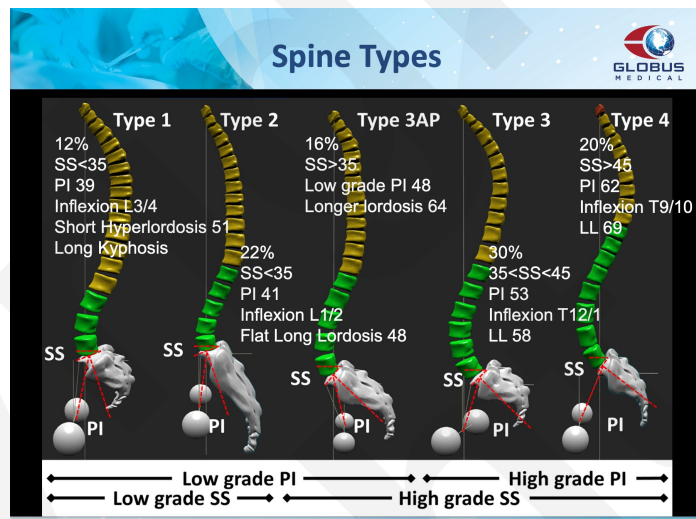


GLOBUS MEDICAL
Life moves us

Debate: Long Vs Short Constructs

Mr M J H McCarthy
Consultant Spinal Surgeon
University Hospitals of Wales
UK

merc



The Winter Paper

Pick Your Poison

CAPTAIN AMERICA: THE WINTER SOLDIER

Surgical Outcomes of Decompression, Decompression With Limited Fusion, and Decompression With Full Curve Fusion for Degenerative Scoliosis With Radiculopathy

Enzor E. Transfeldt, MD, Raymond Topp, MD, Amir A. Mehdood, MD, and Robert B. Winter, MD

85 pts 2yr FU	Decompression Alone	Decompression Limited Fusion	Decompression Full Correction
Number	21	43	21
Age / yrs	76	70	63
Blood loss / ml	108	450	1538
Complication Rate	10%	40%	56%
Revision Rate	10%	33%	37%
ODI change	20%	22%	nil
RM change	insignificant	insignificant	insignificant
Pt Report Success	64%	74%	75%
Pt Satisfaction	73%	67%	57%

Spine SURGERY

SPINE Volume 37, Number 10, pp 884-890
©2012, Lippincott Williams & Wilkins

Does a Long-Fusion "T3-Sacrum" Portend a Worse Outcome Than a Short-Fusion "T10-Sacrum" in Primary Surgery for Adult Scoliosis?

Brian A. O'Shaughnessy, MD, Keith H. Bridwell, MD, Lawrence G. Lenke, MD, Woojin Cho, MD, PhD, Christine Baldus, RN, Michael S. Chang, MD, Joshua D. Auerbach, MD, and Charles H. Crawford, MD

- 58 pts min 2yr FU
- Matched cohort 20 UT vs 38 LT to sacrum
- All improved clinical outcomes
 - UT 30% vs LT 16% periop complications
 - UT 20% vs LT 5% pseudarthrosis
 - UT 20% vs LT 11% revision rate
 - UT 10% vs LT 18% PJK but rarely required op

Is the T9, T11, or L1 the More Reliable Proximal Level After Adult Lumbar or Lumbosacral Instrumented Fusion to L5 or S1?

Yongjung J. Kim, MD, Keith H. Bridwell, MD, Lawrence G. Lenke, MD, Saungchul Rhim, MD, and Young-Woo, Kim, MD

- 125 lumbar deformity over 2 year FU
- Long instrumenetation to L5 or S1
- No significant differences

	T9/10	T11/12	L1/2
No	37	49	39
PJK	51%	55%	36%
Rev Rate	24%	24%	26%

Short-term Morbidity and Mortality Associated With Correction of Thoracolumbar Fixed Sagittal Plane Deformity

A Report from the Scoliosis Research Society Morbidity and Mortality Committee

Justin S. Smith, MD, PhD,* Charles A. Sansur, MD, MHS,† William F. Donaldson III, MD,‡ Joseph H. Perra, MD,§ Ram Mudiyan, MD, MBA,¶ Theodore J. Choma, MD,** Reinhard D. Zeller, MD,†† D. Raymond Knapp, Jr., MD,‡‡ Hilali H. Noordeen, MD,§§ Sigurd H. Berven, MD,¶¶ Michael J. Goytan, MD,*** Oheneba Boachie-Adjei, MD,††† and Christopher I. Shaffrey, MD*

- Age not a factor
- The more you do the more complications there are...

