# POSTERIOR WEDGE OSTEOTOMY IN TREATMENT OF LOCALISED KYPHOSIS

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***ABSTRACT :***

*Twentythree patients ( 12 men, 11 women; mean age 23 ) diagnosed as having segmentary kyphosis due to either congenital kyphoscoliosis, or POTT's disease, or fracture sequel were operated from May 1991 to July 1993 in SSK İstanbul Hospital II nd Orthopedics and Traumatology Clinic. Using posterior approach techniques wedge osteotomy, instrumentation, and fusion operations were performed. Eighteen patients out of 23 were evaluated in December 1993 and included in the study. Longest follow-up period was 25.6 months, shortest was 6 months. Preoperative mean kyphosis angle was 64.2 degrees, and postoperative was 20.3 degrees. Except one patient no neurologic deficit was detected postoperatively, and patients did not complain of pain in the latest follow-ups. Fusion occurred in all cases within six months. Problems related to instrumentation material was not seen. This procedure with proper operative technique is as sufficient as anterior approach is, and does not necessitate two separate operations as anterior approach does. For this reason, this procedure is an alternative method to anterior approach for patients with rigid localized kyphotic deformity.*

Combined anterior and posterior approaches are the basic surgical techniques in order to correct deformities in sagital plane caused by several factors, that is to say, congenital kyphosis, congenital scoliosis, Pott's disease, and fracture sequel (2, 5, 6, 8).

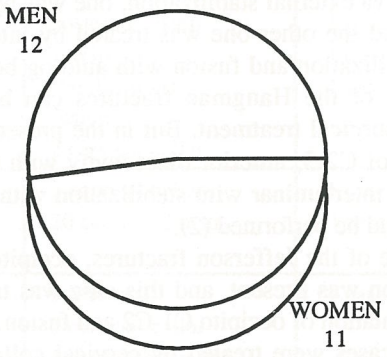
Particularly localized kyphotic deformities, appearing in early ages progressing later on, comes out with rigid structure during adolescent period and necessitates major operations for treatment. Wedge osteotomy from posterior route corrects the deformity as effective as combined anterior and posterior route without a need of second major operation.

In this study we aimed to declare the results obtained from our patients operated by this tecnique, and to discuss the outcome of this new operative technique for the treatment of localized rigid kyphotic deformities.

## PATIENTS AND METHODS :

Twentythree patients (12 men, 11 women; mean age 23) diagnosed as having segmentary kyphosis due to either congenital kyphoscoliosis, or POTT's disease, or fracture sequel were operated and posterior wedge osteotomy, posterior fusion and instrumentation operations were performed from May 1991 to July 1993 in SSK İstanbul Hospital IInd Orthopedics and Traumatology Clinic (Table 1).

**Table 1.** Sex Distribution




In our series, etiologic factor for development of rigid localized kyphosis was diagnosed as congenital scoliosis for six patients, Pott's disease for seven patients, Schuermann kyphosis for four patient, and fracture sequel for six patients (Table 2). Eighteen patients were examined and evaluated in the latest follow-ups in December 1993. The longest follow-up period was 25.6 months, and the shortest was 6 months (mean 17.4 months).

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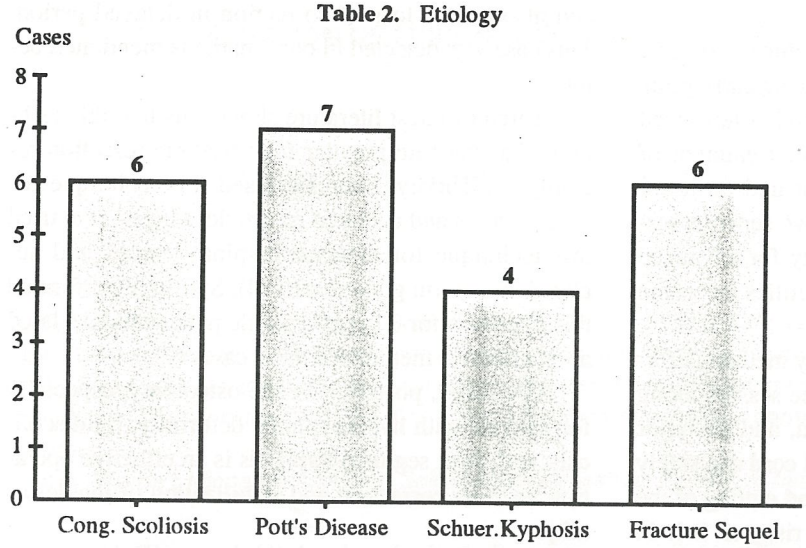
**Table 2.** Etiology




In our method, following classical posterior approach, the apical vertebrae of kyphotic deformity is detected, and through removal of lamina, facet joint, and spinous process wedge osteotomy of which apex is in anterior part and base in posterior is performed. The extent of wedge osteotomy differs depending on severity of the kyphotic deformity, and may be extended to include upper and lower vertebrae of the apex till anterior longitudinal ligament. After completion of the osteotomy, posterior instrumentation of the vertebral column is done. During this process and compression of the rods medulla spinalis is observed in order not to cause neither obstruction nor stretching of the spinal chord. If any space is left empty at the osteotomy site after correction of the deformity, greft is inserted from posterior through posterolateral edge to anterior and anterolateral vertebral column. Attention should be paid not to cause compression of the chord from anterior part of the canal. Afterwards routine posterolateral decortication and grafting is performed. By this way both correction and stabilisation of the deformity is obtained.

**RESULTS :**

Clinical assessments of the patients are done according to Denis pain and work scale. Patients are evaluated radiologically in preoperative, early postoperative, and latest follow-up periods by measuring kyphosis and scoliosis angles, searching for progression of fusion (1).

