

ANATOMY

EMBRYOLOGY

EMBRYOLOGY

Development of Myotomes

An adult myotome is defined as '*a group of muscles innervated by a single spinal nerve root*'. They are clinically useful as they can determine if damage has occurred to the spinal cord, and at which level the damage has occurred.

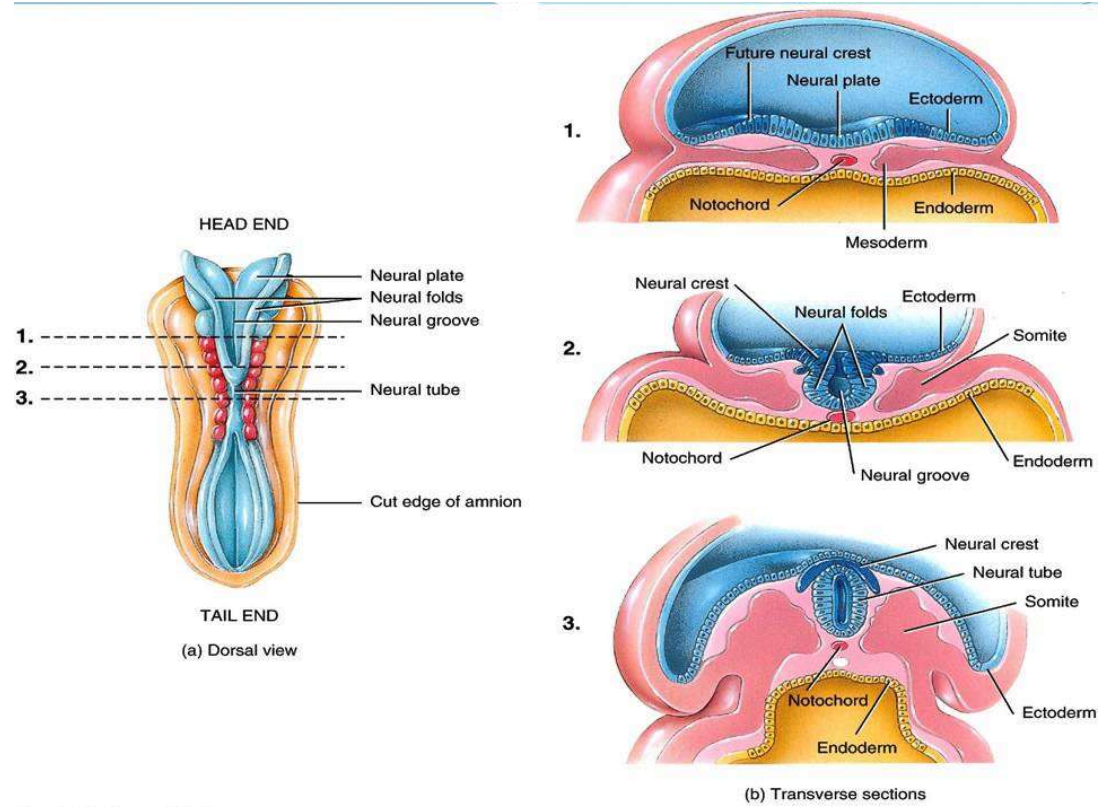
EMBRYOLOGY

Development of Myotomes

- Skeletal muscle development can be traced to the appearance of **Somites**. By day 20 the **trilaminar disc** has formed and the **Mesoderm** has differentiated into different areas. The area directly adjacent to the **neural tube** is known as the **paraxial mesoderm**.
- From day 20 onwards the **paraxial mesoderm** begins to differentiate further into segments known as **Somites**. 44 pairs of Somites are formed, however some of these regress until 31 pairs remain, corresponding to 31 pairs of spinal nerves in the adult.
- **Somites** are composed of a dorsal and ventral portion. The ventral portion forms the **sclerotome**, the precursor of the ribs and vertebral column. The dorsal portion consists of the **dermomyotomes**. As the embryo continues to develop the **myotome** proliferates and eventually develops into muscle