Complication	No. by Type of Osteotomy (%)						
	No Osteotomy, n = 176 (%)	Osteotomy, n = 402 (%)	SPO (n = 135)	PSO (n = 215)	VCR (n = 18)	ADC (n = 19)	Not Specified (n = 15)
Death*	1 (0.6)	2 (0.5)	1 (0.7)	1 (0.5)	0	0	0
Dural Tear†	4 (2.3)	30 (7.5)	9 (6.7)	15 (7.0)	2 (11.1)	2 (10.5)	2 (13.3)
Wound Infection	5 (2.8)	17 (4.2)	3 (2.2)	12 (5.6)	1 (5.6)	1 (5.3)	0
Superficial	2 (1.1)	5 (1.2)	0	4 (1.9)	0	1 (5.3)	0
Deep	3 (1.7)	12 (3.0)	3 (2.2)	8 (3.7)	1 (5.6)	0	0
New Neurological Deficit‡	2 (1.1)	20 (5.0)	5 (3.7)	15 (7.0)	0	0	0
Implant Failure	3 (1.7)	7 (1.7)	1 (0.7)	6 (2.8)	0	0	0
Wound Hematoma	2 (1.1)	7 (1.7)	2 (1.5)	5 (2.3)	0	0	0
Epidural Hematoma	1 (0.6)	7 (1.7)	3 (2.2)	3 (1.4)	1 (5.6)	0	0
Nonfatal PE	0	6 (1.5)	1 (0.7)	4 (1.9)	1 (5.6)	0	0
Pulmonary (not PE)	4 (2.3)	8 (2.0)	2 (1.5)	5 (2.3)	0	1 (5.3)	0
DVT	0	4 (1.0)	0	2 (0.9)	2 (11.1)	0	0
Visual Loss	1 (0.6)	0	0	0	0	0	0
Other	7 (4.0)	32 (8.0)	11 (8.1)	16 (7.4)	3 (16.7)	1 (5.3)	1 (6.7)
Total§	30 (17.0)	140 (34.8)	38 (28.1)	84 (39.1)	11 (61.1)	6 (31.6)	3 (20.0)

**There were a total of 170 complications in 132 patients.*

Indications Sacral +/- Iliac fixation in ASD

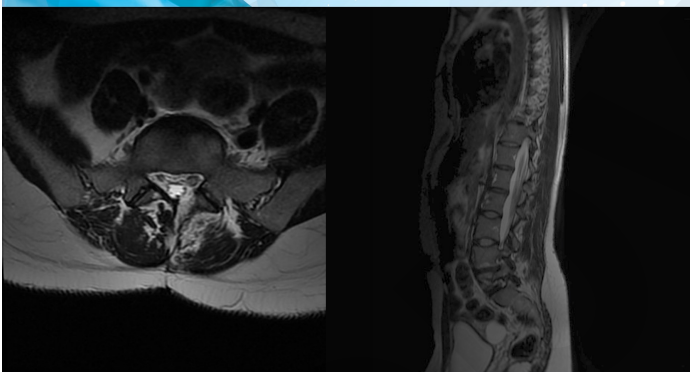
- Significant L5/S1 obliquity
- L5/S1 instability (lysis / prior decompression)
- L5/S1 stenosis requiring decompression
- Advanced DDD L5/S1
- Incomplete correction of sagittal balance
- Osteoporosis / bone stock insufficiency

