

Outcomes of Minimally Invasive Surgery (MIS) Compared to Open Fusion for Spondylolisthesis.

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Glassman S.



Utility of MIS Spine Fusion?

- Comparative evidence is lacking!
- Equivalence / Superiority to open has not been proven
 - Outcomes
 - Variability in diagnosis
 - Techniques
 - Adverse events
 - Re-operations
 - Instrumentation related
 - Non-union?
- Learning curve
- Cost



Objective

- Compare 1 and 2 year patient reported outcomes (PRO) following MIS vs. Open fusion for low-grade spondylolisthesis.
- Hypothesis: No difference in outcomes at 1 and 2 years.



Study Design

- Multicenter, comparative, retrospective cohort study
 - Prospective data collection
 - Centers:
 - Toronto - UHN – Krembil Neuroscience Center
 - Louisville Kentucky - Leatherman Spine Institute
 - Madison Wisconsin – UW Health



Definitions

- Open
 - Midline muscle stripping approach
- MIS
 - Paramedian muscle splitting approach that does not violate adjacent segment soft tissue



Inclusion / Exclusion

- Inclusion
 - Aged 18-80
 - Degenerative / Isthmic Spondylolisthesis (Grade ≤ 2)
 - 1 Level Fusion between L2-S1
 - Leg and/or back pain present
 - Any number of co-morbidities
- Exclusion
 - Multi-level fusion
 - Absent baseline PRO
 - < 1 year follow-up



Outcome Measures

- Primary
 - ODI \pm SF-36 at 1 and 2 years
- Secondary
 - AEs
 - Short term outcome measures
 - Acute
 - EBL , LOS, Surgical Time
 - 6mth pain scores, ODI / SF-36



Covariates

- Statistically control for:
 - Age / Sex
 - BMI
 - Levels
 - Degen vs. Isthmic
 - Primary vs. Revision
 - Differences in baseline patient reported outcome measures



Data from 3 centers

	MIS (TLIF) n=59	OPEN n=130
Djurasovic / Glassman et al	n=12	n= 87 (PLF) n=15 (TLIF)
Anderson et al	-	n=28 (TLIF)
Rampersaud	n=47	-

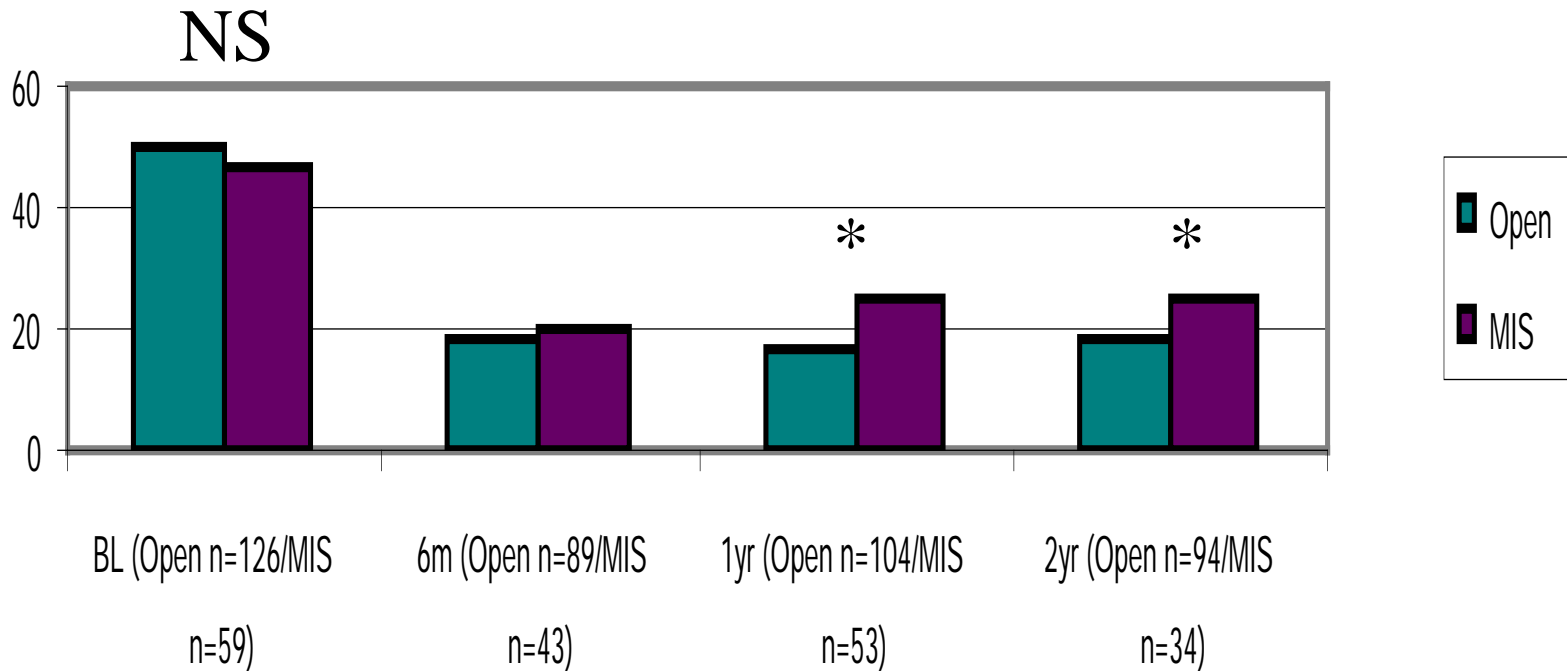
MIS (n=59) / Open (n= 43 – TLIF / 87 –PLF)



