Electrode Placement

Skin Preparation

1) Removing the hair:
   • Shave if necessary

2) Clean the skin:
   • Use a towel or abrasive pad with conductive cleaning paste or alcohol to remove dead skin cells (high impedance) and clean the skin from dirt and sweat.
   • Avoid any harm to the skin from rubbing too hard.
   • When done properly, the skin typically receives a light red color. This indicates good skin impedance condition.

Skin Preparation

Frontalis (FRL) (Specific)

The electrodes are placed midpoint between the eyebrow and the hairline (vertically or horizontally).

Temporalis Anterior (TA) (Specific)

Electrodes are placed along the direction of muscle fibers. Lowest electrode just above the zygomatic arch or opposite the notch of the eye.

Masseter (MAS) (Specific)

Electrodes are placed along the direction of muscle fibers. Due to fascia, place the electrodes on the belly of the muscle which is commonly found on the lower half closer to the angle of the mandible.

Sternocleidomastoid (SCM) (Specific)

With the patient’s head slightly rotated, the electrodes are placed parallel to muscle fiber direction, 1/2 way between the mastoid process & the sternal notch.
C4 Paraspinals (C4)
(Semi-specific)

The electrodes are placed approx. 2cm lateral to the spinous process at the level of C4.

Scalene (SCA)
(Semi-specific)

Electrodes are placed just lateral to the SCM’s attachment to the clavicle. Move posterior, follow the hollow triangle which lies just posterior to the SCM, above the clavicle, anterior to the upper trapezius.

Pectoralis Major - Clavicular Placement (PMC)
(Specific)

Electrodes are placed on the chest wall at an oblique angle towards the clavicle, approx. 2cm below the clavicle, just medial to the axillary fold.

Pectoralis Major - Sternal Placement (PMS)
(Specific)

Palpate just medial to the axillary fold while the patient medially rotates the arm against resistance. Place the electrodes horizontally on the chest wall over the muscle approx. 6cm below the clavicle.

Anterior Deltoid (ADE)
(Specific)

Electrodes are placed on the anterior aspect of the arm approx. 4cm below the clavicle, parallel to muscle fibers.

Lateral Deltoid (LDE)
(Specific)

Electrodes are placed on the lateral aspect of the upper arm & approx. 3cm below the acromion, parallel to the muscle fibers.
Posterior Deltoid (PDE)  
(Specific)

Electrodes are placed approx. 2cm below the lateral border of the spine of the scapula & on an oblique angle towards the arm such that they run parallel to the muscle fibers.

Upper Trapezius (UTP)  
(Specific)

The electrodes are placed parallel to the muscle fibers, along the ridge of the shoulder, slightly lateral to 1/2 the distance b/t the C7 spinous process & the acromion.

Lower Interscapular (LTP)  
(Semi-Specific)

Have the patient retract & depress the scapula & flex the arm to 90 degrees. Palpate the inferior, medial border of the scapula for the muscle & place the electrodes on an oblique angle, medial to the medial border, approx. 5cm down from the scapular spine.

Serratus Anterior (SER)  
(Specific)

Have the patient protract the shoulder girdle against resistance. Palpate the area just anterior to the latissimus dorsi muscle at the level of the inferior tip of the scapula. Place the electrodes vertically or horizontally at the lower aspect of the axillary area.

Middle Interscapular (MTP)  
(General)

Locate the medial border of the spine of the scapula. Electrodes are placed horizontally, next to the root.

Infraspinatus (INF)  
(Specific)

Electrodes are placed on the lateral aspect of the infrascapula fossa, approximately 2cm below the spine of the scapula.
Latissimus Dorsi (LAT) (Specific)
Electrodes are placed approx. 4cm below the inferior tip of the scapula, 1/2 the distance b/t the spine & the lateral edge of the torso on an oblique angle of 25 degrees.

Triceps (TRI) (Specific)
The electrodes are placed parallel to muscle fiber direction, on the posterior medial or lateral aspect of the arm, approx. 1/3 of the distance b/t the acromion & the olecranon.

