

## STABILIZATION OF THE CERVICAL DISC HERNIATION WITH THE ANTERIOR PLATE

SERVİKAL DİSK HERNİLERİNDE ANTERİOR PLAK İLE STABİLİZASYON

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### ÖZ

**AMAÇ:** Bu çalışmada; tek seviye servikal disk hernisi bulunan ve diskektomi sonrası anterior kısa segment plak-vida ile füzyon uygulanan hastaların klinik ve radyolojik olarak uzun dönem takip sonuçları değerlendirildi.

**GEREÇ VE YÖNTEM:** 01.01.2015-31.12.2017 yılları arasında Afyonkarahisar Sağlık Bilimleri Üniversitesi Tıp Fakültesi Nöroşirurji Kliniğinde opere edilen ve tek seviye diskektomi sonrası anterior plak-vida stabilizasyon yapılan 44 hasta hastane bilgi işlem sisteminden, dosyalardan tarandı. En az 1 yıllık takipler sonrasında hastalar klinik ve servikal dinamik grafi ile radyolojik olarak değerlendirildi.

**BULGULAR:** Araştırma sonucunda 44 hastanın dosya bilgilerine ulaşıldı. Hastalar klinik ve radyolojik olarak değerlendirildi. En fazla cerrahi uygulanan mesafe 20 hasta ile C6-7 (%45) idi. En sık karşılaşılan semptom olarak tek taraflı kol ağrısı bulundu. Hastaların %72 (32 hasta)sinin daha önceden bir fizik tedavi programı aldığı saptandı. Tedavi sonucunda 34 hastanın şikayetleri tamamen düzeldi. Hastaların radyolojik takiplerinde herhangi bir kifotik açılma veya greft kollapsı izlenmedi.

**SONUÇ:** Servikal disk hernilerinin tedavisinde preop iyi bir değerlendirme ile uygun hastalara yapılan mikrodiskektomi sonrası plak ve füzyon işleminin uzun dönem takiplerinde başarılı sonuçlar elde edildi.

**ANAHTAR KELİMELER:** Servikal Mikrodiskektomi, Kifotik açılma, Anterior stabilizasyon

### ABSTRACT

**OBJECTIVE:** In this study; results of clinical and radiologic follow-up of patients who had single-level cervical disc herniation and applied fusion with anterior short-segment plate-screw after discectomy were evaluated.

**MATERIAL AND METHODS:** 44 patients who underwent anterior plate-screw stabilization after single level discectomy performed in Department of Neurosurgery in Afyonkarahisar Health Sciences University Faculty of Medicine were scanned from the hospital data processing system and patient files between 01.01.2015 and 31.12.2017. Patients followed for at least 1 year were evaluated clinically and radiologically by cervical dynamic x-ray.

**RESULTS:** As a result of the research, file information of 44 patients was reached. Patients were evaluated clinically and radiologically. The location where the surgery was performed the most in 20 patients was C6-7 (45%). The most common symptom was unilateral arm pain. Seventy-two percent of the patients (32 patients) were found to have received a physical therapy program. As a result of the treatment, complaints of 34 patients were completely resolved. No kyphotic angulation or graft collapse was observed in the radiological follow-ups of the patients.

**CONCLUSIONS:** In the treatment of the cervical disc herniation, good results were obtained in the one year follow-up of plate and fusion procedures after microsurgical microdiscectomy with good evaluation before operation.

**KEYWORDS:** Cervical Microdiscectomy, Kyphotic Angulation, Anterior Stabilization

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## INTRODUCTION

Symptomatic cervical disc herniation (CDH) is a common diagnosis but epidemiological data related to symptomatic CDH are rare. CDH is often associated with degenerative disc disease (DDD) and can lead to a combination of severe pain, instability, radiculopathy, myelopathy or symptoms (1,2). DDD can also lead to herniation of the nucleus into the foramina or spinal canal. Loss of disc height may also lead to instability by causing the formation of osteophytes by further narrowing the foramina. Surgical treatment should be considered when conservative treatment for CDH is unsuccessful (3). The primary goals of surgical treatment are to remove nerve pressure, improve instability of the spinal cord, stabilize the spine (3), and prevent the development of neurological deficits in patients with myelopathy (4).

