MANAGEMENT OF CERVICAL DISC DISEASE AND SPONDYLOSIS

THESIS

SUBMITTED FOR PARTIAL FULFILLMENT

OF M.D. IN NEUROSURGERY

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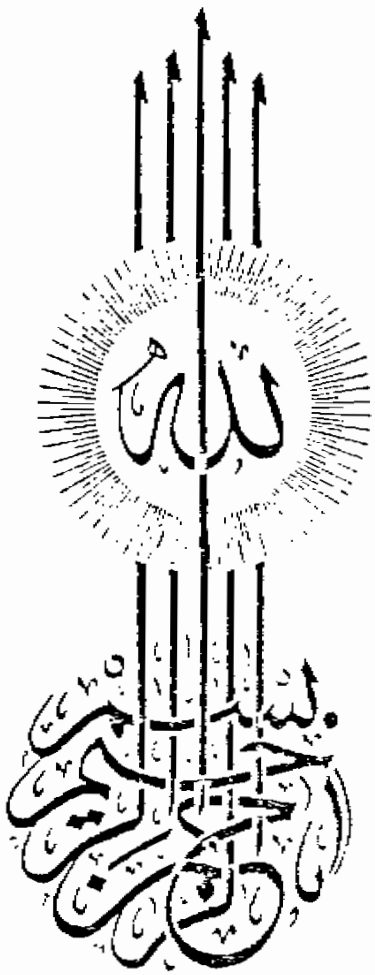

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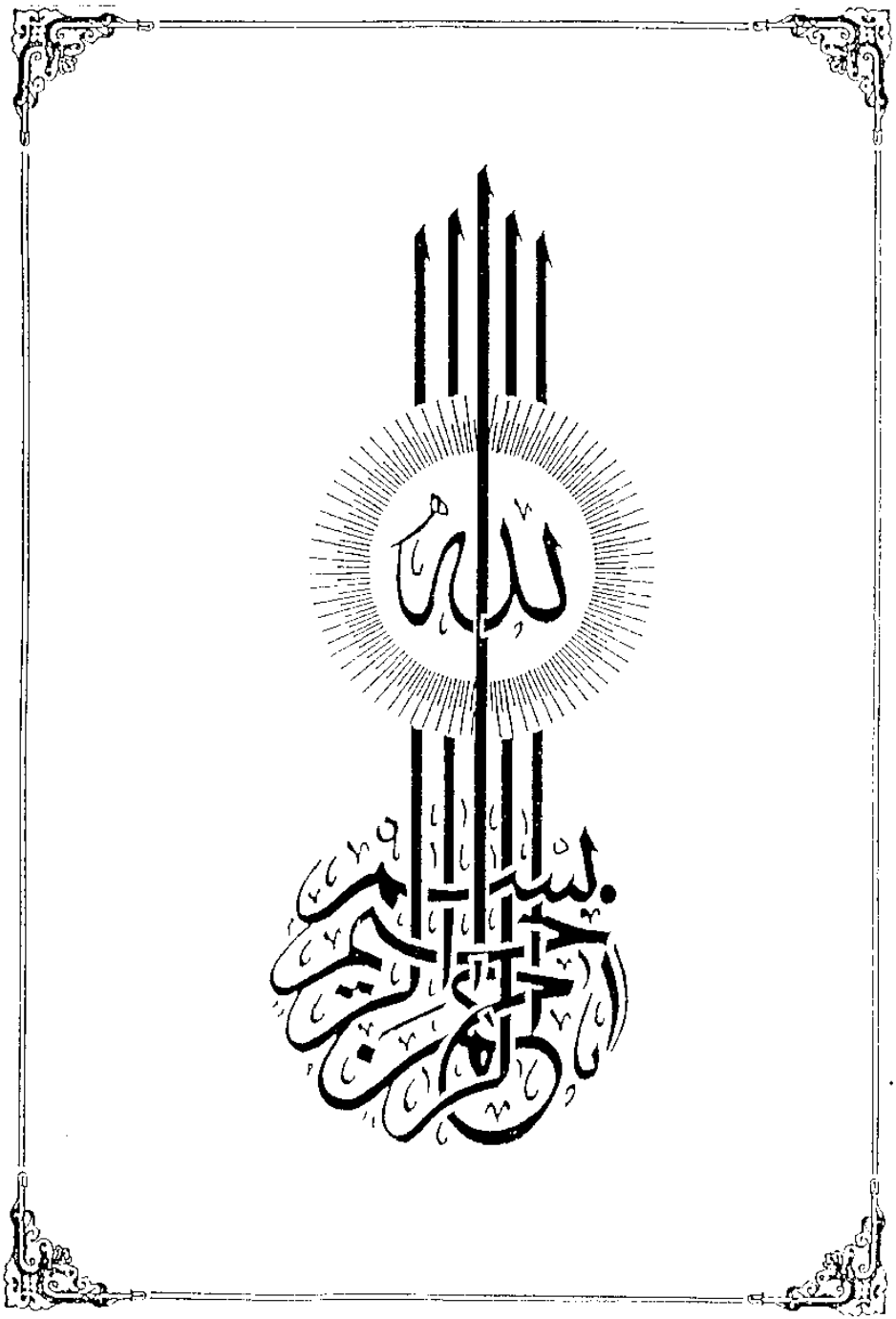

