

Adjacent Segment Disease

A Summary from the Cervical Spine Research Society (CSRS)

CSRS 2010 Instructional Workshop
Charlotte, NC

ALD - Very Significant Topic in Spine Surgery

Adjacent Level/Segment Disease (ALD or ASD) - late degenerative changes at disc levels adjacent to fused levels.

- What causes ALD?
 - Nature - Is ALD genetic?
 - Nature - Is ALD caused by surgical intervention?
 - Over 400 participants were polled
 - Not surprisingly - 90% of surgeons voted for “nature” cause
 - However, the panel & literature paint a very different picture

Important Literature Review

- Hilibrand - (JBJS '99) - Most quoted study
 - reported 2.9% ASD per year
 - 26% ASD at 10 yrs
- Garvey - (CSRS '10)
 - 17% at 3 years
 - 19% at 6.5 years
- Gore - (Spine 1984) - 25% long term

ASD Panel

Alan Hilibrand, MD - Jefferson Medical College , Philadelphia, PA

John Rhee, MD - Emory University, Atlanta, GA

Tim Garvey, MD - Twin Cities Spine Center, Minneapolis, MN

Louis Jenis, MD - Tufts Medical School, Boston, MA

Seth Zeidman, MD - Rochester Neurosurgery, Rochester, NY

Alpesh Patel, MD - University of Utah Med School, Salt Lake City, UT

Andrew Cappuccino, MD - Buffalo Spine, Buffalo, NY

Jeffrey Coe, MD - Silicone Valley Spine, San Jose, CA

What is the debate?

- ASD is natural history - Rhee's position
- Is caused by genetics
- ASD is due to surgical intervention - Garvey's position
- Is caused by ACDF or CDR
- ASD is due to imbalance - Jenis's position
- ASD is due to Surgical Technique - Zeidman's position
- ***Is caused by current surgical techniques***

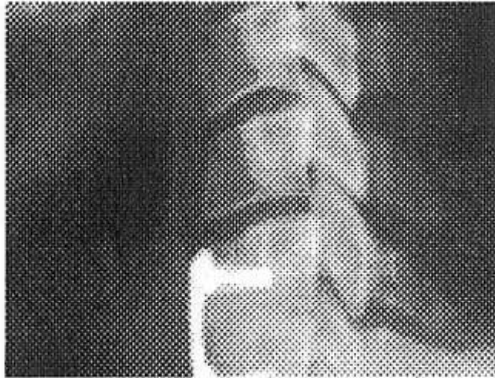
Zeidman - Surgical Techniques Cause ASD

- Stated that “Technical Factors” in ACDF cause ASD
 - Anterior Longitudinal Ligament (ALL) is damaged in ACDF
 - Casper pin placement compromises ALL & Vascular nutrition of VB
 - Cites the “Grading Scale of Ossification” for ALL &/or adjacent disk
 - Plates within <5mm to the disk above or below result in 45.4% ossification of ALL/adjacent level disk
 - Uninstrumented ACDF resulted in only 5% ossification

Grading Scale for Ossification

Park,JB, Choo,YS, Riew, KD - et. al., JBJS 2005

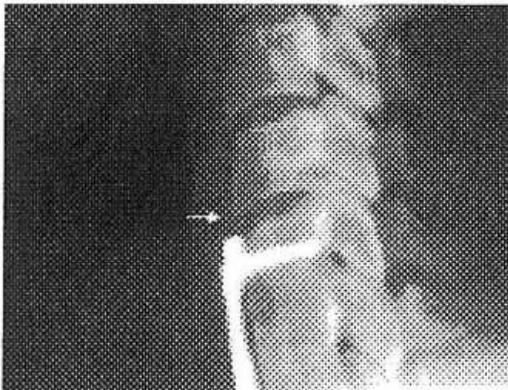
ADJACENT-LEVEL OSSIFICATION Grading Scale



