

# Long term prognosis of young adults after ACDF

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# Long term prognosis of young adults after ACDF

- Anterior cervical decompression and fusion (ACDF) is the leading surgical treatment of cervical radiculopathy caused by intervertebral disc herniation or spondylotic nerve root compression.
- In the younger patient population intervertebral disc diseases are the leading cause for radiculopathy requiring surgical intervention.
- ACDF procedures have been suggested to lead to accelerated degeneration of the adjacent cervical discs, so called adjacent segment disease. Re-operation need due to adjacent segment disease have been estimated to be circa 10% in 10 year follow up in general patient population undergoing ACDF.
- Occurrence of adjacent segment disease is of particular interest when treating young individuals as the cumulative disease burden from degenerative cervical disease may become increasingly significant during their expectedly long lifetime and can lead to significant reduction in quality of life and high overall health economic costs. However, the overall impact of degenerative disc disease, requiring surgical intervention, on life time prognosis for degenerative cervical disease is incompletely understood.

# Long term prognosis of young adults after ACDF

- a retrospective study collecting all adult patients under 40 years of age operated with an ACDF-procedure due to degenerative cervical disease during years 1990-2005 in the Helsinki University Hospital Department of Neurosurgery (n=476 patients).
- The follow-up period was 12-27 years.
- End points:
  - Long-term outcome, satisfaction to surgery and quality of life
  - Long term risk of reoperations

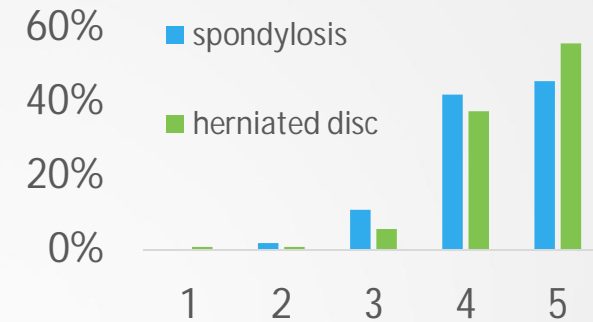
# Patient population and operations

		n	%
Total		476	
Main Diagnosis	Herniated disc	345	72 %
	Spondylosis	127	27 %
	Unclear	4	1 %
Age (years), mean (min-max)		35,6	(21,7–40,0)
Spinal cord compression	only radiological findings	56	12 %
	clinical signs or symptoms of myelopathy	60	13 %
Operation acutely / at emergency timing		44	9 %
Number of levels operated	1	405	85 %
	2	70	15 %
	3	1	0 %
Operated level	C3-C4	7	1 %
	C4-C5	41	9 %
	C5-C6	225	47 %
	C6-C7	266	56 %
	C7-T1	11	2 %
Implant type	Synthetic interbody cage	328	69 %
	Bone autograft	84	18 %
	No implant, discectomy only	64	13 %

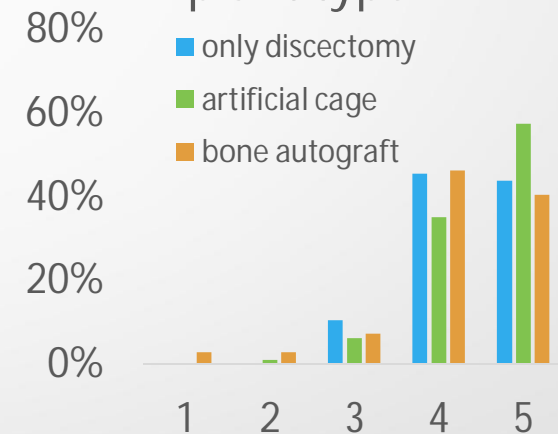
# Postoperative follow up

- Subjective treatment benefit assessed on 5-tier Likert scale at 2-3 months post-surgery
- Relief of symptoms:
  - 92% excellent or good relief (Likert 4-5)
  - 7% no change of symptoms (Likert 3)
  - 1% worsening of symptoms (Likert 1-2)
- Trend of higher score if diagnosis a disc hernia vs. spondylotic nerve compression (p=ns.)
- Higher scores if fused with artificial cage vs. patients operated with only discectomy or bone autograft. (p=0.033)
- Patients with clinical myelopathy had significantly lower scores (p=0.009)