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CONTENT

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INTRODUCTION

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Cervical joint disorders probably affected man in the remote past just as Today. Even 4500 years, the Egyptians knew that certain neck lesions produced paraplegia. In 1838, ***Key des*** described intsances in which firm ventral ridges across cervical disc spaces encroached on the spinal co***Gower*** made similar observations in 1892 ***[Wilkinson 1971]***. ***Bailey and Casmajor 1911*** noticed that arthrosis is capable of compressing the spinal cord and its roots just as is a tumour ***[Ehni et al., 1990]***.

In ***1928, Stookey*** described several cervical syndromes due to what he called "ventral chondromas" ***[Wilkinson 1971]***. In ***1932, Mixter and Barr*** became the first surgeons to remove preoperatively diagnosed ruptured intervertebral discs ***[Ehni et al., 1990]***. Surgeons at that time encountered two problems, some cervical discs were soft, detached or ruptured fregments of cartilage similar to the ruptured lumbar discs that were being so effectively treated. Other abnormal discs were firm of almost completely osseous. Sometimes they extended across the cervical spinal canal, quite unlike anything seen in the lumbar spine. In addition, paraplegia was a too frequent result of attempts to remove these hard discs by employing chisels and currets of various design ***[Ehni et al., 1990]***. After ***Brain, Northfield, and Wilkinson,*** and others defined the cervical spondylotic

myelopathy due to arthrosis, it became apparent that there were two kinds of cervical disc abnormalities *[Wilkinson, 1971]*.

Cervical disc disease has been studied more in recent times. ***Bailey, Elsberg, Gowers, Scoville*** and others recognized the effects of compression of the cervical cord and nerve roots by osteophytic protrusions into the spinal canal and root foramina *[Hoff and Hood 1990]*. ***Brain, Frykholm, and Gooding*** stressed the role of ischaemia caused by compression of radicular arteries and veins as a fundamental process *[Hoff and Wilson, 1977]*. Still others identified the importance of abnormal joint mobility and intermittent cord compression by osteophytic process during neck movement in the evolution of various cervical disc syndromes *[Nurick, 1972]*. Predisposing factors that contribute to the clinical signs of cervical disc disease were classified by ***Symonds***, who recognized the role of acute and chronic neck trauma, and by ***Arnold and Payne and Spillane***, who identified the anatomical and radiographic dimensions of the normal and spondylotic cervical spine *[Hoff and Hood, 1990]*.