Grade 0: no adjacent-level ossification



Grade 2: Ossification extending across
>50% of the adjacent disc space

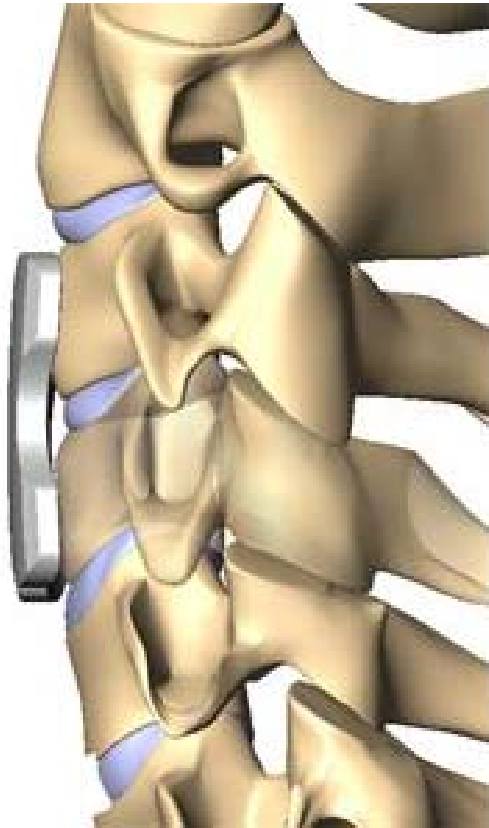


Grade 1: ossification extending across
<50% of the adjacent disc space



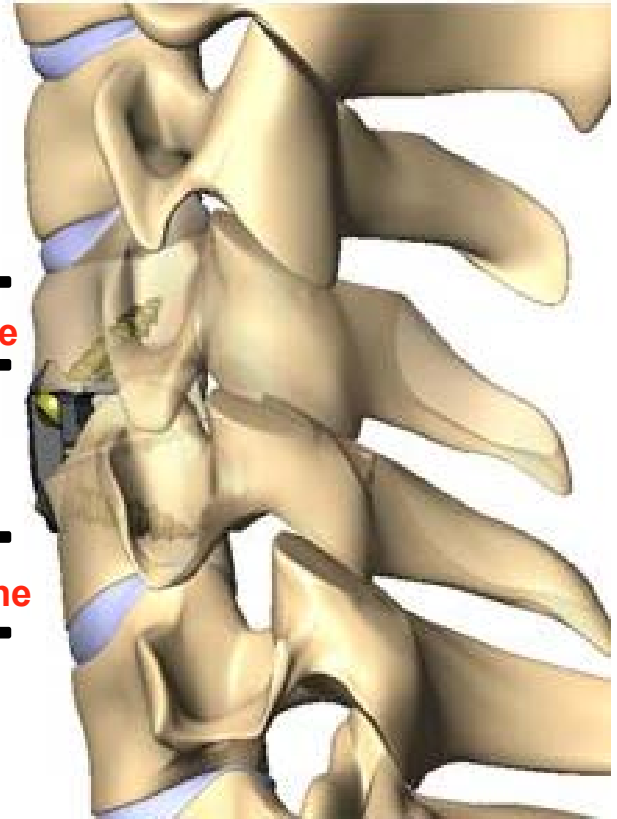
Grade 3: Complete bridging of adjacent
disc space

Plate Placement is Crucial



Safety Zone

Safety Zone

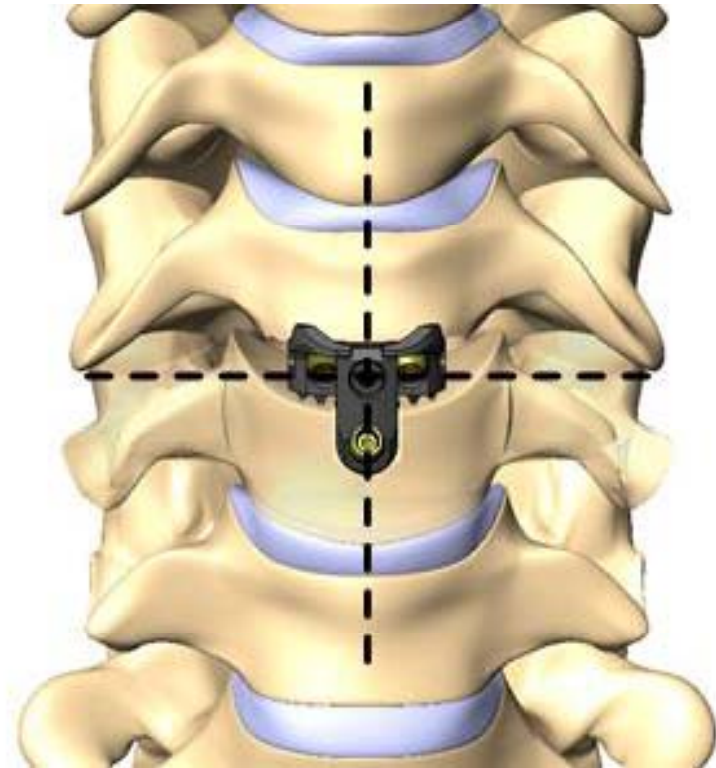
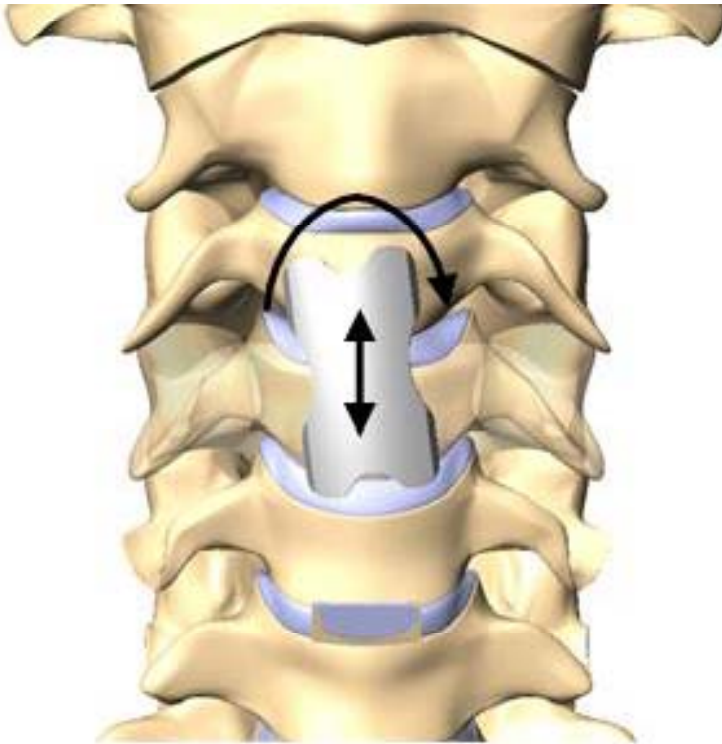


Static Plate

vs. Disc Specific Plate

Traditional Plates:

- * Span 2 or more vertebrae
- * Screw placement is restricted
- * Proper plate sizing is difficult



Recommendations - Avoiding Adjacent Level Ossification

- Use shortest plate possible
- Drill fixation holes close to fused disc space
- Angle drill trajectory away from fused disc both cranially & caudally
- Insert plate at least $>5\text{mm}$ away from adjacent disc space (Riew et. al.,)