Cervical disc hernias (CDH) are the second most frequent (10-20% of disc hernias) in disc hernias and it is characterized by a pain that usually starts after waking up in the morning. CDH is most commonly seen in men aged 30-45 years and at the C5-6 segment. The majority of patients with CDH related acute radiculopathy are recovered by medical methods. Surgical treatment is recommended in cases in which progressive neurological deficits developed during treatment or recovery was not provided with non-surgical methods. At the present time, surgery is successfully performed with anterior and posterior methods. For the first time in 1958, Cloward and Smith & Robinson performed graft fusion after the post-cervical discectomy (5,6). In 1964, Hirsch stated that simple discectomy was a successful method (7). There are many reports in the literature about both the success of simple discectomy and fusion with hematograft or plate (8,9). There are publications showing increased fusion rate after plate-based surgeries (10). In this study, clinical and radiological results of patients with single-level cervical disc disease who underwent fusion with anterior cervical discectomy with short-segment plate-screw were reviewed.

## MATERIALS AND METHODS

5122 (16%) patients who complained of neck pain from 31,138 patients admitted to the

outpatient clinic between 01.01.2015 and 31.12.2017 in Department of Neurosurgery in Afyonkarahisar Health Sciences University Faculty of Medicine were retrospectively studied. After the imaging procedures, it was detected that there were cervical disc herniation at various levels in 1648 (32%) patients. Forty-four patients in which the surgery decision was made and the fusion surgery was performed by anterior single level discectomy + cage + plate-screw, were evaluated clinically and radiologically by cervical dynamic X-ray. The mean postoperative follow-up was 12 months.

## STATISTICAL ANALYSIS

Descriptive statistical analyzes were performed using SPSS 22.0 (IBM, New York, USA) software. Mean (range) for parametric data with normal distribution, median (range) for parametric data with no normal distribution, and percent values for nonparametric data were used.

## RESULTS

The most common levels for discs to herniate were at the C6-7 (41%) and the C5-6 (35%) levels (**Table-1**).

**Table 1:** Levels for discs to herniate

Disk distance	Number of patients
C3-4	8 (%18,1)
C4-5	2 (%4,5)
C5-6	12 (%27,2)
C6-7	20 (%45,4)
C7-T1	2 (%4,5)

It was found that the mean age of the patients was 47 (20-75). Clinical evaluation was performed according to the Odom criteria (**Table 2**).

**Table 2:** Odom's Criteria

Excellent	All preoperative symptoms and abnormal findings improved
Good	Minimal persistence of preoperative symptoms abnormal findings unchanged or improved
Fair	Definite relief of some preoperative symptoms; other symptoms unchanged or slightly improved
Poor	Symptoms and signs unchanged or exacerbated

There were 18 unilateral and 16 bilateral arm pain in the patients. 10 patients did not have arm pain. 32 patients had complaints of shoulder pain as well as arm pain. Patients were evaluated according to the Odom criteria at the early postoperative period and the 12th postoperative month, it was found that 82% of the patients were excellent and 18% were good.

Neurological loss was detected in 18 patients on preoperative neurological examination. Neurological deficits of 14 patients improved in postoperative period. It was detected that there was increase in muscle strength of 3 patients and no change in muscle strength of 1 patient. 19 of the patients received a physical therapy program prior to surgery.

There were 11 of the patients with complaints ongoing despite of the medical treatment for at least 3 weeks. Before deciding on the surgery, cervical dynamic x-ray was performed in all patients, and it was seen that the cervical axis and disc height were deteriorated. All patients were operated from the right side while the head was in the neutral position. Postoperatively, lateral cervical radiographs and cervical CT were performed; segmental angulation and cervical axis were evaluated (**Figure 1, 2**).

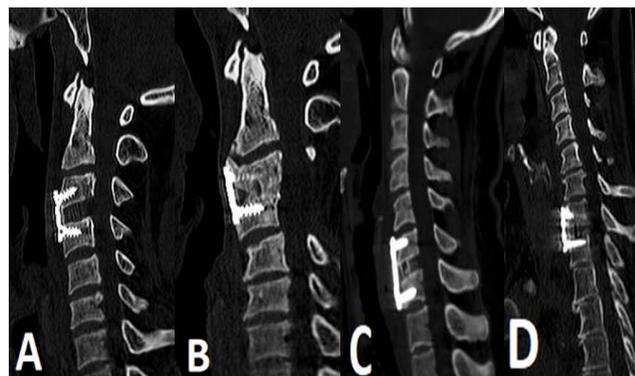
**Figure 1:**

- A. C5-6 disc hernia preoperative Cervical MRI
- B. C5-6 disc hernia preoperative Cervical CT
- C. C5-6 disc hernia postoperatively 3rd month Cervical MRI
- D. C5-6 disc hernia postoperative 3rd month Direct X-ray



