

## TECHNICAL NOTE

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# Technique for Dissecting the Cervical Vertebral Column

**REFERENCE:** Berzlanovich AM, Sim E, Muhm MA. Technique for dissecting the cervical vertebral column. *J Forensic Sci* 1998; 43(1):190–193.

**ABSTRACT:** Dissecting the cervical vertebral column usually is presumed in the course of a routine autopsy to be difficult and time-consuming. Additionally, most techniques described in the literature lead to extensive mutilation of the corpse. We present a method which can be performed quickly and is learned easily. The major advantage of our technique is that the integrity of the corpse, in particular of the facial surface, is maintained.

**KEYWORDS:** forensic science, autopsy, vertebral column, dissection

Forensic pathologists are quite familiar with various autopsy techniques (1–6), which give satisfactory results in most cases.

In the course of routine autopsies the precise dissection of the cervical vertebral column is often neglected, because it is presumed to lead to major disintegrity of the corpse, to be difficult and time-consuming. Accordingly, references to the techniques used for preparing this area are found only sporadically in the literature (7–10). Nevertheless, death resulting from cervical injury is not uncommon and relevant forensic questions can be answered only by closer inspection of this region.

So, we present a simple, quick and careful method for exposing the cervical vertebral column with minimal mutilation of the corpses' cranium.

### Methods

The body is placed in the supine position on the autopsy table. For stretching the cervical spine a head block is placed under the neck to give maximum elevation to the anterior cervical region. The autopsy starts with a midline longitudinal incision through the skin and subcutaneous tissue, made from the chin to the symphysis. The autopsy is continued by the dissection of the anterior cervical musculature, the dissection of the cervical viscera, the conventional separation of the cervical viscera from the vertebral spinal column, and the opening of the thoracic cavity as well as the removal of the thoracic viscera.



FIG. 1—The base of the skull is exposed.

The next step comprises the dissection of the cranium. The soft scalp is separated by a frontal cut starting behind the ear, just above the right mastoid process, and continuing over the vertex, to the left mastoid process. Then, the two halves of the scalp are pulled off backwards and forwards, respectively. A subcutaneous cut through the external auditory meatus on both sides exposes the mastoid process along with the posterior root of the zygomatic arch. After a circular cut is done with a cranial saw the brain is removed. Preparation of the base of the skull (Fig.1) starts with the separation of the sella turcica by a transverse cut with a circular

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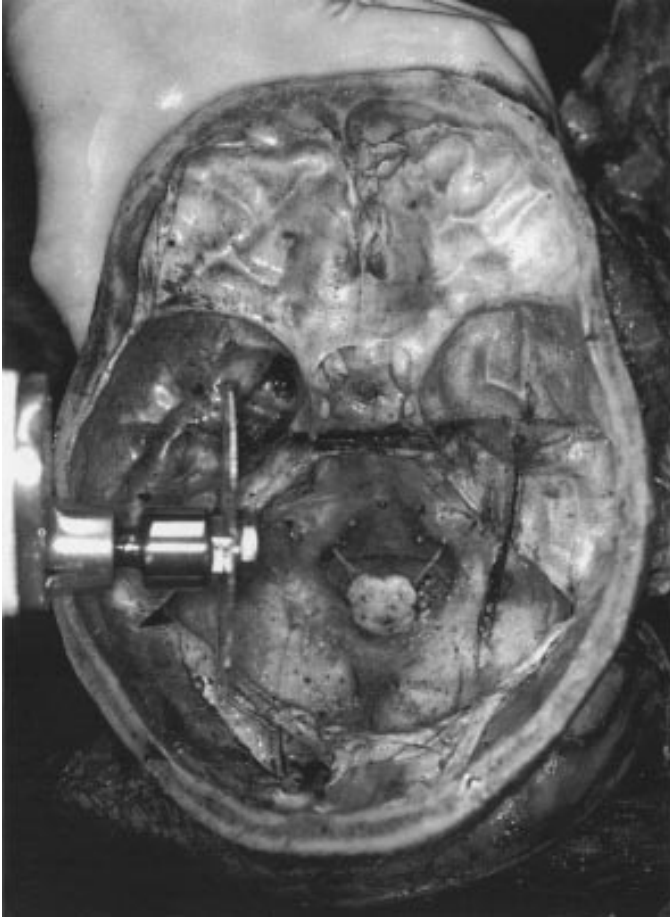


FIG. 2—The sella turcica is separated by a transverse cut with a circular saw, and the crista pyramidis is separated by a parasagittal cut on each side.



FIG. 3—The square is completed by a transverse cut through the occipital bone.

saw. The crista pyramidis is separated by a parasagittal cut on each side in the middle cranial fossa (Fig. 2) and a cut transversing the occipital bone completes the square (Fig. 3). A chisel is used to mobilize the obtained osseous square. With a knife the nuchal musculature is then separated from the cervical column (Fig. 4). Thus, this part is entirely separated from the base of the skull.

As a final step an intervertebral disc is cut at the desired level of the spine by means of a handsaw. Then the cervical column can be pulled up through the opening just made at the base of the skull (Fig. 5). Figure 6 and Fig. 7 show a longitudinal and cross section of specimen.

### Results and Discussion

Severe injuries to the cervical region can be the cause of death. Standard autopsy techniques are often inadequate for examination of this area. The techniques for instance by Becker (12) or Saternus (13) certainly give excellent visualization of the cervical region but lead to severe mutilation of the corpse.

