

# Surgery versus nonsurgical treatment of cervical radiculopathy

Randomized studies of anterior cervical decompression and fusion followed  
by physiotherapy versus structured physiotherapy alone

Akademisk avhandling

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av

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- I. Engquist M, Löfgren H, Öberg B, Holtz A, Peolsson A, Söderlund A, Vavruch L, Lind B. Surgery versus nonsurgical treatment of cervical radiculopathy: a prospective, randomized study comparing surgery plus physiotherapy with physiotherapy alone with a 2-year follow-up. *Spine (Phila Pa 1976)*. 2013 Sep 15;38(20):1715-22.
- II. Peolsson A, Söderlund A, Engquist M, Lind B, Löfgren H, Vavruch L, Holtz A, Winström-Christersson A, Isaksson I, Öberg B. Physical function outcome in cervical radiculopathy patients after physiotherapy alone compared with anterior surgery followed by physiotherapy: a prospective randomized study with a 2-year follow-up. *Spine (Phila Pa 1976)*. 2013 Feb 15;38(4):300-7.
- III. Engquist M, Löfgren H, Öberg B, Holtz A, Peolsson A, Söderlund A, Vavruch L, Lind B. Factors affecting the outcome of surgical versus nonsurgical treatment of cervical radiculopathy: a randomized, controlled study. *Spine (Phila Pa 1976)* 2015 Jul 17[Epub ahead of print]
- IV. Engquist M, Löfgren H, Öberg B, Holtz A, Peolsson A, Söderlund A, Vavruch L, Lind B. A 5-8 years randomized study on treatment of cervical radiculopathy: anterior cervical decompression and fusion plus physiotherapy versus physiotherapy alone. *Submitted*.



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# Surgery versus nonsurgical treatment of cervical radiculopathy

Randomized studies of anterior cervical decompression and fusion followed  
by physiotherapy versus structured physiotherapy alone

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## ABSTRACT

**Background and aims:** Cervical radiculopathy (CR) is a symptom complex comprising neck pain and radiating arm pain due to compression of one or more cervical nerve roots, caused by spondylotic narrowing of the intervertebral foramina, intervertebral disc herniation or both. Anterior cervical decompression and fusion (ACDF) is a common surgical procedure to treat CR, but the evidence supporting use of this method versus nonsurgical treatment is scarce. The main aims of this thesis were to evaluate the additive value of ACDF when combined with physiotherapy (PT) in regard to disability, pain, patient satisfaction, health outcome and recovery of function, and to find patient-related factors that may predict the outcome of surgery and PT.

**Patients and methods:** Sixty-three patients were included in the study. They were all evaluated prior to treatment and two years after treatment start, while 59 were also evaluated 5-8 years after treatment. Patients were randomized into two groups: ACDF followed by a structured PT program or the same PT program alone. Outcome measures at 2 years were disability using the Neck Disability Index, (NDI), pain intensity, patient global assessment and objective function. At 5-8 years, health outcome (EQ-5D) was also analyzed, but function was not. Based on the outcomes of the NDI and pain intensity at one year, possible patient-related modifiers of treatment outcome such as age, gender, smoking and psychological factors were analyzed.

**Results:** During the first two years, the only significant differences between treatment groups were that the operated patients had less neck pain throughout the entire period, while at one year, the patient global assessment of the treatment effect was superior in the surgery group. After 5-8 years, the surgical patients fared significantly better concerning NDI, neck pain and global assessment. No significant differences were seen regarding arm pain, health outcome or function.

Factors that significantly altered the treatment effect between the two treatment groups in favor of surgery regarding one or more of the outcome measures were: duration of neck and arm pain < 12 months, female sex, low EQ-5D index, high levels of anxiety due to neck/arm pain, low SES score and high DRAM score. No factors were found to be associated with better outcome from PT alone.

**Discussion:** The studies in this thesis represent the first scientific evidence to support use of ACDF for treatment of cervical radiculopathy, based on a randomized study of surgical versus nonsurgical treatment. From the results of the studies, it is reasonable to recommend a trial of structured physiotherapy in the early phase of CR, before deciding upon surgery. However, for patients with substantial residual symptoms, ACDF is a good option for achieving greater and more rapid improvement, which can also be expected to last at least throughout a 5-8 year time span. Patients should not be disqualified from surgical treatment due to gender, poor health or a high level of distress and/ or anxiety. When surgery is deemed necessary, better treatment outcomes can be expected when the procedure is performed within one year of onset of CR symptoms.

**Keywords:** Cervical radiculopathy, randomized, RCT, physiotherapy, physical therapy, surgery, ACDF, outcome, cervical disc degeneration, long term.

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