Biceps (BIC) (Specific)
The electrodes are placed parallel to muscle fiber direction, approx. 1/2 way b/t the acromion and the radius.

Brachioradialis (BRA) (Semi-Specific)
The electrodes are placed, approx. 2cm distal to the lateral epicondyle, parallel to muscle fiber direction.

Forearm Flexor Group (FLX) (Semi-Specific)
The electrodes are placed on the ventral aspect of the arm, approx. 5cm distal from the elbow, parallel to muscle fiber direction.

Forearm Extensor Group (EXT) (Semi-Specific)
The electrodes are placed on the dorsal aspect of the arm, approx. 5cm distal from the elbow, parallel to muscle fiber direction.
L3 Paraspinal (L3)  
(Semi-Specific)  
Pallate the iliac crest. The electrodes are placed 2cm parallel to the spine approx. 2cm lateral to the spinous process over the muscle mass. ** Helpful to put electrodes on while patient is in forward flexed position.

Multifidi  
(Semi-Specific)  
2 cm from spinous process at lumbar level 5 (L5-2)  
Helpful to put electrodes on while patient is in forward flexed position. Movement tends to add considerable cross talk.

Gluteus Maximus (GMX)  
(Specific)  
The electrodes are placed 1/2 the distance b/t the greater trochanter & the sacral vertebra at the level of the trochanter, on an oblique angle parallel to muscle fiber direction.

Hamstrings (HAM)  
(General or Specific)  
The electrodes are placed in the center of the back of the thigh, approx. 1/5-1/4 the distance from the gluteal fold to the back of the leg. Lateral – Biceps Femoris (specific) Medial - Semitendinosis (specific)

Gluteus Medius (GMD)  
(Specific)  
The electrodes are placed anterior to the gluteus maximus over the proximal 1/3 of the distance b/t the iliac crest and the greater trochanter parallel to muscle fiber direction.

Rectus Abdominus (ABR)  
(Specific)  
The electrodes are placed parallel to the muscle fiber direction, approx. 2cm lateral to the umbilicus.
Abdominal Oblique (ABO) (Semi-Specific)

The electrodes are placed lateral to the rectus abdominus, directly above the ASIS, 1/2 way between the crest & the ribs at a slightly oblique angle, parallel to muscle fiber direction.

Internal Oblique (IO) (Semi-Specific)

The electrodes are positioned horizontally 2cm inferomedial to the ASIS within a triangle outlined by the inguinal ligament, the lateral border of the rectus sheath, and a line connecting the ASISs.

Hip Flexor Group (General)

The electrodes are placed in the femoral triangle inferior to inguinal ligament just medial to rectus femoris.

Tensor Fasciae Latae (TFL) (Specific)

The electrodes are placed approx. 2cm below the ASIS, while the leg is extended, parallel to muscle fiber direction.

Rectus Femoris (RF) (Specific)

The electrodes are placed on the center of the anterior surface of the thigh, approx. 1/3 the distance between the knee & the iliac spine.

Vastus Lateralis (VL) (Specific)

The electrodes are placed approx. 3-5cm above the patella, on an oblique angle just lateral to the midline.
Vastus Medialis Oblique (VMO) (Specific)
The electrodes are placed on the distal aspect on an oblique angle (55 degrees), 2cm medial to the superior rim of the patella.

Medial/Lateral Gastrocnemius (GAS) (Specific)
The electrodes are placed just distal from the knee, 1-2cm medial or lateral to the midline.

Soleus (SOL) (Semi-Specific)
The electrodes are placed on the inferior lateral aspect of the lower leg. Just distal to head of the gastrocnemius and lateral to the achilles tendon.

Tibialis Anterior (TA) (Semi-Specific)
The electrodes are placed parallel to, & just lateral to the medial shaft of the tibia, at approx. 1/3 the distance b/t the knee & the ankle.