Long Adult Deformity Fusions to L5 and the Sacrum A Matched Cohort Analysis

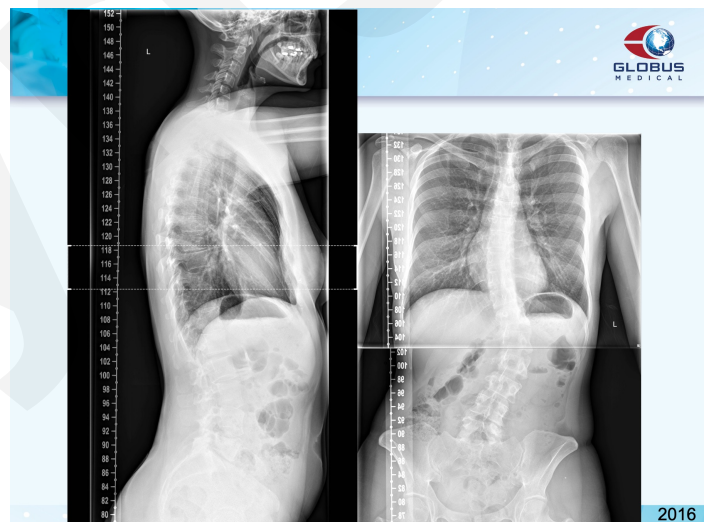
Charles C. Edwards II, MD, Keith H. Bridwell, MD, Alpesh Patel, MD, Anthony S. Rinella, MD, Annette Berra, BA, and Lawrence G. Lenke, MD

- L5 - 27 pts vs S1 - 12 pts matched ASD
- 67% L5 group developed advanced L5/S1 disc degeneration and a forward shift in sagittal balance
- 75% Sacrum group required more initial and revision procedures and higher incidence of complications
- Patient self-assessed functional outcomes similar for the 2 cohorts.