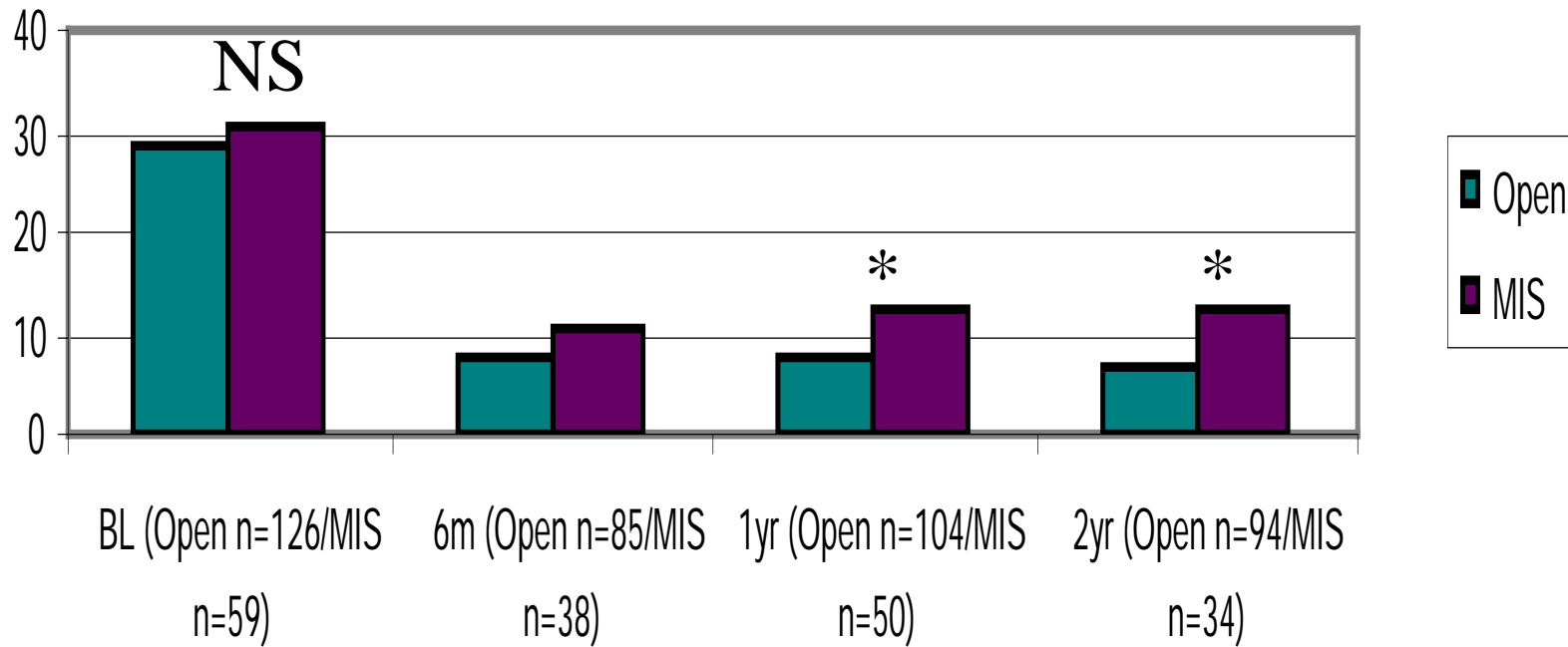
	MIS	OPEN	p value
Age	50.72	59.00	4.83 E-05
BMI	30.24	29.90	0.74
CMI	1.82	1.93	0.81
OR Time	255.94	209.43	4.44 E-06
Estimated Blood Loss	285.86	479.71	0.0002



