Cortical trajectory TLIFs and traditional pedicle TLIFs have similar fusion rates

A Retrospective Cohort Study



EMORY

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## Disclosures

- Dan Refai Stryker Spine, royalties
- Faiz Ahmad DePuy-Synthes and Medtronic, consulting

## **Cortical Trajectory**



- Alternate to traditional pedicle trajectory
  - Medial-to-lateral
  - More cortical bone purchase
  - Avoids trabecular bone
  - Less facet disruption
  - Use shorter/thinner screws

#### pedicle





cortical

Santoni Spine Journal 2009

## pedicle















# **Cortical Trajectory**

• Less lateral dissection and retraction



## **Current state of literature**

### **Biomechanical studies**

- Similar pullout and toggle
  - Santoni Spine Journal 2009
- Contacts higher density bone
  - Mai Spine Journal 2016



### **Clinical studies**

- Similar fusion & functional scores, less periop morbidity
- Lee *Spine Journal* 2015 (RCT n=79)
- Similar fusion, functional outcome, revision rates
  - Sakaura JNS:Spine 2016 & 2017

#### **Excellent review:**

• Delgato Asian Spine Journal 2017



## **Spring GNS: Perioperative Outcomes**

- Three cohorts:
  - cortical TLIF (n=45)
  - pedicle TLIF (35)
  - posteriolateral w/o interbody (38)
- Perioperative variables
  - Reduced OR time
  - Reduced EBL, fewer transfusions
  - Less rehab
- 90-day Outcomes
  - No difference in complications
- Accepted to *Neurosurgery*



# Methods

### Design

- Retrospective
- Patients of Dan Refai
  - 2010-2017
- Two cohorts:
  - Cortical trajectory TLIFs
  - Pedicle trajectory TLIFs

### Outcomes

- Perioperative factors (Spring GNS)
  - Estimated blood loss
  - OR time
  - Length of stay
- Fusion rate
  - Only if imaging beyond 9 months
  - Evaluated by neurosurgeon
- Revisions

# Demographics

	Total	Cortical	Pedicle
Patients	74	49	25
Female/Male	48/26	30/19	18/7
Age (years)	61 ± 11	65 ± 9	54 ± 11
BMI (kg/m)	28 ± 6	28 ± 5	27 ± 4
Smokers	5 (7%)	3 (6%)	2 (8%)
Diabetics	9 (12)	8 (16)	1 (4)
Osteoporosis	6 (8)	5 (10)	1 (4)
Cancer	3 (4)	3 (6)	0 (0)

## **Perioperative Variables**

	Total (n=74)	Cortical (n=49)	Pedicle (n=25)	p-value
One/Two levels	67 / 7	44 / 5	23 / 2	>0.05
EBL (ml)	320 ± 288	248 ± 207	422 ± 354	0.034
OR time (min)	229 ± 70	203 ± 101	265 ± 81	0.002
LOS (days)	$4.4 \pm 1.8$	4.4 ± 2.0	$4.4 \pm 1.4$	>0.05

#### **Cortical had reduced blood loss and OR time**

## Follow-up, fusion, revisions

	Total (n=74)	Cortical (n=49)	Pedicle (n=25)	p-value
Follow-up (mean days)	335 ± 165	305 ± 156	392 ± 184	
>9mo	<b>F</b> 63 (85%)	38 (78%)	25 (100%)	
Fused	L 60 (95%)	38 (100%)	22 (88%)	0.058
Revised?	1	1	0	>0.05

Cortical had better fusion, but did not reach significance One revision was adjacent segment laminectomy

## Discussion

- One RTC has compared to pedicle (Lee Spine J 2015)
  - Similar fusion, reduced OR time & EBL
  - Our results confirm
- Less blood loss: reduced costs, fewer complications
- Less OR time
  - Cortical was not slowed down by intraop imaging
  - Significant time spent in lateral dissection for pedicle
  - Disc space prep for both TLIF groups
- Fusions
  - Similar rate as pedicle trajectory
- Revisions
  - Need longer follow up
- Limitations
  - Spanned 2010-2017
  - Surgeon experience
  - Small cohort





## Conclusions

- Cortical screws require less dissection
  - EBL reduced
  - OR time reduced
- Fusion rate is similar
- Next steps
  - Compare fusion, subsidence, & correction at one year
  - Radiologist independently verify
  - Follow remaining patients >9mo
  - Follow entire cohort out to 2 years for revisions
- Are we ready for a randomized controlled trial?

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