The sixth thoracic ventral nerve roots contain efferent somatic nerve fibers corresponding to the sixth thoracic segment, as well as preganglionic sympathetic fibers from the lateral horn of the sixth thoracic segment. They emerge as two or three rows of rootlets from the antero-lateral sulci of the spinal cord. Between adjacent rootlets are inter-radicular spaces, which contain small blood vessels.

The roots pass obliquely infero-laterally to their exit through the intervertebral foramina between the pedicles of T6 and T7. They are slightly smaller in diameter than their corresponding dorsal roots but larger in obliquity and length than the ventral roots above. They pass over the superior surfaces of the transverse processes of T7 to join with the sixth thoracic dorsal roots to form the sixth thoracic spinal nerves. The 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.