

Musculoskeletal Mechanics of the head region

Nathaniel Yomogida, SPT

Chloë Kerstein, SPT

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1 Osteokinematics

1.1 Head Lateral SB

| Muscle | Origin | Insertion | Nerve | Action |
|-------------------------------------|---|---|--|---|
| Sternocleidomastoid | Sternal head: sternum (manubrium); Clavicular head: Clavicle (medial 1/3) | Temporal bone (mastoid process); Occipital bone (superior nuchal line) | Motor: CN XI Accessory n. and Proprioception: Cervical plexus (C2, C3, C4) | Unilateral: Tilts head to same side, rotates head to opposite side; Bilateral: Extends head, aids in respiration when head is fixed |
| I/L SB Obliquus Capitis Superior | C1 (TP) | Occipital bone (inferior nuchal line, middle third) | Suboccipital N. | BIL: Extend head; UNIL: I/L SB, C/L rotation |

1.2 Head rotation

| Muscle | Origin | Insertion | Nerve | Action |
|--------------------------------|---|--|--|---|
| C/L head rotators | | | | |
| Obliquus Capitis Superior | C1 (TP) | Occipital bone (inferior nuchal line, middle third) | Suboccipital N. | BIL: Extend head; UNIL: I/L SB, C/L rotation |
| Sternocleidomastoid | Sternal head: sternum (manubrium); Clavicular head: Clavicle (medial 1/3) | Temporal bone (mastoid process); Occipital bone (superior nuchal line) | Motor: CN XI Accessory n. and Proprioception: Cervical plexus (C2, C3, C4) | Unilateral: Tilts head to same side, rotates head to opposite side; Bilateral: Extends head, aids in respiration when head is fixed |
| I/L Head Rotators | | | | |
| Rectus Capitis Posterior Major | C2 (SP) | Occipital bone (inferior nuchal line, middle third) | Suboccipital N. | BIL: Extend head; UNIL: I/L head rotation |
| Rectus Capitis Posterior Minor | C1 (posterior tubercle) | Occipital bone (inferior nuchal line, inner 1/3) | Suboccipital N. | BIL: Extend head; UNIL: I/L head rotation |
| Obliquus Capitis Inferior | C2 (SP) | C1 TP | Suboccipital N. | BIL: Extend head; UNIL: I/L rotation |

1.3 Head Extension

| Muscle | Origin | Insertion | Nerve | Action |
|--------------------------------|--|---|---|--|
| Rectus Capitis Posterior Major | C2 (SP) | Occipital bone (inferior nuchal line, middle third) | Suboccipital N. | BIL: Extend head; UNIL: I/L head rotation |
| Rectus Capitis Posterior Minor | C1 (posterior tubercle) | Occipital bone (inferior nuchal line, inner 1/3) | Suboccipital N. | BIL: Extend head; UNIL: I/L head rotation |
| Obliquus Capitis Superior | C1 (TP) | Occipital bone (inferior nuchal line, middle third) | Suboccipital N. | BIL: Extend head; UNIL: I/L SB, C/L rotation |
| Obliquus Capitis Inferior | C2 (SP) | C1 TP | Suboccipital N. | BIL: Extend head; UNIL: I/L rotation |
| Sternocleidomastoid | Sternal head: Sternum (manubrium); Clavicular head: Clavicle (medial 1/3) | Temporal bone (mastoid process); Occipital bone (superior nuchal line) | Motor: CN XI Accessory n. and Proprioception: Cervical plexus (C2, C3, C4) | Unilateral: Tilts head to same side, rotates head to opposite side; Bilateral: Extends head, aids in respiration when head is fixed |