Case 1 - 37 year old female



2016

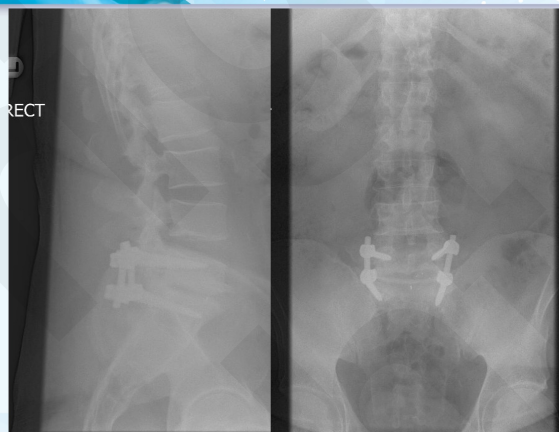


2016

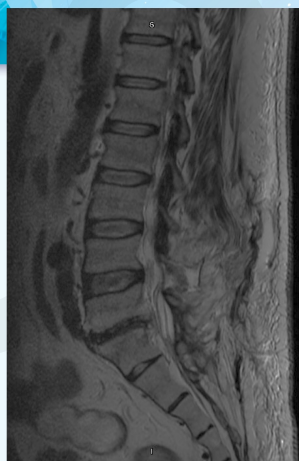
Case 2 – 57 year old male



2011



2012



2013



Weight Bearing
R



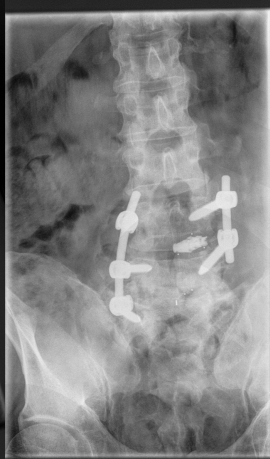
Weight Bearing
R

2014

WEIGHT BEARING
R



WEIGHT BEARING

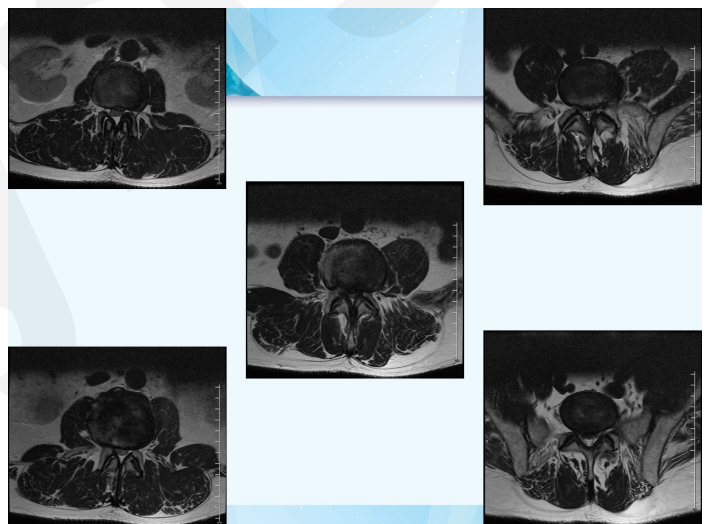
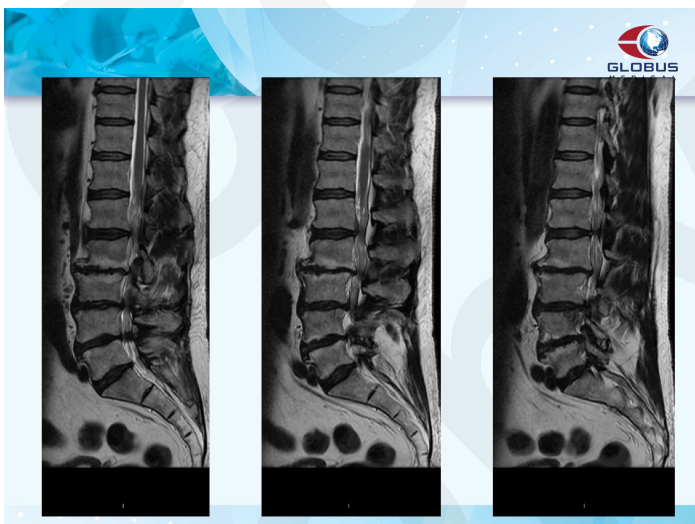
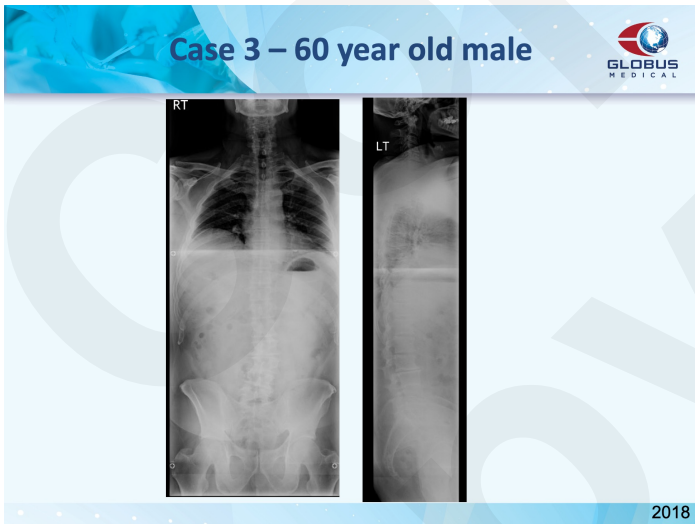
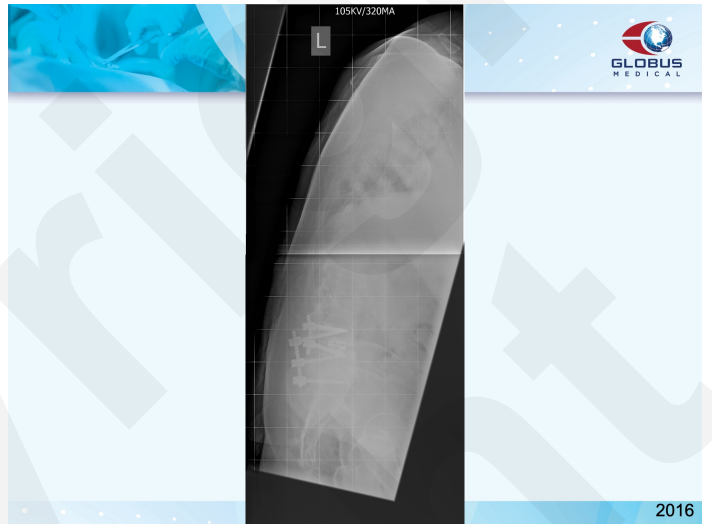


