotation
Semitendinosus	Hip extension & internal rotation; Knee flexion & internal rotation
Biceps femoris (long head)	Hip extension & internal rotation; Knee flexion & external rotation
Latissimus dorsi	Shoulder extension, adduction, internal rotation
Erector spinae, Longissimus, Spinalis, Iliocostalis	Trunk extension, hyperextension & lateral flexion Deep muscle that originate in the posterior iliac crest & sacrum running up the spine and inserts in the transverse process of ribs
Pes anserine, Gracilis, Sartorius, Semimembranosus, Semitendinosus	Internal rotation of tibia when knee is flexed

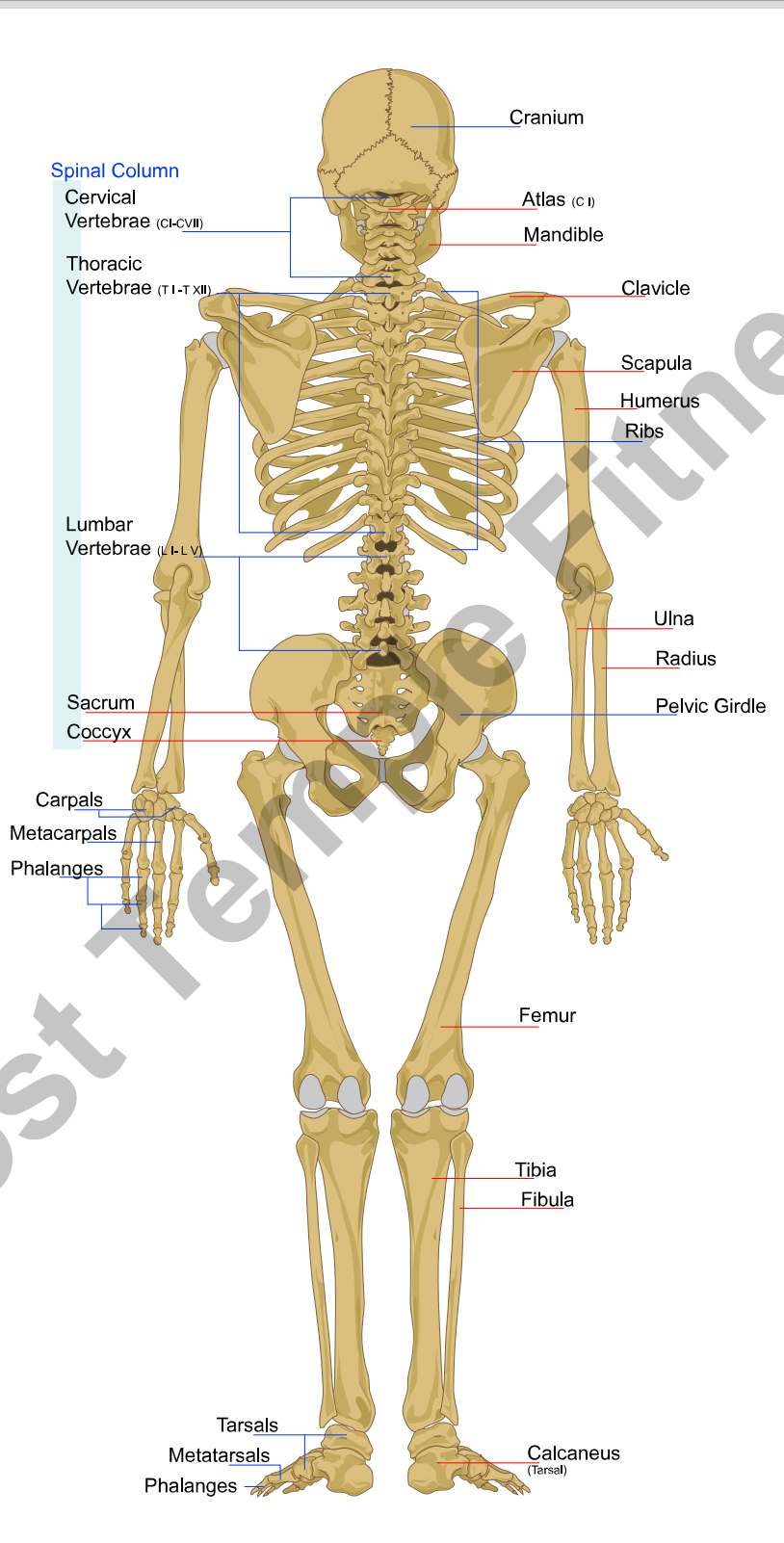
SKELETON

ANTERIOR (FRONT)



SKELETON

POSTERIOR (BACK)



**Average Joint Range of Motion
Anatomical Positions – Upper Extremity**

Joint	Movement	Normal Range of Motion (degrees)	Plane
UPPER EXTREMITY			
Elbow	Flexion	150	Sagittal
	Extension	0 (neutral)	Sagittal
	Hyperextension	< 10	Sagittal
Shoulder	Flexion	180	Sagittal
	Extension	0 (neutral)	Sagittal
	Hyperextension	60	Sagittal
	Adduction (Add)	0 (neutral)	Frontal
	Abduction (Abd)	180	Frontal
	Horizontal Add/Flexion	130	Transverse
	Horizontal Abd	0 (to neutral)	Transverse
	Horizontal Extension	45	Transverse
	Internal rotation	70	Sagittal
	External rotation	90	Sagittal
Radioulnar	Pronation	90	Transverse
	Supination	90	Transverse

Average Joint Range of Motion

Anatomical Positions – Lower Extremity

Joint LOWER EXTREMITY	Movement	Normal Range of Motion (degrees)	Plane
Knee	Flexion	135	Sagittal
	Extension	0 (neutral)	Sagittal
	Hyperextension	10	Sagittal
Hip	Flexion	120	Sagittal
	Extension	0 (neutral)	Sagittal
	Hyperextension	< 20	Sagittal
	Adduction (Add)	0 (neutral)	Frontal
	Abduction (Abd)	50	Frontal
	Internal rotation	40	Transverse
	External rotation	50	Transverse
Ankle	Dorsiflexion	20	Sagittal
	Plantarflexion	50	Sagittal