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## Literature review of quality of life and influencing factors in patients of cervical spondylosis treated by ACDF

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### Abstract

**Introduction:** Influence of psychosocial factors on patients of cervical spondylosis need to be calculated as they plays an important role in patient's quality of life (QOL). As anterior cervical discectomy and fusion (ACDF) has become most common surgical approach, since 1958 introduced by Robinson and Smith in patients affected by cervical disc disease like cervical spondylosis. So we have reviewed the literature of psychosocial factors correlated with the physical conditions in patients treated with ACDF.

**Method and material:** We have searched the literature on Pubmed, MEDLINE, EMBASE, PsycINFO, Psyc ARTICLES, Cochrane Library, Web of Science, Elisver, Google scholar, and Baidu scholar limiting results to those published in the English language without limiting year. The key search terms utilized were ACDF, quality of life, cervical spondylosis, anxiety and depression with ACDF, cervical radiculopathy, cervical myelopathies, neck pain, SF-36, HRQOL.

**Conclusion:** On the base of previous published article men have affected more than women with age >50 years. ACDF was the most common procedure used to treat the cervical spondylosis. When it comes to psychosocial factors anxiety and depression was found to be most common influencing factor and neck pain was the physical condition accompanied to those factors. After surgery it was found a significant increase in QOL as ACDF reduces the neck pain which reflect in psychosocial factors as well by significant decrease in anxiety, depression and working ability.

**Keywords:** ACDF, quality of life, cervical spondylosis, anxiety and depression with ACDF, cervical radiculopathy, cervical myelopathies, neck pain, SF-36, HRQOL

### 1. Introduction

Cervical spondylosis is a degenerative disorder in which formation disc degenerate around amphiarthrodial Joint by adjoining vertebral bodies and disc between them. It is one of most common spinal degenerative disease, which not only affect elders but also young adult once in life. The incidence of cervical spondylosis is 9 out of 10 peoples over 65 years of age. It's non-inflammatory process of cervical spine causes paraparesis and quadriparesis [1]. The degeneration can eventually worsen and causes either compression of existing cervical spinal nerves or of the cervical spinal cord. Cervical spondylosis clinically described by local pain in neck-shoulder area with or without radiation to arms, numbness, tingling and paresthesia. In later stages spondylotic myelopathy of the upper limb, radiological reduction in intervertebral disc space and formation of marginal osteophytes are found. Posteriorly these osteophytes protrude into the spinal canal and laterally into the intervertebral foramina. These osteophytes cause spinal cord and nerve root impingement, bulging intervertebral disc which would present as local neck stiffness and radicular pain along the offending nerve root. Long-standing compression of the spinal cord can result in irreversible damage including demyelination and necrosis of grey matter [2]. Radhakrishnan reported an annual incidence rate of cervical spondylosis related radiculopathy is 83 per 10,000 population in Rochester, Minnesota. Men have affected more than women with peak age 50-54 years [3]

When conservative management failed patients have to undergo, a variety of procedures to treat cervical radiculopathy depends on patient condition and severity. ACDF (anterior cervical discectomy and fusion) has become most common approach, since 1958 introduced by Robinson and Smith in patients affected by cervical disc disease like cervical spondylosis.

It is a primary procedure performed as anterior cervical discectomy of the herniated disc with endplate and fusion of vertebral bodies for standard stabilization [4]. In the past several decades, epidemiological data has suggested a rapidly increasing number of ACDF procedures performed on increasingly elderly patients [30, 31, 32]. Decker and Korinath have explained that ACDF leads to significant improvements in quality-of-life (QOL). [5] More recently, there have been increasing data supporting the role of preoperative psychosocial states affecting operative clinical outcomes, given that conditions such as depression are often prevalent in patients with chronic pain [25, 26]. The association between depression and neck pain is less clear and not well documented. Relatively few studies have explored the association between preoperative psychological states such as depression with clinical outcomes following anterior or posterior cervical surgery [27, 28]. One recent study retrospectively analyzed 106 patients who underwent ACDF but did not find a statistically significant association between preoperative depression and postoperative health outcome [29]. Purpose of this literature review was to find the health-related quality of life postoperative anterior cervical fusion surgery and its correlation with social or psychological factors.

## 2. Method

At present Report of QOL outcomes have been evaluated by scales via Odom's criteria, SF-36, Beck Depression Inventory scale, neck disability index(NDI), PDQ, PDQ-9, EQ-5D, JOA score and visual analog scale (VAS).[6] Previous studies have verified several demographic and clinical variables that reported a group of patients has same prior ACDF QOL Health states [7, 8]. The SF-36 scale is divided into 8 dimensions, mainly from a physiological function, physical pain, general health status, muscle power (muscle tone), social function, emotional function and mental health to summarize the life-related quality of the respondents.

An electronic search was done on:Pubmed, MEDLINE, EMBASE, PsycINFO, PsycARTICLES, Cochrane Library and Web of Science, Elisver to identify the relevant paper.

**2.1 Key words search:** ACDF, quality of life, cervical spondylosis, anxiety and depression with ACDF, cervical reticulopathy, cervical myopathies, neck pain, SF-36, HRQOL.

**2.2 Inclusion criteria were:** in all studies in which patients were treated by ACDF. Studies focused on QOL in such patients, per and postoperative QOL comparisons in patients treated by ACDF.

**2.3 Exclusion criteria:** case series, patients treated by other methods than ACDF, All the selected papers were then reviewed by two researchers separately to conclude all the information. Initially 220 paper were included; out which 80 found to be relevant, out of them 40 got final selection for review.

