

Pattern of Segmental Innervation of the Somatic Body Wall

The body has a segmental structure that has become modified and somewhat distorted by the development of the limbs. A body segment consists of a group of muscles, and an overlying area of skin supplied by a spinal nerve, an artery and a vein.

A **spinal nerve**:

- is formed by union of a ventral and a dorsal root
- emerges from the intervertebral foramen
- divides into an anterior primary ramus and a posterior primary ramus

The **posterior primary ramus**:

- Divides into medial and lateral branches
- Supplies the deep muscles of the back from both medial and lateral branches
- Supplies a strip of skin close to the posterior midline from one of the two branches
 - From the medial branch in the upper half of the body
 - From the lateral branch in the lower half of the body
- The posterior primary rami of C1, C7-8, L3-4 do not have a cutaneous branch

The **anterior primary ramus** of the **thoracic nerves** gives the following branches

- A collateral branch that supplies muscles
 - T1-T6 supply the intercostal muscles
 - T7 –T11 supply the intercostal and abdominal muscles
 - T12 and L1 supply the lower abdominal muscles
- A lateral cutaneous branch that divides into anterior and posterior branches to supply an oblique strip of skin of the antero-lateral body wall
- An anterior cutaneous (terminal) branch that supplies a strip of skin next to the anterior midline

The **anterior primary ramus of T1**:

- Gives a small branch to the muscles of the 1st intercostal space.
- Its main part crosses the neck of the 1st rib to join the lower trunk of the brachial plexus

The **lateral cutaneous branch of T2** is the intercostobrachial nerve supplying the floor of the axilla (armpit)

The **anterior primary ramus of L1** divides into two branches:

- **Iliohypogastric nerve** is the muscular branch to the lowermost abdominal muscles (It corresponds to the collateral branch of the thoracic nerves)
- **Ilioinguinal nerve** is the cutaneous branch to the skin over the pubis, the anterior half of the scrotum in males, or labia majora in females (It corresponding to the lateral cutaneous branch of a thoracic nerve)

The **anterior primary rami of the other nerves** form plexuses:

- C2,3,4 form the **cervical plexus** that supplies muscles and skin of the neck
- C5,6,7,8 and T1 form the **brachial plexus** that supplies the upper limb
- L2,3,4,5, S1 and S2 form the **lumbo-sacral plexus** that supplies the lower limb
- S3,4 form part of the **sacral plexus** that supplies the muscles of the pelvic floor and skin of the perineum