Another standard technique (7) describes removal of the brain from above after transection of the upper cervical cord, followed by removal of the spinal cord by either the anterior or posterior approach. In the anterior approach the dissection and removal of the cervical cord is almost completely blind, which might be disadvantageous. In the posterior approach the spinal cord is visualized in situ along with the surrounding bones, ligaments and soft

tissues; however, it is almost impossible to separate the cord damage caused by the postmortem removal of the brain from recent antemortem injury.

An additional approach described by Sohn (8) succeeds in removing the brain and spinal cord in one piece and is adequate if the upper cervical pathology is confined to the cord; but it is still inadequate if careful examination of the upper cervical region is necessary to elucidate the pathology (9).

The major advantage of our technique of dissecting the cervical vertebral column is that the integrity of the cranium is maintained as far as possible.

Furthermore our preparation can be done with the corpse on its back. The body is left in supine position throughout the autopsy, in contrast to techniques of dissecting the cervical spine from behind by cutting the trapezius muscle (9–11).

Our experience with 30 corpses autopsied as described has shown that this technique can be learned quickly. Each autopsy was performed by one forensic pathologist in cooperation with one assistant. After an initial learning period the time needed for dissecting the cervical column was 15 min or less. Standardizing it in such a way could increase the frequency of its use.

As a result the cooperation between forensic specialists and clinical traumatologists could be intensified and help deepen our understanding of the pathophysiology of injuries to the cervical verte-



FIG. 4—A knife (arrow) is used to separate the nuchal musculature from the cervical column.



FIG. 5—The isolated cervical column after pulling up through the opening made at the base of the skull (o . . . occipital bone, s . . . spinous process of C VII).

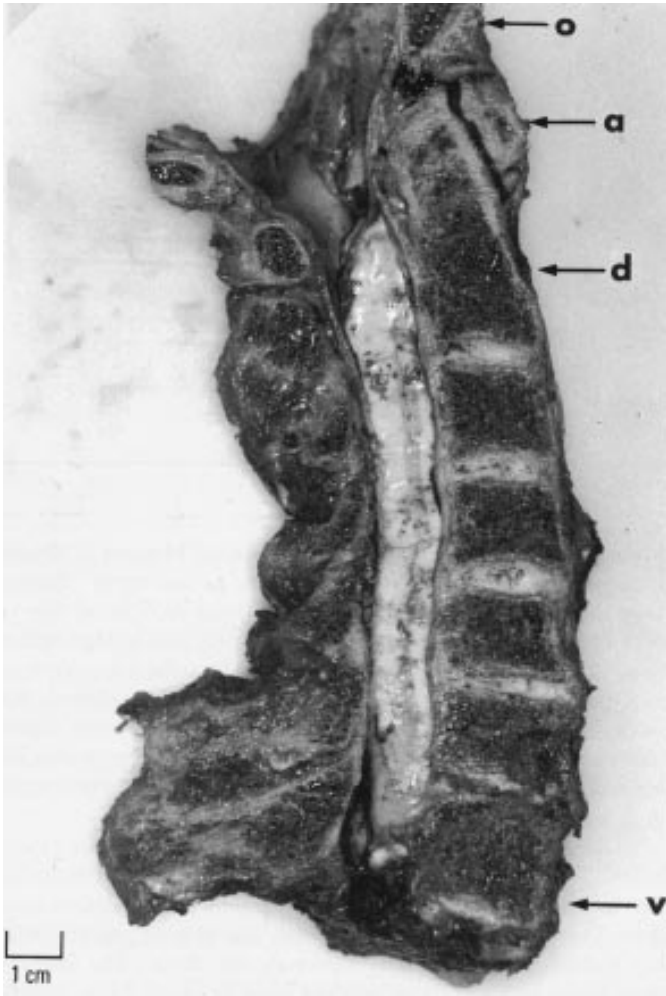


FIG. 6—Longitudinal section of the isolated cervical column (o . . . occipital bone, a . . . atlas, d . . . dens axis, v . . . vertebra prominens).

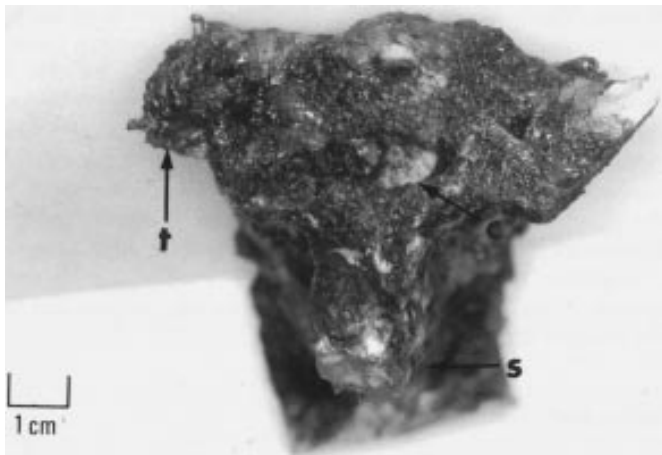


FIG. 7—Cross section of the vertebra prominens (t . . . transverse process, s . . . spinous process, c . . . cord).

bral column. At our institute, for instance, the dissected cervical vertebral column is passed on to the traumatologist for further examination if forensic questions arise (14).

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