2016



R

2016

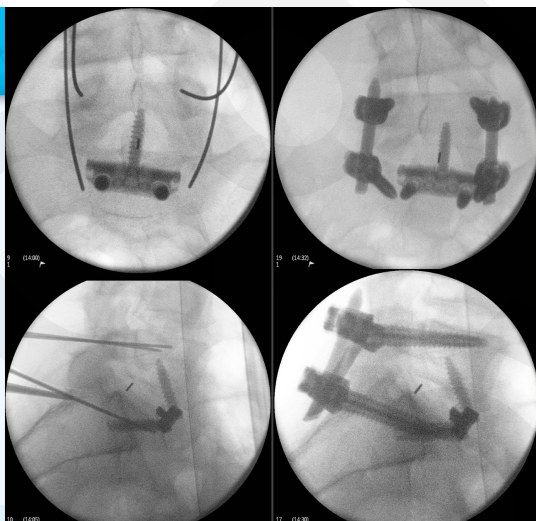




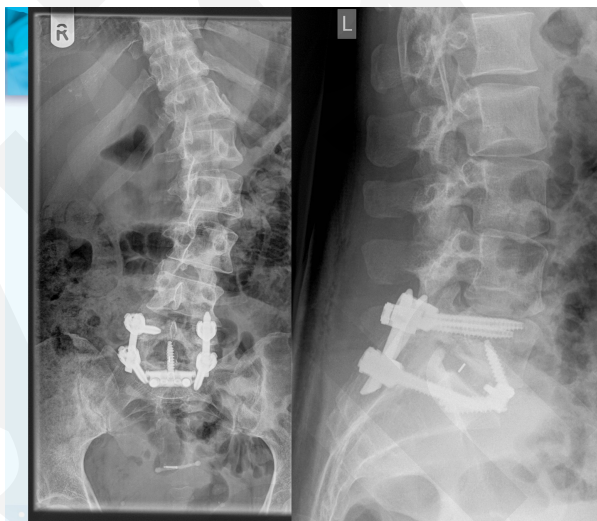
Case 1



2016



2016



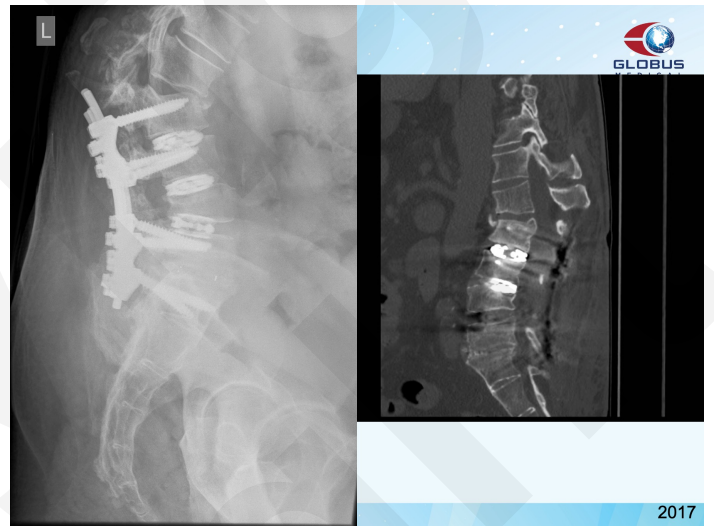
