

Impact of Age on Patient Outcomes after Cervical Disc Arthroplasty or Anterior Cervical Discectomy and Fusion: Comparison at 5-Year Follow-up

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Introduction

When treating cervical degenerative disc disease, surgeons have the choice of cervical disc arthroplasty (CDA) or traditional anterior cervical discectomy and fusion (ACDF). Previous studies of lumbar surgery have found no association between age and outcomes, but there is little information on the outcomes after cervical spine procedures in older patients. This study assessed the impact of patient age on outcomes after CDA or ACDF using data from the Mobi-C® Cervical Disc FDA clinical trial.

Study Details

- Prospective, randomized, Mobi-C FDA clinical trial
- 599 patients treated at one or two contiguous levels
 - 413 patients treated with Mobi-C Cervical Disc
 - 186 patients treated with ACDF (allograft bone and anterior plate)
- Post hoc analysis of patients stratified by age: <50 years old vs. ≥50 years old
- Outcomes: NDI, neck pain, SF-12 PCS, subsequent surgery
- NDI success: >50% improvement in preoperative NDI score of <60 or 30+ point improvement in patients with a prep NDI score of ≥60
- Statistical comparison of outcomes between age groups made with chi-squared test.
- Multivariable logistic regression was used to identify potential factors influencing NDI success or subsequent surgery: age ≥50 vs. <50; TDR vs. ACDF; 1-level vs. 2-level; female vs. male.
- Neither number of levels nor gender influenced any of the results reported.

Results

Patients

- Age ranged from 21 to 67 years (average 44.6)
- 27% of patients were age 50 years or older

Table 1 Age distribution by levels treated.

Age	1-Level		2-Level	
	Mobi-C	ACDF	Mobi-C	ACDF
≥ 50	22.9%	22.2%	29.5%	31.4%
< 50	77.1%	77.8%	70.5%	68.6%

Patient Reported Outcomes

- After 5 years, no significant differences ($p > 0.05$) in patient-reported outcomes were observed with respect to age in patients receiving either Mobi-C or ACDF.

Table 2 Mobi-C outcomes by age at 5 years.

Outcome	Age ≥ 50	Age < 50	p value
NDI Success	84.2%	79.1%	NS
NDI score	15.4	17.2	NS
VAS neck pain	16.1	19.2	NS
SF-12 PCS	45.9	47.6	NS

NS – No significant difference ($p > 0.05$) in outcomes between age groups.

In all patients, NDI scores were similar ($p>0.05$) between patients ≥ 50 years old vs. age <50 (Figure 1).

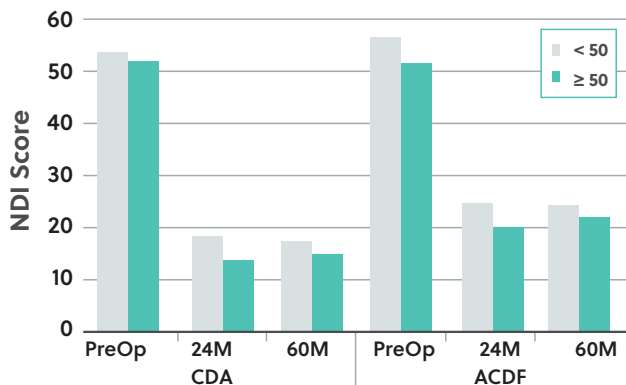


Fig. 1 Mean NDI score by age in CDA and ACDF patients.

There also was no significant difference in VAS neck pain in older patients (≥ 50 years) compared to age <50 (Figure 2).

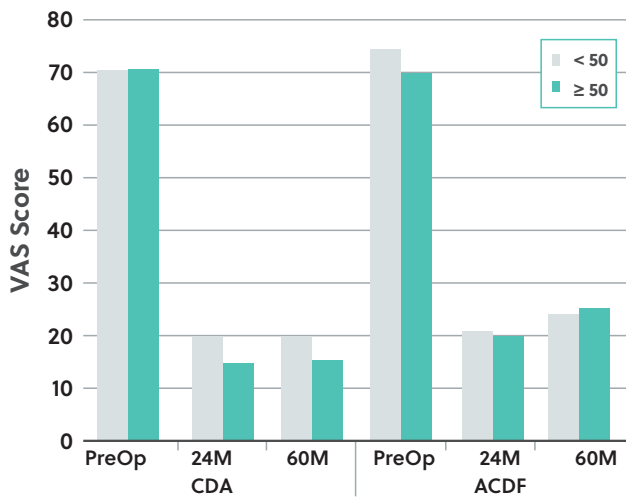


Fig. 2 Mean VAS neck pain by age.