## Diagnosis



## Implant type



## Spinal cord compression



# Complications

Complications			
Hematoma, leading to reoperation	Parapharyngeal	5	1 %
	Intraspinal	2	0,4 %
dysphonia		17	4 %
dysphagia		10	2 %
Wrong level operated		4	1 %
New neurological sign, reoperation*		9	2 %
New neurological sign, no reoperation		8	2 %
Infection**		6	1 %
Dural lesion		2	0 %
Problems with bone autograft, reoperation		2	0 %

\*other than intraspinal hematomas or problems with autograft

\*\*two cervical wound infections, two autograft donor site wound infections, one pneumonia, one fever NAS

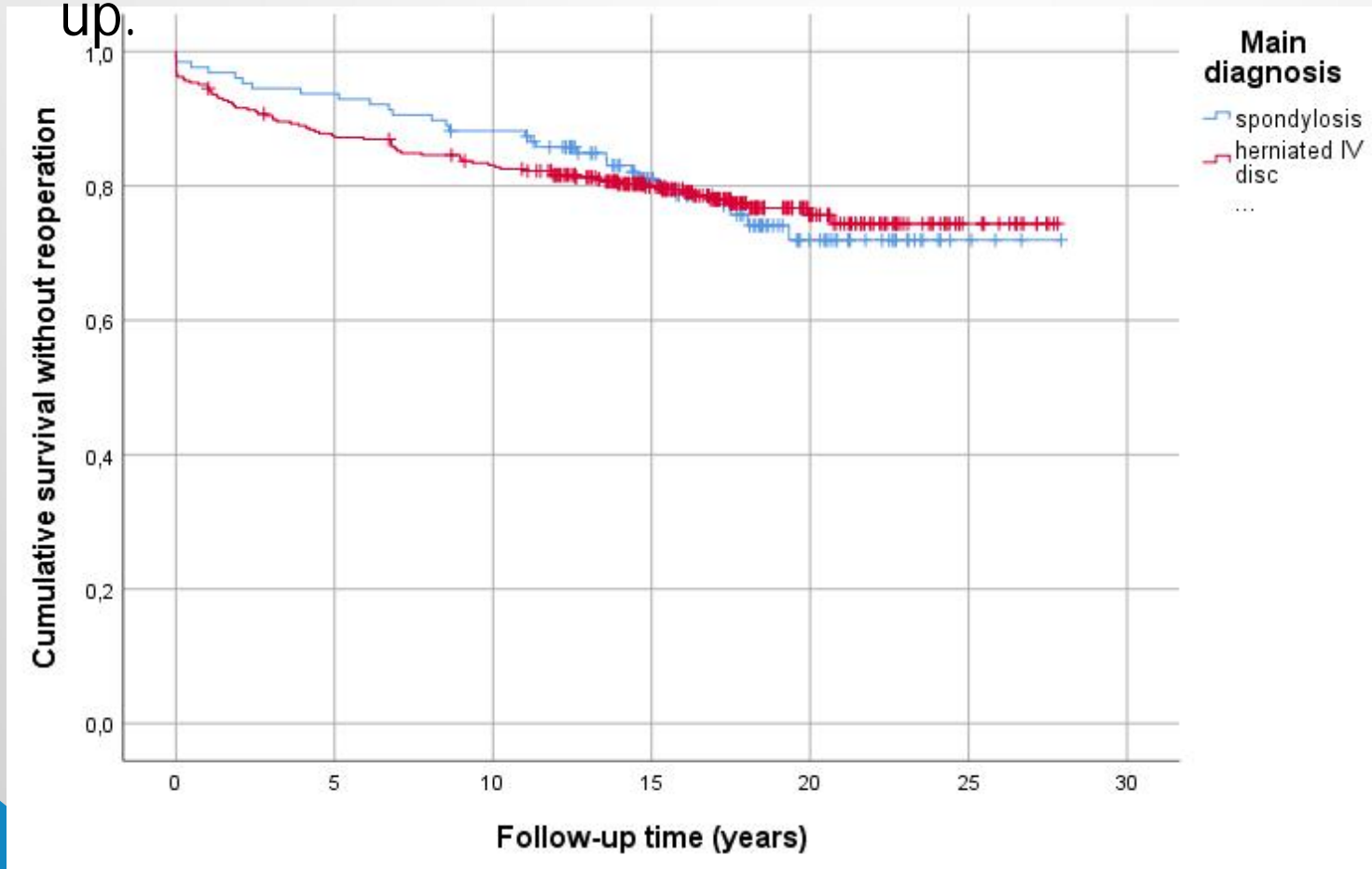
# Re-referrals and reoperations

- 33% of the patients were re-referred to the HUH neurosurgery at least once for a consultation.
- 24% of the patients were reoperated at least once during median follow-up of 17 years.

Number of new referrals to the HUH neurosurgery	0	1	2	3	4	5
Patients	321 (67%)	107 (22%)	31 (7%)	9 (2%)	6 (1%)	2 (0%)
Number of reoperations	0	1	2	3	4	
Patients	364 (76%)	90 (19%)	16 (3%)	4 (1%)	2 (0%)	

# Reoperations - Kaplan-Meier analysis

- Cumulative survival without reoperation presented as a Kaplan-Meier plot. Vertical ticks indicate end of follow up.





# Reoperations – type and level

- Most of the early (<28 days) reoperations were either hematoma evacuations or ACDFs of the same level.
- Most of the late reoperations were ACDFs, laminectomies and posterior foraminotomies of other levels.

Type of reoperations	early (<28 days)	late (>28 days)	total
hematoma evacuation*	7	2	9
anterior decompression	14	85	99
laminectomy	0	11	11
posterior foraminotomy	0	8	8
bone autograft removal	2	0	2
epidural stimulator	0	2	2
data not available	1	11	12
	24	119	143

Re-operation levels	Early (<28 days)		late (>28 days)		total	