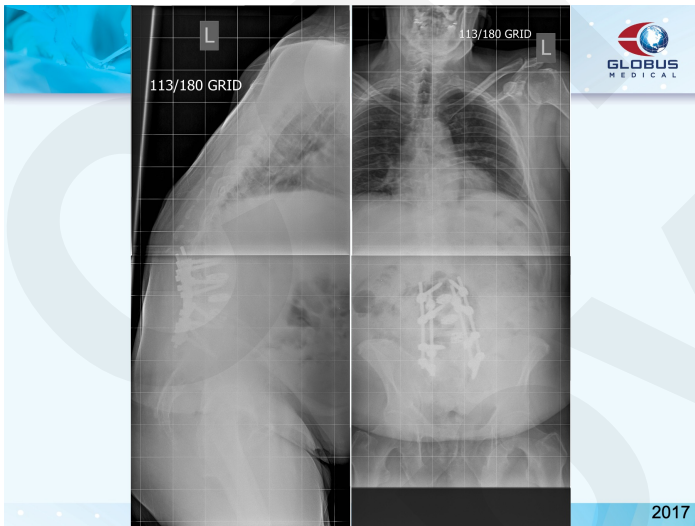
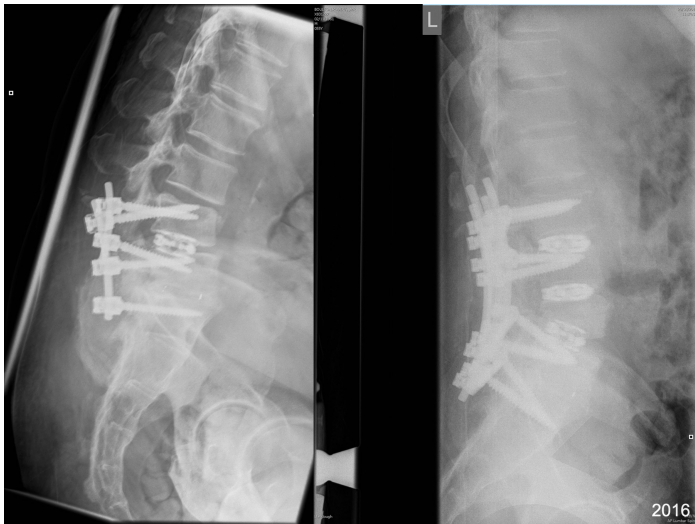
2016

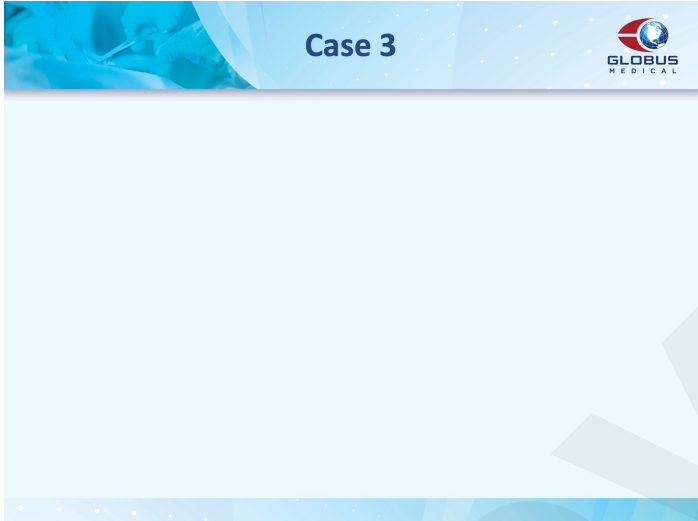
But...



