OSTEOTOMY OF THE SPINE

Essay
Submitted in partial fulfilment for
Master Degree in Orothpaedic Surgery

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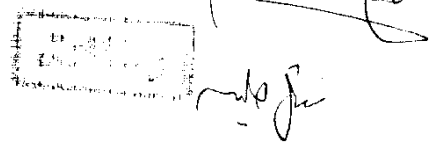

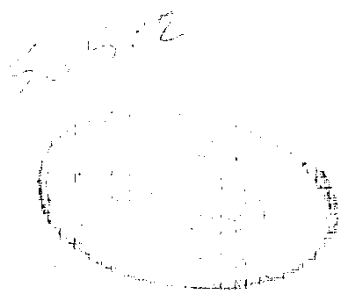

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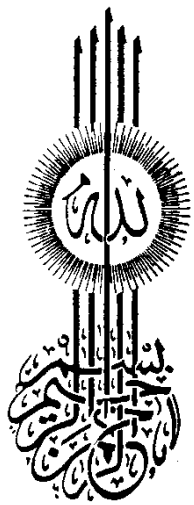

"سبحانك لا علم لنا إلا ما علمتنا
إنك أنت العليم الحكيم

صدق الله العظيم

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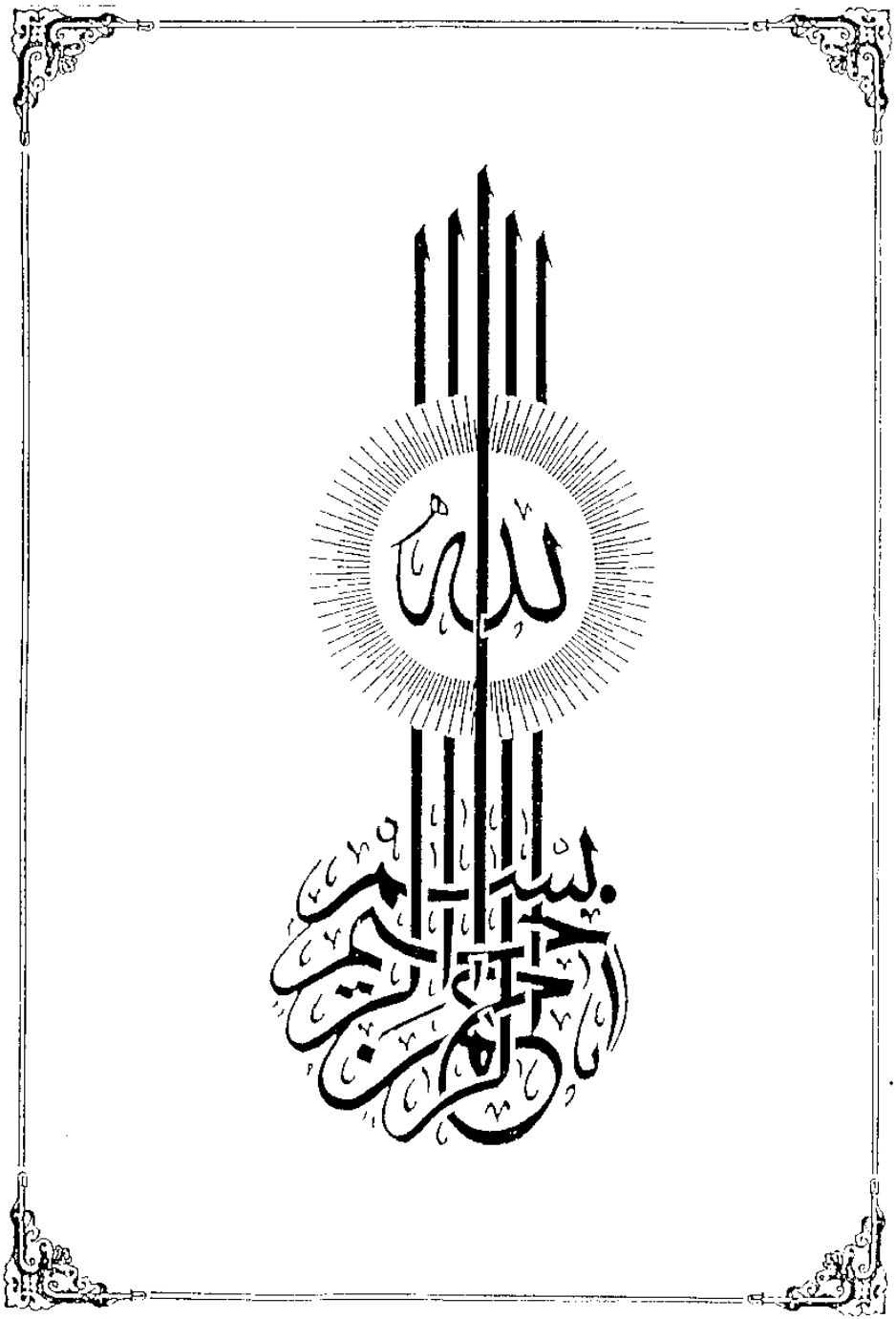

Acknowledgement

I wish to express my everlasting gratitude to Prof. Dr. Mohamed Nabil Khalifa, Professor of Orthopaedic Surgery, Faculty of Medicine, Ain Shams University, for his valuable advice, meticulous guidance, and concrete help.