ODI Score Change from Baseline

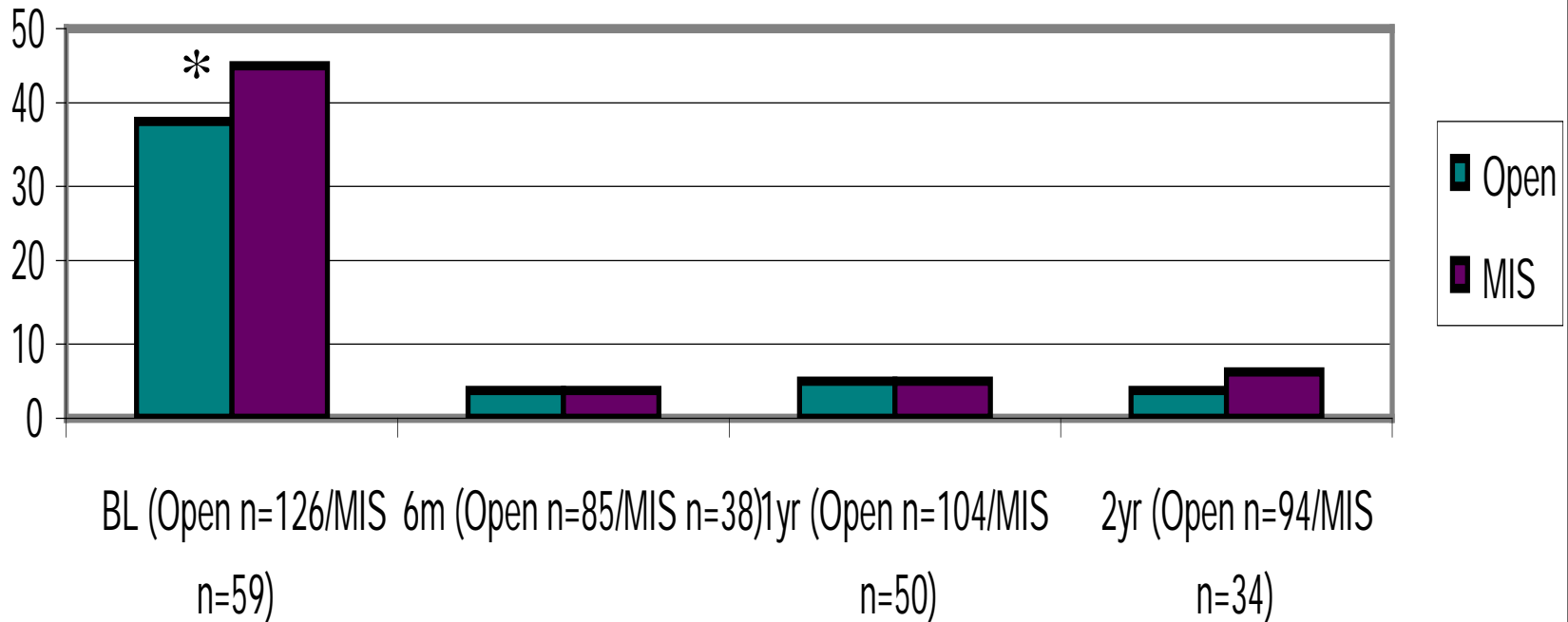


PCS Change from Baseline



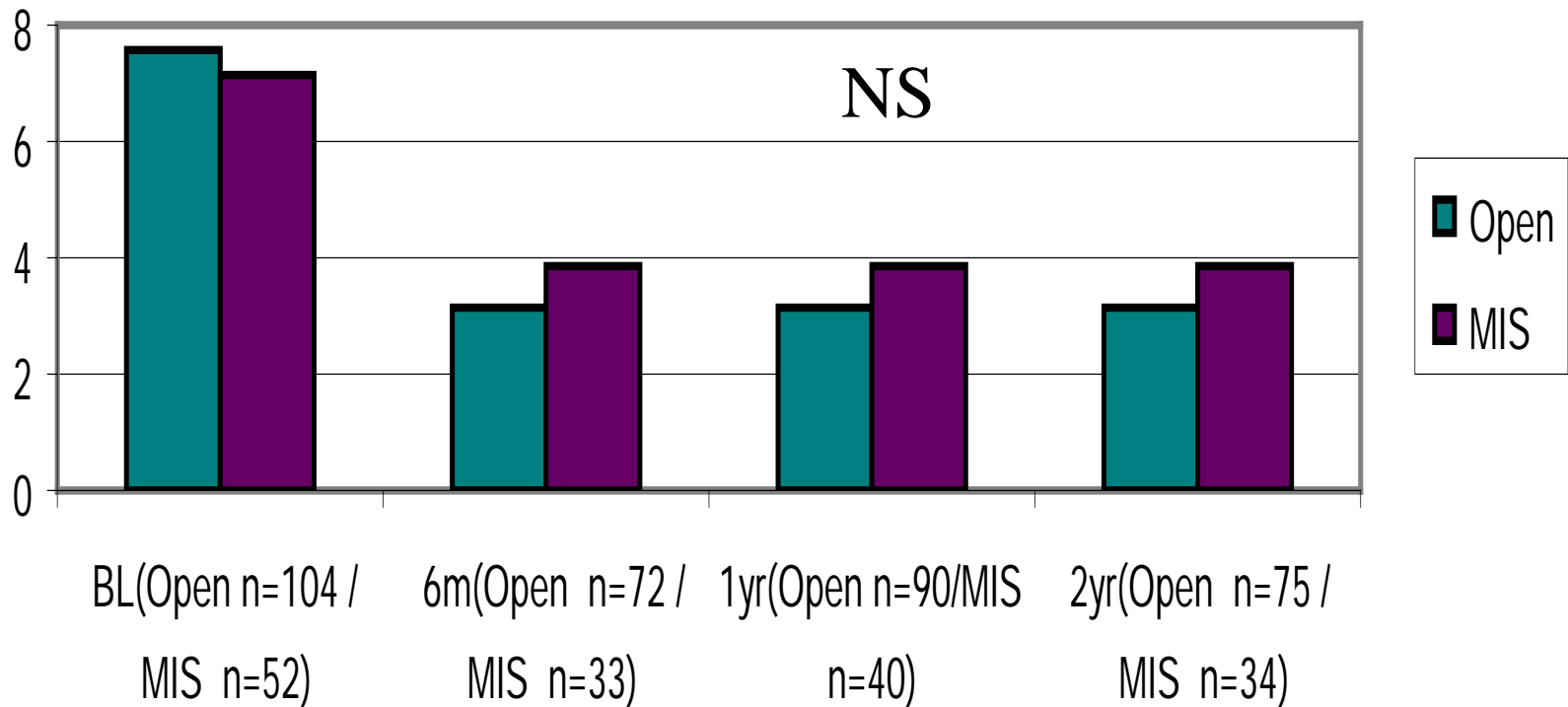
MCS Change from Baseline

6.7pt
difference

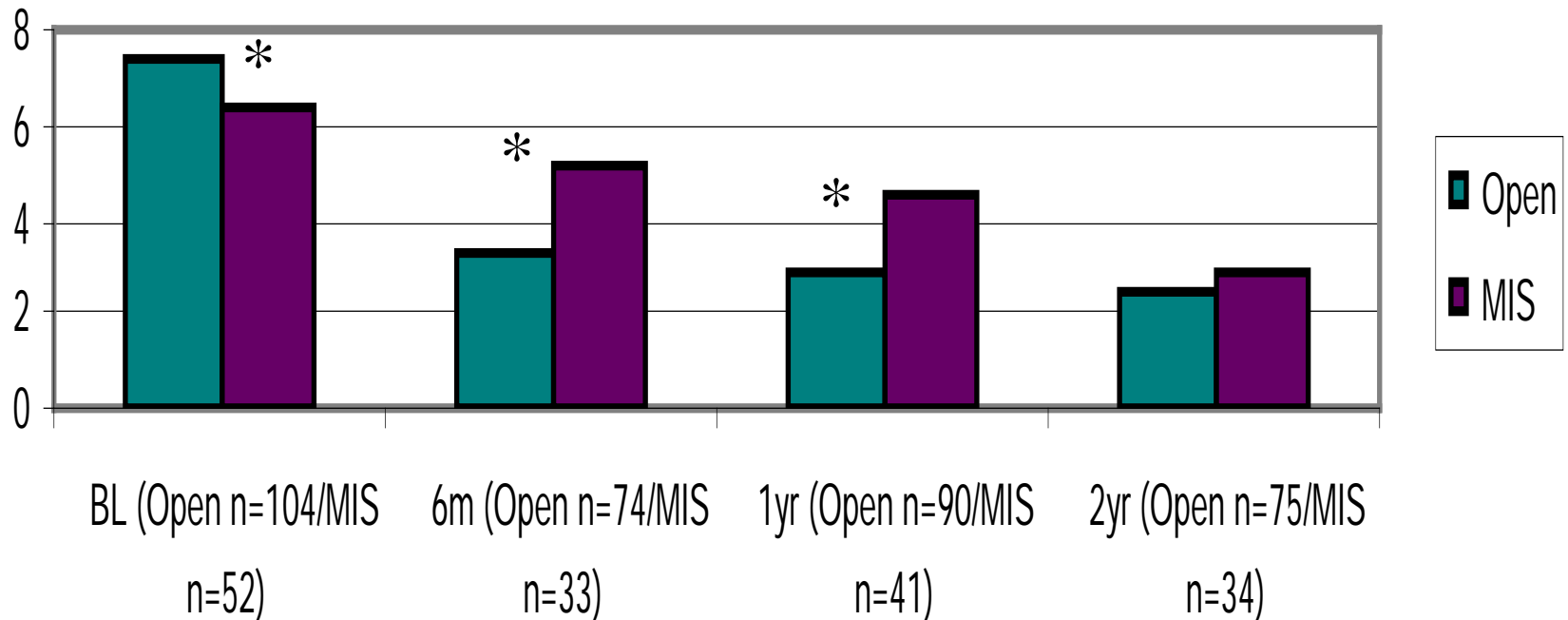