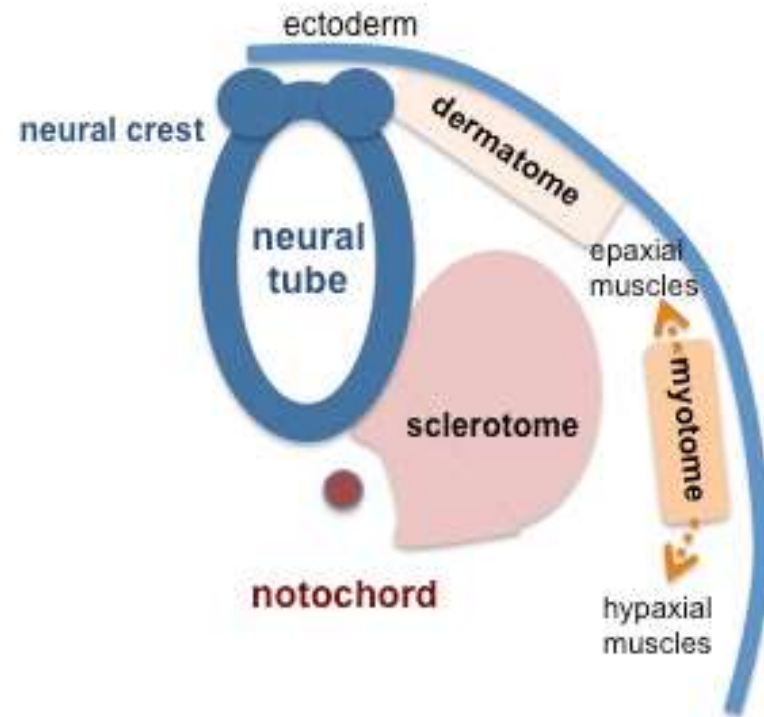
Embryology

Development of Myotome





Development of Myotome

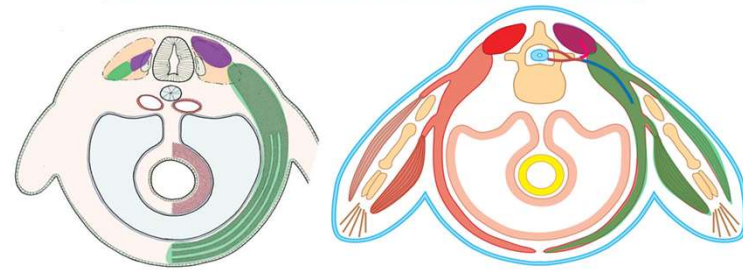




Development of Myotome

Epimere

- Forms intrinsic back muscles
- Innervated by **dorsal ramus of spinal nerve**

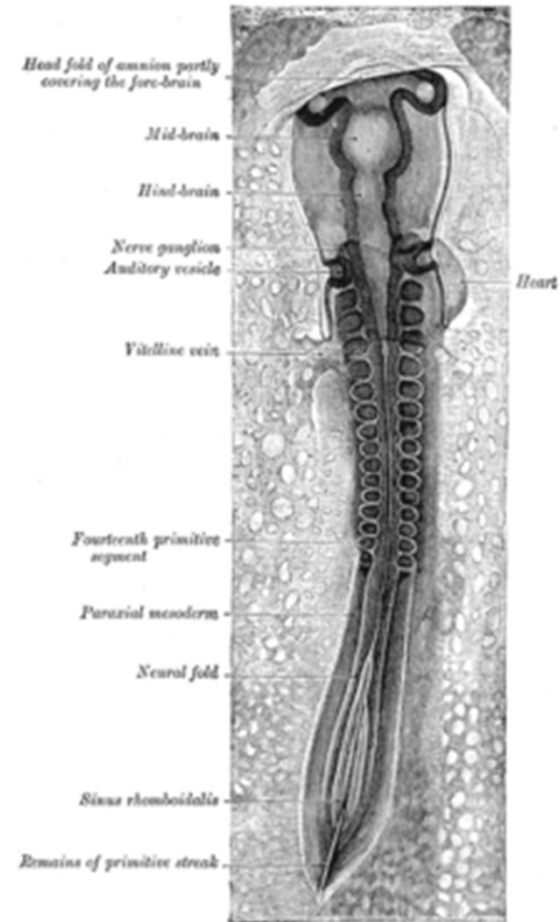


Hypomere

- Forms body wall and limb musculature
- Innervated by **ventral ramus of spinal nerve**

