CHAPTER 3

Anatomy and Anatomical Pathology

J. C. Dosdat and E. Denaro
The definition and the description of stenosis has shown how the principal causes of the narrowing of the vertebral canal produce a discrepancy in volume between canal and cord which results from the combined effects of both pathological and morphological changes in the anatomical structure of the canal. At this point, it is important to review the various components of the vertebral canal since it is through knowledge of the anatomy that the various forms of cervical stenosis can best be understood (Fig. 3.1). What is proposed is not a discussion of the basic anatomy of the structures that constitute the canal, since this can be found in the classical anatomy textbooks. A review of the anatomy of the cervical canal will be provided by specifically discussing the individual constituents that participate in the pathogenesis through the complex interrelationships with the neurological structures and with particular reference to the vascular components. In order to arrive at the surgical indications and the surgical approaches to be utilized in the decompression of the neurological structures, one must first understand these complex anatomical interrelationships.

The Cervical Vertebral Canal

The cervical vertebral canal, like all the spinal segments, is formed by the stacking of the vertebral canals. They are held together into a functional and structural unit by ligamentous and capsular tissues. The diameter of the canal so formed will differ at different levels for it is composed of a total of seven cervical vertebrae with variable anatomical configuration.

Overall, the cervical canal has a triangular outline; the anterior portion is the widest and forms the base along the posterior wall of the vertebral bodies. The anterior wall also includes the interconnecting fibroligamentous structures such as the posterior longitudinal ligament and the posterior margin of the intervertebral disk (Fig. 3.2). The lateral walls are constructed from the vertebral laminae and the powerful ligamentum flavum. The two lateral angles are formed at the anterior margin by the vertebral pedicles. As the vertebrae are stacked one on the other, the pedicles enclose a specific space known as the vertebral canal. The posterolateral wall is formed by the medial side wall of the articular processes. The posterior angle, which is a particularly obtuse angle, is where the laminae join at the midline at the site of the spinous apophysis. The ligamentum flavum binds adjacent vertebrae across the midline of this posterior angle.

In our discussion of the cervical cord, we must remember that there are two sites that are particularly different in their embryologic origins as well as in their structure and function:

- The atlas and the axis (C1 and C2), which form the superior cervical unit
- The remaining five vertebral bodies (C3–C7), which form the lower cervical unit

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Fig. 3.1. Sagittal midline section through head and neck to show normal structure and anatomy. Note the protrusion of C6–C7 – a common anatomical finding in mature adults which is not of clinical relevance.