same or same+other level	17	71 %	27	23 %	44	31 %
only other level	0	0 %	80	68 %	80	56 %
data not available	0	0 %	7	6 %	7	5 %
hematoma	7	29 %	2	2 %	9	6 %
epidural stimulator	0	0 %	2	2 %	2	1 %
all	24	100 %	118	100 %	142	100 %

\*Two late hematoma evacuations were hematomas after reoperations .

# Late follow up - questionnaires

- Questionnaires sent to patients now at the end of follow-up (median 17 years) to assess overall neck symptoms at current time point and health related quality of life.
- 281 out of 443 patients (59%) answered the questionnaires
- Patients now 35-67 years of age
- Smoking reported more commonly both now and at index time than in general population
  - 43% smoked at the time of the operation (general population 22-25% at 1196-2005)
  - 25% of the patients are smoking now (general population 15% at 2016)
- Working status
  - 67% working
  - 13 % disability pension (56% of them due to cervical problems)
  - 4% part-time disability pension.

# Late follow up - questionnaires

Satisfaction to the result of the surgery (n=281)	5 (very satisfied)	182 (65%)
	4 (moderately satisfied)	77 (27%)
	3 (can't say)	13 (5%)
	2 (moderately unsatisfied)	6 (2%)
	1 (very unsatisfied)	3 (1%)
Would the patient choose surgery again? (n=270)	yes	259 (96%)
	no	11 (4%)

- Median NDI was 12%.
  - NDI was significantly higher among patients with spondylosis or clinical myelopathy and among patients operated more than once
- Median EQ5D-VAS was 78%.
  - EQ-VAS was significantly lower among patients with spondylosis or clinical myelopathy, patients operated more than once and patients with more than one level operated in the primary operation.

# Conflicts of Interest

- The authors have no conflicts of interest to disclose