Embryology

Development of MYOTOME



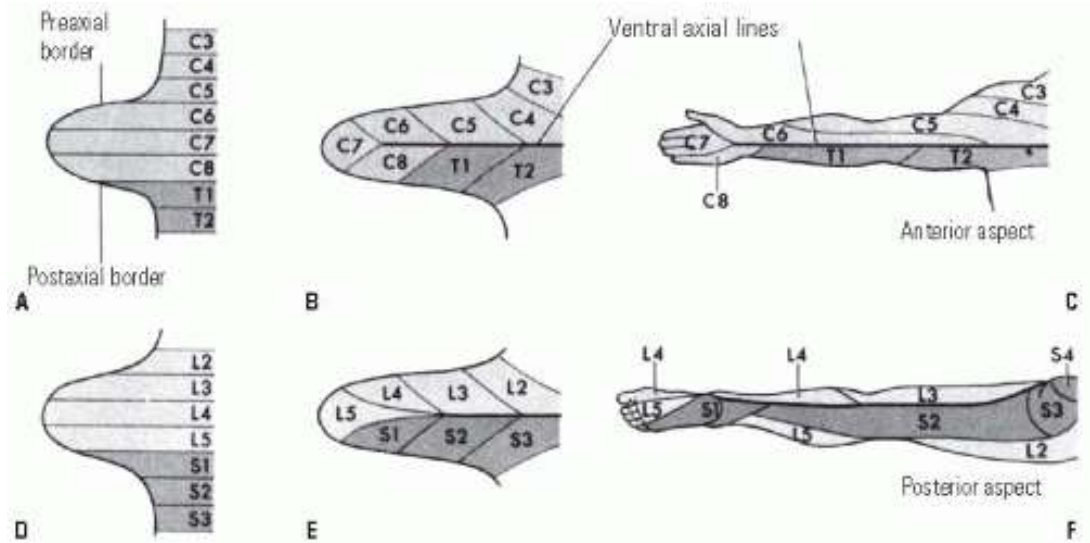
Development of Myotomes

Distribution of Myotome

- Most muscles in the upper and lower limbs receive innervation from more than one spinal nerve root. They are therefore comprised of multiple myotomes. For example, the biceps brachii muscle performs flexion at the elbow. It is innervated by the musculocutaneous nerve, which is derived from C5, C6 and C7 nerve roots. All three of these spinal nerve roots can be said to be associated with elbow flexion.

Embryology

Development Of Myotome



Development of Myotomes.

Distribution of Myotomes

The list below details which movement is *most strongly associated* with each myotome:

- C5 – Elbow flexion
- C6 – Wrist extension
- C7 – Elbow extension
- C8 – Finger flexion
- T1 – Finger abduction
- L2 – Hip flexion
- L3 – Knee extension
- L4 – Ankle dorsiflexion
- L5 – Great toe extension
- S1 – Ankle plantarflexion

Development of
Myotomes

Clinical Relevance

Look for Muscle strength

Reflexes

Development of Myotome

Clinical Relevance

Myotomes are tested in terms of power, and graded 1-5:

- 0 = total paralysis.
- 1 = palpable or visible contraction.
- 2 = active movement, full range of motion (ROM) with gravity eliminated.
- 3 = active movement, full ROM against gravity.
- 4 = active movement, full ROM against gravity and moderate resistance in a muscle specific position.
- 5 = (normal) active movement, full ROM against gravity and full resistance in a muscle specific position expected from an otherwise unimpaired person