VAS Back Change from Baseline

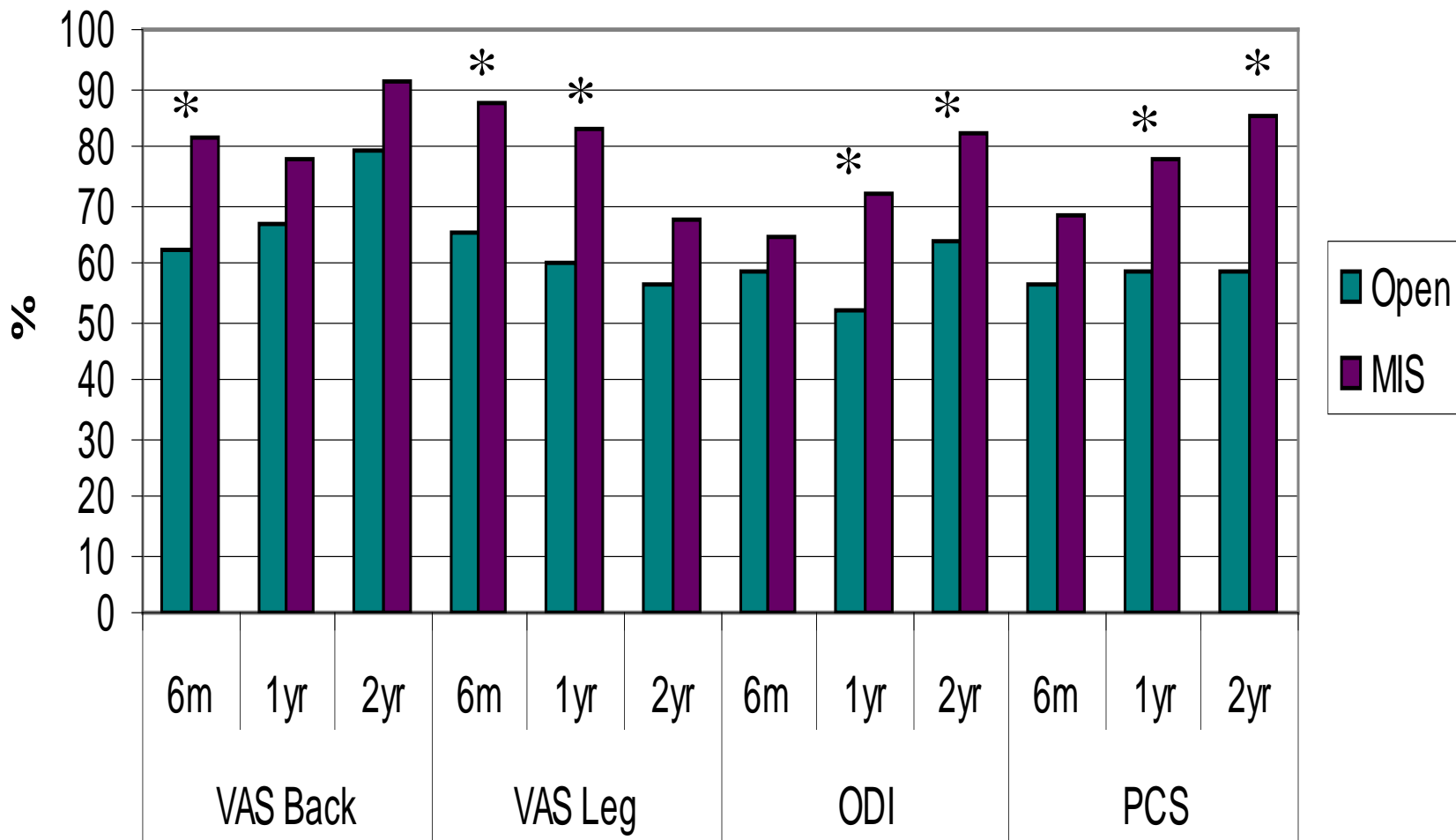
NS



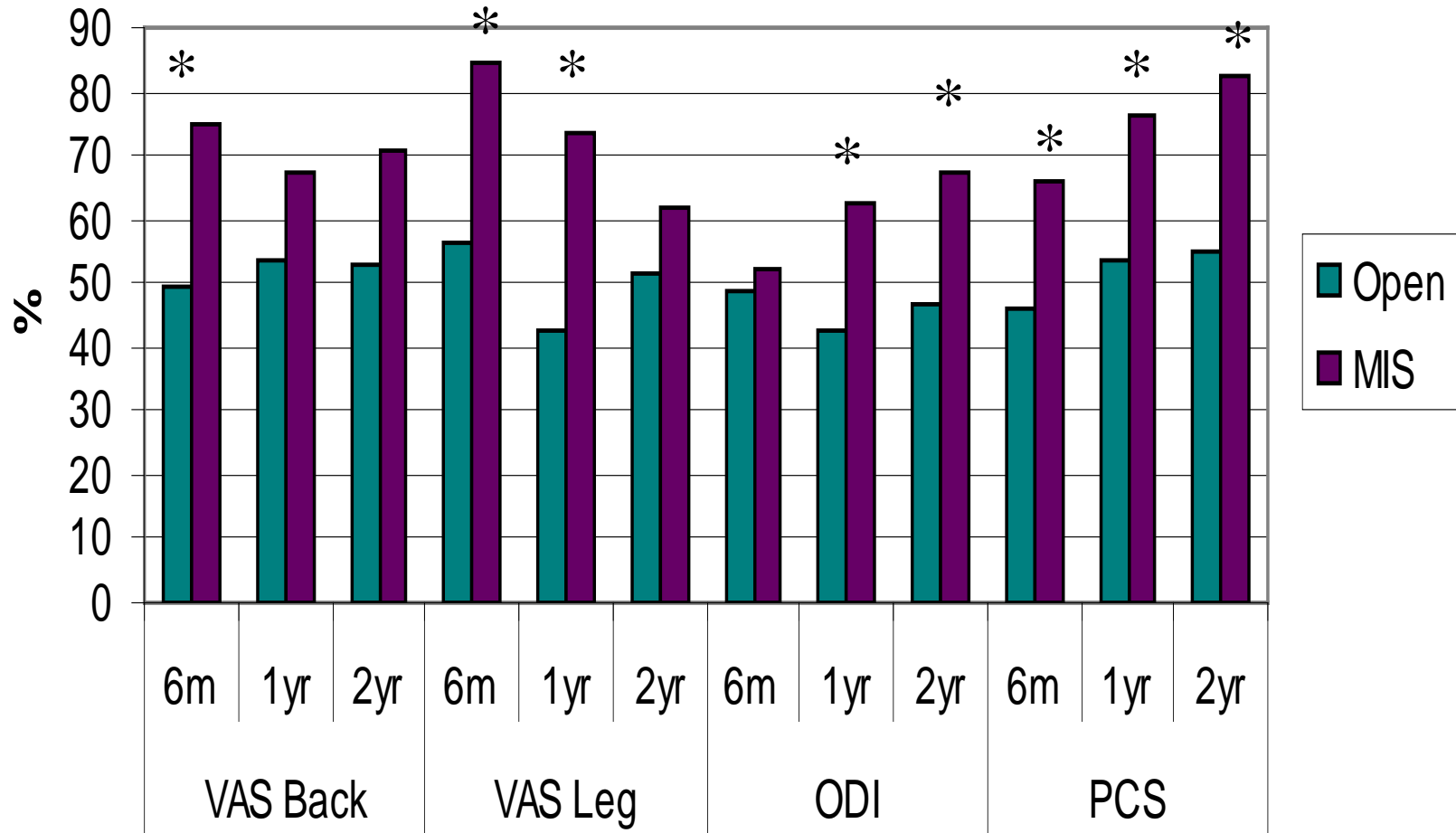
VAS Leg Change from Baseline



% that Reached MCID



% that Reached SCB



Regression Analysis

ONE YEAR

- Dependent variable = ODI
 - **MIS** (p=0.008)
 - **Redo** (p=0.0004)
 - Baseline ODI (<0.0001)
 - Baseline MCS (0.005)

TWO YEAR

- Dependent variable = ODI
 - **MIS** (p=0.03)
 - **Redo** (p=0.01)
 - Baseline ODI (<0.0001)
 - Baseline MCS (0.005)

Age, Sex, BMI, CMI, DS vs IS, and Complications had no independent effect on F/U ODI



Posterior MIS vs. Open Fusion for Spondylolisthesis

- Posterior MIS fusion is a valid surgical treatment option.
- This preliminary report suggest improved outcomes at 1 and 2 years for spondylolisthesis.
- ? Patient selection vs. technique
- ? Generalize to spine community
 - Greater participation (i.e. number of centers) and patient numbers