There was no significant difference in SF-12 PCS scores by age group out to 5 years (Figure 3).

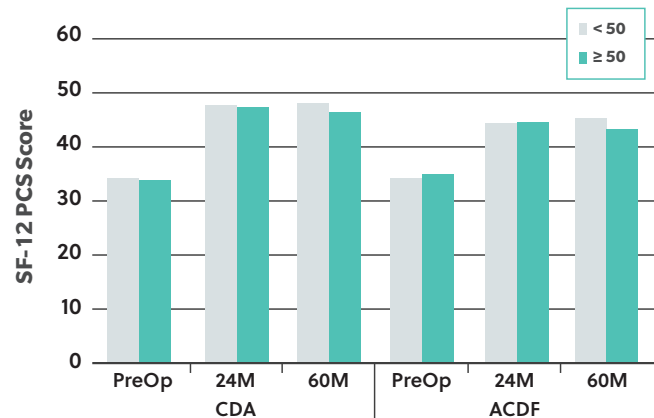


Fig. 3 Mean SF-12 PCS by age.

The rates of NDI success were also not significantly different between the age groups (Table 3). In multivariable logistic regression, age was not a predictor of NDI success after adjusting for gender, levels treated, and treatment group. **However, patients treated with Mobi-C were twice as likely to achieve NDI success than ACDF patients ($p<0.01$).**

Table 3 NDI success by age.

Variable	Odds Ratio	95% CI	p value (z test)
Age	1.02	0.99 – 1.04	0.21
Gender (Male)	1.39	0.91 – 2.13	0.13
Levels Treated (Two)	0.67	0.43 – 1.02	0.06
Treatment (CDA)	2.06	1.34 – 3.17	<0.01

Subsequent Surgery

When comparing secondary surgery between age groups, Mobi-C patients >50 years of age had subsequent surgery rates similar to younger patients (3.6% vs. 2.7%; $p>0.05$). **After 5 years, younger ACDF patients (<50 years) had a higher rate of subsequent surgery than their older counterparts (17.0% vs. 5.9%; $p=0.05$) (Figure 4).**

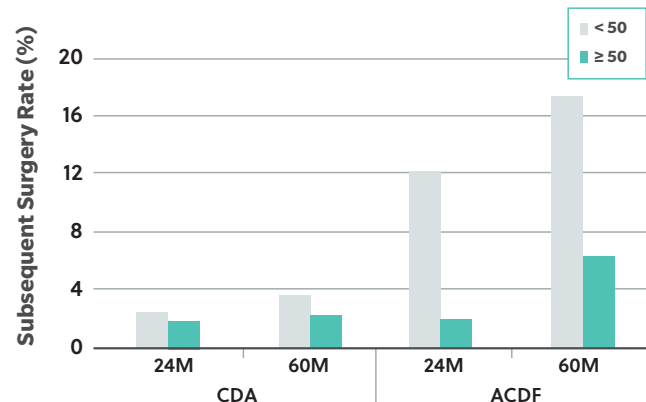


Fig. 4 Subsequent surgery by age.

In multivariable logistic analysis, age also was not a predictor of subsequent surgery when adjusting for gender, treatment group, levels treated, and preoperative NDI. **Patients treated with ACDF were four times more likely to have subsequent surgery than Mobi-C patients ($p<0.01$).**

CONCLUSIONS

- Mobi-C is shown to be an effective treatment for patients of any age in this study (21-67).
- There was no difference in clinical outcomes (NDI, pain, SF-12) between old and young patients in either the Mobi-C or ACDF groups.
- Mobi-C patients performed equivalent to or better than ACDF patients of the same age in these same clinical outcomes (NDI, pain, SF-12).
- ACDF patients less than 50 years old had a higher incidence of subsequent surgery. Mobi-C patients less than 50 years old had similar rates of subsequent surgery compared to their older counterparts.

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