I am also indeed thankful to Dr. Hany Mamdouh Hefny, Lecturer of Orthopaedic Surgery, Faculty of Medicine, Ain Sham University, for his valuable suggestions and continuous help.

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HISTORICAL REVIEW

Historical Review

Spinal osteotomy constitutes a technical challenge for the orthopedist and carry considerable potential for patient morbidity and mortality **[David Jaffeay et al., 1992]**.

In 1945 Smith-Peterson has the great Merit of carrying out the first vertebral osteotomy, obtaining his corrections by osteotomy of the neural arches alone after resection of two or three lumbar spines, he sectioned the ligamentum flaveum or If this structure had ossified, he performed an osteotomy; he next osteotomized the articular processes at one or more levels. Correction was then accomplished and grafts, taken on the spot, were so places as to favor ankylosis in the corrected position.

In 1946, La Chapelle has performed osteotomy on both neural arch and vertebral body. La Chapelle operated in two stages. **[Herbert, 1948]**.

Shortly after that time many surgeons have attempted the op-

eration **Low [1949]; Adams [1952]; Urist [1958]; Herbert [1959]; Mc Master [1962]; Goal [1968]; Simmons [1983]; Mc Master [1985]; Stylo et al., [1985]; and David Jaffeay et al. [1992].**

Most of them reported high incidence of complications there are number of problems encountered with the patient in prone position. **Adams [1952]** circumvented these problems by recognizing the advantage of doing the procedure with the patient in the lateral posture. He also designed special extending apparatus with which the deformity can be corrected on the operation table using the three-point pressure to manipulate the spine and allow correction (the three-point pressure at sternum and symphesis pubis in front and site of osteotomy behind).

The initial reports of osteotomy of the fusion mass for realignment of a spinal deformity in the frontal plane were by **Meiss [1955], Schmidt [1969], Floman et al., [1982], Simmons and Trammell [1983], and Largrone et al., [1988].**

As regards spinal osteotomy for congenial kyphosis in myelomeningocele. Spinal osteotomy was done by kildoyle, **Foley and Norton [1965]** by exercising vertebral bodies and **Sharrad [1968]**

reported the operation of spinal osteotomy in children with myelomeningocele, **[Eckstien, 1972]**.

Mc Master [1985] had reported a modification of usual technique that was used and angular correction was obtained with a specially designed device which allowed slow and finely controlled closure of the osteotomy as well as providing rigid internal fixation.

INDICATIONS

Indications

Abnormal skeletal curvature can be corrected by osteotomy, if the involved bone is surgically accessible and if the nature of the disease produces the curvature and the patient general condition permit **[La Chapelle, 1946]**.

The basic goals in the use of osteotomy are to gain correction to achieve and maintain clinical stability and to avoid damage to vital structures. The ideal site for osteotomy from the geometrical and mechanical standpoint is at the apex of the curve of the deformity **[White and Parzabi, 1978]**.

The main indication for osteotomy of the spine are:

I - Ankylosing spondylitis (Marie-Strumpell arthritis).

II - Rheumatoid spondylitis.

III- Congenital kyphosis in Myelomeningocele.

IV - Scoliosis associated with unsegmented bar and hemivertebrae

V - Failed fusion in Scoliosis.

I. Ankylosing spondylitis:

Is a disease of spine occurring in late adolescent or early adulthood, characterized pathologically by progressive inflammation of the spine, Sacroiliac joint and the large joint of the extremities, particularly the hips, and leading to fibrous or bony ankylosis and deformity.

Ankylosing spondylitis may be regarded as being neither constructive nor destructive but transformative. The lesions and deformities concerned in the ankylosing process are follows:

(1) Anteriorly:

The intervertebral discs ossify; this ossification is centripetal starting at the periphery on the anterolateral portions of the disc, but never extend to the center of the disc. Actually the radiographic characteristic of ankylosing spondylitis is erosion and sclerosis which will extend into the intervertebral disc and adjacent bone when this occur it is called spondylodiscitis. Spondylodiscitis as a destructive lesion on the disc space that is frequently asymptomatic and noted on routine radiographic studies. The radiographic appearance of spondylodiscitis is fairly typical. The erosive process wid-

ens the disc space, breaking down the subchondral bony plates. The surrounding bone becomes sclerotic and radio-dense, **[Simmons, 1990; and Herbert, 1959]**.

(2) Posteriorly:

The flaval ligaments, the capsular ligaments and less often interspinal ligaments ossify. It seemed necessary for successful correction that both the anterior and posterior elements of the vertebral column be freed, since each is involved in the ankylosing process, **[La Chapelle, 1946] [Herbert, 1959]**.

(3) Changes in Joints:

There is villous hyperplasia of synovial tissue with proliferation of synovial cells. The synovial Tissue proliferates to form a granulation Tissue "Pannus" over the surface of articular cartilage the underlying articular cartilage gradually disappears and the granulation tissue penetrates the underlying bone, as the disease progresses and the opposing articular cartilage is destroyed, the joint surfaces are ankylosed by a mixture of fibrous tissue and bone. Later on, the joint space becomes progressively more narrowed and the ultimate picture is that of bony ankylosis with disappearance of all vestiges of the joint. The ligamentous insertion