Neither of the patients complained of pain restricting daily activity and causing continious use of pain killers.

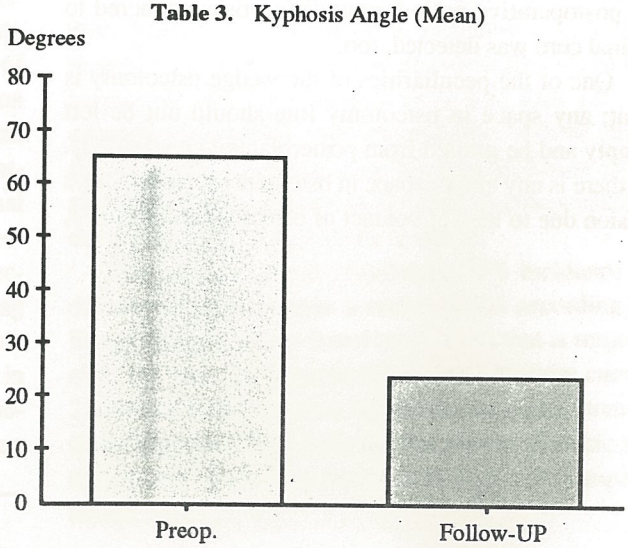
Preoperative mean kyphosis angle was measured as 64.2 degrees, and post operatively in latest follow-up was 20.3 degrees (Table 3). In patients having kypho-scoliotic deformity, mean correction angle in frontal plane was 30.7 degrees. Overall correction loss was 5.3 degrees except in 3 patients of which correction loss was 18.3 degrees.

Fusion was detected within 6.8 months in all patients. In 3 patients with excessive correction loss, delayed fusion occured at anterior osteotomy site due to insufficient grafting.

Except in one patient having kyphotic deformity due to Pott's disease sequel, postoperative neurologic deficit was not observed. Complete paraplegia was detected in that patient and early postoperative removal of the implants were performed.

Neurologic problem of the patient was improved later on and in latest follow up the neurologic examination of the patient was completely normal.

**Table 3.** Kyphosis Angle (Mean)



**DISCUSSION :**

Segmentary kyphotic deformities due to several different factors develope especially during early years of life and comes out in adolescent period as advanced rigid deformities. Classical method for treatment of these pathologies is combined anterior and posterior approaches either in one session or in two seperate sessions. This classical method, especially for advanced rigid kyphotic or kyphoscoliotic deformities has some technical limitations (6).

With our posterior wedge osteotomy method deformity can effectively be corrected in one session along with both anterior and posterior fusion, and posterior stabilisation. During this process spinal cord can safely be observed and guarded. Separation and cutting of the posterior longitudinal ligament is not risky as it is in anterior approach, either.

If proper operative technique is used carefully, with experienced hands, the risk to cause neurologic deficit in patients is not greater than other methods. In patients with rigid kyphotic or kyphoscoliotic deformity due to Pott's disease sequel, the possibility of causing postoperative neurologic problems is thought to be higher. Infection in posterior part of the vertebral body generates granulation and scar tissue that adheres spinal cord, and without appopriate release of these tissues, attempt to correct the deformity increases the risk of bending and compression of spinal cord, i.e., development of post operative nerologic deficit. During the operation of the patient with kyphotic deformity due to Pott's disease sequel, who had neurologic deficit in early postoperative period, granulation tissue adhered to spinal cord was detected, too.

One of the peculiarities of the wedge osteotomy is that; any space in osteotomy line should not be left empty and be grafted from posterolateral site properly. If there is any empty space in osteotomy lie, this delays fusion due to lack of contact of osteotomized surfaces, and also causes loss of correction in delayed period. This case was detected in our 3 patients mentioned before.

Search of latest literature showed us that this technique has become popular for vertebrae resection recently. In Turkey, Domaniç used this technique for several cases and declared an article. Magerl et al used this technique for metastatic spinal lesions and declared short term good results (4). Stab et al performed this operation for 3 hyperkyphotic patient and declared as an effective method for these cases (7).

As a result, posterior wedge osteotomy, especially for patients with hyperkyphotic deformity, rigid scoliosis, and short segment kyphosis is an effective operation for both correction and stabilization of the deformity.

**REFERENCES :**

1. Algün D, Torako-Lomber Fraktur ve Dislokasyonlarda Coutrel-Dubousset Enstrumantasyon ve Alıcı Spinal Sistem Uygulamaları, Uzmanlık Tezi, SSK İstanbul Hastanesi, İstanbul - 1992.
2. Campbell's Operative Orthopeadics, edited by A. H. Crenshaw, C.V. Mosby Company, St Louis, 1987.
3. Domanic U, Şar C, Lokalize Kifozun Cerrahi Tedavisinde Posteriordan Total Kama Wedge Osteotomisi ve CD Enstrumantasyon Uygulaması, XII. Milli Türk Ortopedi ve Travmatoloji Kongre Kitabı, 1991.
4. Magerl F, Coscia MF, Total Posterior Vertebrectomy of the Thoracic or Lumbar Spine, Clin. Orthop., 232, 1988.
5. Moe Textbook of Scoliosis and Other Spinal Deformities, W.B. Saunders Company, 1987.
6. The Spine, edited by Rothman RH, W.B. Saunders Company, 1992.
7. Steib JP, Long G, Kehr P, Mitteon M, Leculee F, Spine Osteotomy and Synthesis with CD Material in Serious Kyphoscoliosis, Proceeding of the International Congress on Coutrel-Dubousset Instrumentation, Sauramps Medical, 1986.
8. Textbook of Spinal Surgery, J.P. Lippincott Company, Philadelphia, 1991.