2019

Case 2





Parameters	Results	Subgroups	Scores	Preoperative Planning			
Age Factor ①	59		0	Current Angle	Calculated 'Ideal'	Correction Required	
RPV ①	-25.6°	Severe Retroversion	3	SS	17.0°	42.6°	25.6°
RLL ①	-47.3°	Severe Hypolordosis	3	L1-S1	17.0°	64.3°	47.3°
LDI ①	141%	Hyperlordotic Maldistribution	3	L4-S1	24.0°	39.2°	15.2°
RSA ①	27.6°	Severe Positive Malalignment	3	GT	40.0°	12.4°	-27.6°

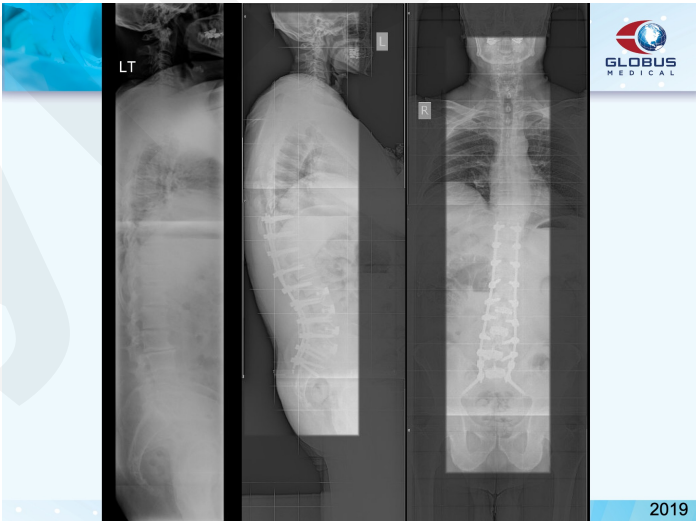
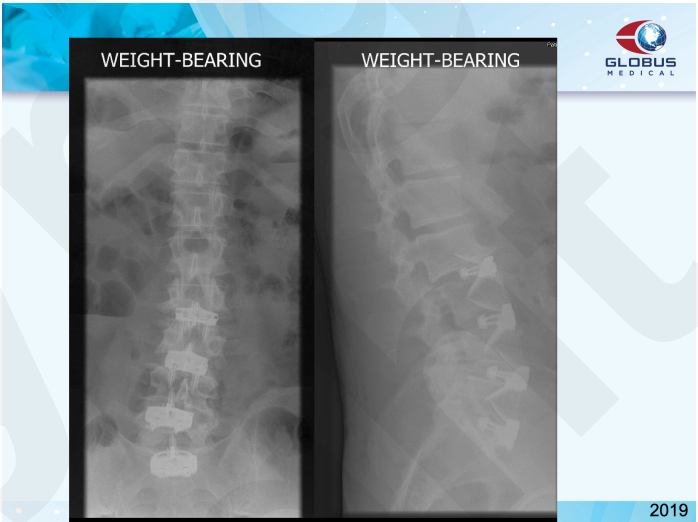
① GAP Score 12
Severe Disproportion