## 3. Result

Depression prior to surgery for degenerative cervical disc disease and was found to be present in 11.7% of patients [9]. Bohlman *et al.* 2 reported 67% of patients with no neck/arm pain 20 to 33 years after initial surgery at single or multiple levels. In their series, 88.5% of patients had no functional deficit after surgery compared with 45% with motor deficit and 63% with sensory deficit preoperatively. In addition, 80%

of their patients were able to return to work after surgery and maintain socially and economically productive life. These results are "excellent" by all standards and continue to reaffirm the success of ACDF procedure [10].

AA. Theologis *et al.* also showed there is significant increase in SF-36 after surgery [11]. MD. Alvin *et al.* Aslo showed Compared with preoperative health states, the ACDF cohort showed statistically significant improved PDQ (78.5 versus 57.9), PHQ-9 (9.7 versus 5.3), and EQ-5D (0.55 versus 0.68) scores at 1 year postoperatively [12]. Stylianos Kapetanakis showed SF-36, Neck Pain, as well as arm pain feature constant improvement during follow-up, with greatest scores presenting at 12 months and NDI presents its best score at 6 months postoperatively [13]. According to E. Shiban, K. Gapon arm weakness was observed in 82 (61%) and 34 (25%) cases in the radiculopathy and myelopathy groups, respectively. This was improved in 69 (84%) and 28 (82%) cases [14]. INW. Tian, K. Yan study ACDF group showed significant improvement of their JOA scores and NDI from preoperative measurements to the last follow-up. In terms of Odom's scale, 97.1% of the ACDF patients got excellent or good results [15].

## 4. Discussion

Although less frequent than lumbar degenerative disc disease, cervical disc disease may be much more neurologically compromising due to anatomical particularities. Since its first description together with the typical signs and symptoms the operative therapy of cervical disc disease has undergone a changeful evolution over the years [5]. Fountas *et al.* stated in a study that incidence of worsening due to myelopathy was 0.9% [16]. Psychiatric conditions such as mood disorders represent a significant burden to society, with over 50% prevalence of depression in surgical candidates for chronic neck disease [9, 17]. Some studies also shows pathological changes were present in the paravertebral muscles of patients with severe cervical spine disease causing decreased muscle tone or muscle atrophy [18]. Another psychometric study report showed QOL correlated with clinical outcomes and depression, which says in patients with high-level preoperative depression can cause fare worse following surgery [19, 37]. Although the literature supporting the relationship between psychological conditions and surgical outcomes, and they indicated they believed that psychologists have the necessary tools to predict surgical outcomes, they proposed that the results might have been the result of improper application of empirically established evaluation methods [19, 33]. So quality of life is one of the most important measure to check the outcome of surgery. Maratos *et al.* 18 concluded that spine surgery improves both physical and psychological condition and that psychological factors have no independent effect on surgical outcome. Based on their conclusion, surgery that improves physical health might cause psychological conditions to improve as a result of pain relief and other benefits [19, 34]. Until now, cervical degenerative disc disease that causes radiculopathy/myelopathy has been successfully managed via ACDF for the last five decades with the satisfactory outcomes of ACDF [20, 35]. In an effort to measure the treatment outcomes objectively from a patient's perspective, current randomized clinical trials and longitudinal studies often require a measurement of pain, function, and general health. Validated outcome instruments, such as the SF-36, NDI, VAS, Odom's criteria, Beck Depression Inventory scale and pain intensity scales represent objective tools to measure these domains. Utilizing pretreatment scores, treatment outcomes can be assessed at

designated post treatment intervals, evaluating short- and long-term treatment effects [21, 22, 36]. Patient satisfaction with ACDF for cervical spondylotic myelopathy has been reported to range from approximately 75% to 90% [23, 38, 39, 40]. When it comes to radiculopathy most of patients are conservatively treated but if surgery is required then most common procedure is ACDF and most common disc involved are C6 and C7 [3, 44, 45, 46]. There are also some complications related to ACDF as a recent study reported an overall revision rate of 15% in patients who underwent ACDF for radiculopathy or myelopathy [47]. Hilibrand *et al.* studied a consecutive series of 374 patients who had undergone ACDF and reported that symptomatic adjacent segment disease occurred in 2.9% of them per year, with a cumulative rate of 25% in a 10-year period [15, 41]. Beside all the complication there are lot of studies showed the significant improvement in postoperative quality of life. Some recent studies also accepted the effect of anxiety and depression on the outcome so they have stated to have a preoperative education and found to be beneficial by most authorities. Previous meta-analyses have reported the effectiveness of PE. For example, Devine20 found that patients who received PE spent less time (1.5 days) in the hospital. Hathaway21 reported that PE reduced fear and anxiety [24, 42, 43]. So it is most important to include quality of life while considering the outcome of a surgery.

Limitation to the study there were very limited studies that have included quality of life measures in their outcome. Secondly studies which were included had different follow up time and last all studies have different quality of life measure whereas SF-36, NDI and VAS were common.

## 5. Conclusion

As the literature states that ACDF is most common or procedure of choice for cervical spondylosis in past decades. We have concluded that it important to take in count the QOL while checking outcome of ACDF. As there many physical as well as psychological factors that are very important from the patients prospective of life quality. In our study we found ACDF significantly improves QOL in cervical spondylitic patients and most common influencing factors were anxiety, depression and pain.

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