Treatment was generally supportive and non opertive until ***Victor Horsley*** decompressed the cervical spinal cord of a patient with progressive cervical spondylotic myelopathy in 1901. His patient recovered completely after a

C_6 laminectomy *[Brodsky, 1983]*. *Horsley's* posterior decompression was modified by *Scoville, Kahn* and others *[Fager, 1973]*. The anterior approach to cervical spine was developed and popularized in the early 1950s. The procedure was first performed in 1952 for stabilization of the cervical spines of a women with a lytic lesion involving the fourth and fifth cervical vertebrae *[WhiteCloud, 1983]*. During the past 20 years numerous refinement in the anterior approach have been developed. These include the use of operative magnification and modification of graft material and their configuration *[Hoff and Hood 1990]*.

Aim of this work is to evluate the results of both the anterior and posterior approach in an attempt to lay guidelines upon which one approach may be superior to the other. Also, to study the factors which affect the results of each approach.

REVIEW OF LITERATURE

ANATOMY

ANATOMY

The cervical spine is a complex and vital region, and many critically important structures are in close proximity in a small area *[Sherk, 1983]*.

The components of the cervical spine are reviewed in the following order (1) Osseous component, (2) The ligaments (3) The musculture, and (4) the neural and vascular contents of the cervical spine.

OSSEOUS COMPONENTS

The cervical spine is a true movable segment of the vertebral column, containing seven vertebrae and makes forward convexity. The cervical vertebrae are the smallest of the true vertebrae and are readily distinguished from the other vertebrae by the presence of a foramen in each transverse process *[Jeffrey, 1981]*.

1. Typical cervical vertebrae : (Fig. 1c)

The typical cervical vertebra (third through seventh) has a small vertebral body that is concave on its superior surface and has a projecting lip, the uncinate process, on either side. It is correspondingly convex on its inferior surface with shallow concavities laterally which receive the

uncinate process of the vertebra below. Projecting laterally from the bodies and roots of the pedicles on each side is a bar of bone, which is, in fact, the rudimentary rib or costal process. This osseous structure fuses laterally to the true transverse process through the costotransverse lamella. The rib element projects forward to end in the anterior tubercle of the transverse process, and the true transverse process projects slightly posteriorly to end in the posterior tulbercle. The foramen transversarium transmit the vertebral artery, the vertebral veins and a sympathetic plexus except at C_7 where the foramen contains the accessory vertebral vein. The spinous process of the third, fourth and fifth cervical vertebrae are usually bifid, whereas those of the sixth and the seventh are longer and taperd at the ends. The large spinous process of C_7 is called the vertebra prominens. *[Jeffrey, 1981]*.

The lower five cervical vertebrae are united together by articulation between vertebral bodies and articulation of the vertebral arches.

I. Articulation between vertebral bodies :

The bodies of abjacent vertebrae are held together by three joints, median intervertebral disc and pair of small synovial joints at the sides (joints of Luschka).

a) Intervertebral disc : (Fig. 1D)

The intevertebral discs are the strongest bonds between the vertebral bodies which are considered as a secondary fibro-cartilagenous joints. The inter vertebral disc consists of :

i) Annulus fibrosus :

It forms the outer part of the disc and has an outer zone of collagen with some elastic fibers and an inner layer of fibrocartilage, where, it merges with the nucleus and consists of concenteric fibers which lie at 45 degrees with the bodies of vertebrae, alternate layers of annulus contain fibers which lie alternatively in 45 degrees to each other. This arrangement makes the annulus able to withstand strain in any direction *[Galante, 1976]*.

ii) Nucleus pulposus :

It is a sphere of gelatinous hydrophilic tissue, lying inside the annulus and blends with it at its circumference. It consists of randomly arranged collagen fibers and few elastic fibers in a matrix which is a gel, constituting of water held in protein polysaccharide complexes and has the property of imbibing water against resistence. *[Armstrong, 1965]*.

The nourishment of the disc is mainly by diffusion across the cartilage end plate. In adult life the disc