

Musculoskeletal Mechanics of the head region

Nathaniel Yomogida, SPT

Chloë Kerstein, SPT

Table of contents

1 Osteokinematics	1
1.1 Head Lateral SB	1
1.2 Head rotation	2
1.3 Head Extension	2

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