The third cervical dorsal nerve roots contain afferent somatic and visceral nerve fibers corresponding to the third cervical spinal cord segment. They are small but thicker than the third ventral nerve roots and emerge from the postero-lateral sulci of the spinal cord. Rootlets of adjacent dorsal roots may communicate via thin branches.

The roots pass obliquely infero-laterally to their exit through the intervertebral foramina. They pass over the superior surface of the transverse processes of C3 (posterior to the foramen transversarium), to join with the third ventral roots to form the third cervical spinal nerves. The roots are larger in obliquity and length than the dorsal roots above, however, the distance between the spinal attachments and vertebral exit is never greater than the height of one vertebra. Each of the third cervical dorsal roots possesses an ovoid spinal ganglion (dorsal root ganglion) proximal to joining the third cervical ventral roots.

The dorsal roots are covered by a sleeve of pia mater, which is continuous with that of the spinal cord, and loosely invested by a prolongation of dura and arachnoid mater (the dural sleeve) almost as far as the spinal nerves.