**Figure 2:**

- A: C3-4 Anterior Stabilization. Postoperative 3rd month control Cervical CT
- B: C3-4 Anterior Stabilization. Postoperative 2nd year control Cervical CT
- C: C6-7 Anterior Stabilization. Postoperative 6rd month control cervical CT
- D: C7-T1 Anterior Stabilization. Postoperative 1st year control Cervical CT



Serious complications due to surgery were not observed in the patients. It was seen that there was short-term dysphagia in 3 patients, and 2 days of hoarseness in 1 patient. The motor deficit with new onset was not detected in neurological examinations of the patients. There were no plate problems, graft collapse and segmental kyphotic angulation in follow-ups of the patients.

**DISCUSSION**

CDH are the second most frequent (10-20% of disc hernias) in disc hernias and it is characterized by a pain that usually starts after waking up in the morning. CDH is most commonly seen in men aged 30-45 years and at the C5-6 segments. In our study, while the levels where the surgery was performed the most was C6-7 (41%) and C5-6 (35%), the mean age of the patients was 47 (20-75). For the first time in 1958, Cloward and Smith & Robinson performed graft fusion after the post-cervical discectomy (5,6). The most discussed subject in the cervical disc surgery is whether or not the anterior fusion application is performed after the discectomy.

Simple non-fusion discectomy has many advantages and disadvantages. The most known advantages are the being easily applicable, short operation time, less complication rates compared to fusions and implants (11). Segmental kyphotic angulation, loss of cervical lordosis and deterioration of the cervical axis are the most known disadvantages of simple discectomy in postoperative period (12). In a study conducted by Toplamaoglu et al., it was detected that there was segmental kyphosis in 81 (75%) of 108 patients who underwent simple discectomy and the segmental kyphotic angulation was not seen in groups of the fusion and the fusion with plate (13). In our study, segmental kyphotic angulations were not seen in any of the patients with long-term follow-up of 44 patients who underwent fusion with plate.

Long-term clinical outcomes of the patients who underwent simple discectomy are worse than group of the patients who underwent fusion. Generally, the discharged disc space forms an angle towards the anterior, and fusion occurs often in the anterior final plates. The distur-

ted cervical lordosis and segmental angle cause foraminal stenosis and cause neck and arm pain in long-term (14). In a study about fusion by White and Fitzgerald, they noted that the fusion application in the anterior cervical discectomy was fundamentally based on the surgeon's preference. But they suggested that fusion application should perform in patients with 4 mm and greater of the disc height (12). In our study, the disk distance heights of the operated 44 patients were measured as 4.6 mm on mean.

Another common view is that simple discectomy should be preferred in patients with soft discs. In the patients with soft discs, the disc height has preserved and degenerative process has not developed. In a study conducted by Aydin et al., it was reported that the disc was completely removed by the anterior contralateral approach, and in this way it was aimed to maintain disc height (15). This approach may be a good alternative for simple discectomy indication in patients with the disc herniation that has especially soft-disk and has no trauma history and vertebral degeneration, in which localization is lateral or paramedian and cervical axis is protected.

A possible advantage of fusion is reduction of risk of collapse, possible disadvantages, adjacent segment disease, removal of implant placed in disc space, or fracture of screws and plaques (16-18). The major problem encountered in the long-term studies is the changes in cervical lordosis and kyphosis. Therefore, instrumentation after anterior simple discectomy prevents the movement of the spine in order to protect the intended cervical lordosis, to prevent kyphotic deformity, and to allow arthrodesis to occur in a more stable environment (16). In our study, there were no deterioration of cervical lordosis, kyphotic deformity or instrumentation failure in 44 patients examined.

## CONCLUSION

Very good results were obtained in the follow-up of a total of 44 patients who were diagnosed with cervical disc hernia and underwent fusion with anterior plaque. Preoperative radiographic evaluation is important in determining which surgical procedure is appropriate

for cervical disc disease. Fusion surgery should be chosen for patients with segmental kyphotic angulation, especially when the cervical axis is distorted. Anterior plaques are implants that support both cervical fusion and help to minimize graft-related complications and graft collapse.

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