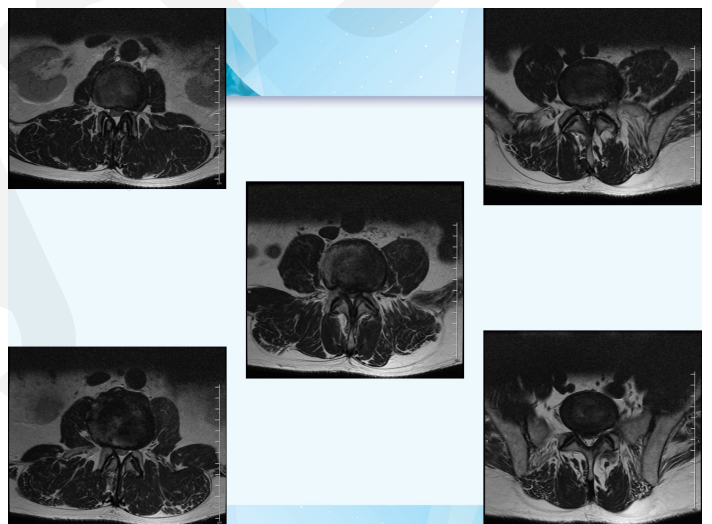
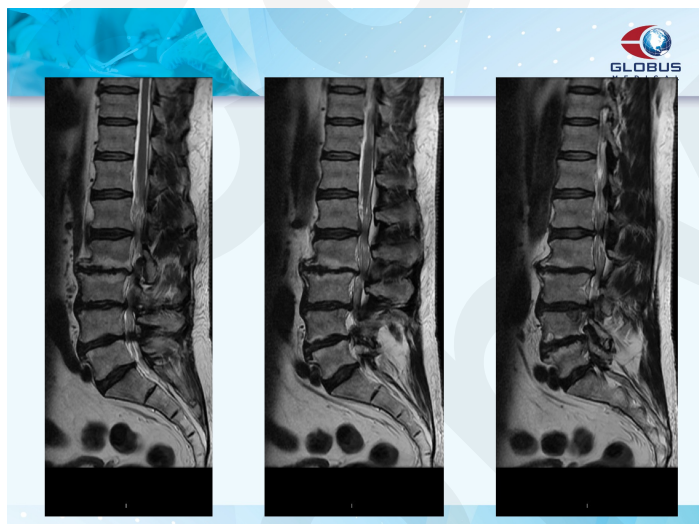
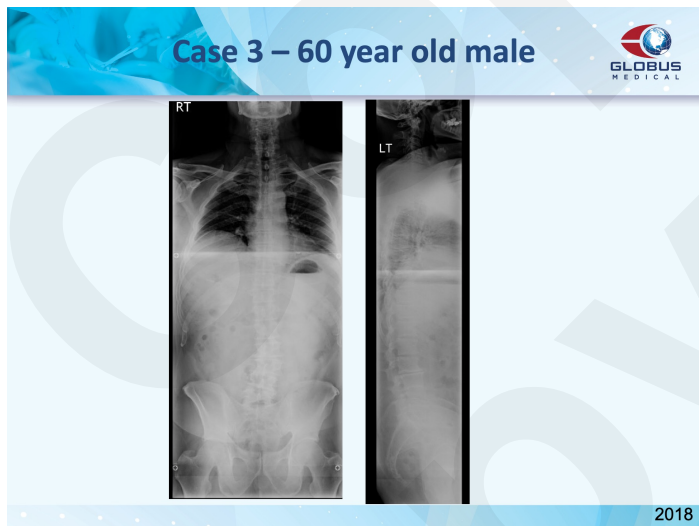
R. T. TRAWERS

The GAP score is a continuum of states that provides an individualized indication of pelvic version, magnitude and distribution of lumbar lordosis, and global spinopelvic alignment to assess disproportion compared with the calculated "ideal" for any given subject.

Setting surgical goals in the sagittal plane on the basis of the proportional indices reflected by the GAP score may decrease the rate of mechanical complications. [PubMed Link](#)

The GAP score comprises the relative pelvic version (RPV= Measured minus Ideal SS), relative lumbar lordosis (RLL= Measured minus Ideal LL), lordosis distribution index (LDI= L4-S1 lower-lordosis / L1-S1 total lordosis x100), relative spinopelvic alignment (RSA= Measured minus Ideal GT), and an age factor (<60 vs ≥60).





www.gapcalculator.com

Measurements

Age

Pelvic Incidence (PI) ⓘ

Sacral Slope (SS) ⓘ

L1-S1 Lordosis ⓘ

L4-S1 Lordosis ⓘ

Global Tilt (GT) ⓘ

The Global Alignment and Proportion (GAP) score is a PI-based individualized method of analyzing the sagittal plane that effectively predicts mechanical complications of surgery for adult spinal deformity.

Calculate

Clear

Parameters

Results

Subgroups

Scores

Age Factor ⓘ

59

0

RPV ⓘ

-25.6°

Severe Retroversion

3

RLL ⓘ

-47.3°

Severe Hypolordosis

3

LDI ⓘ

141%

Hyperlordotic Maldistribution

3

RSA ⓘ

27.6°

Severe Positive Malalignment

3

① GAP Score 12

Severe Disproportion

R. Traweek

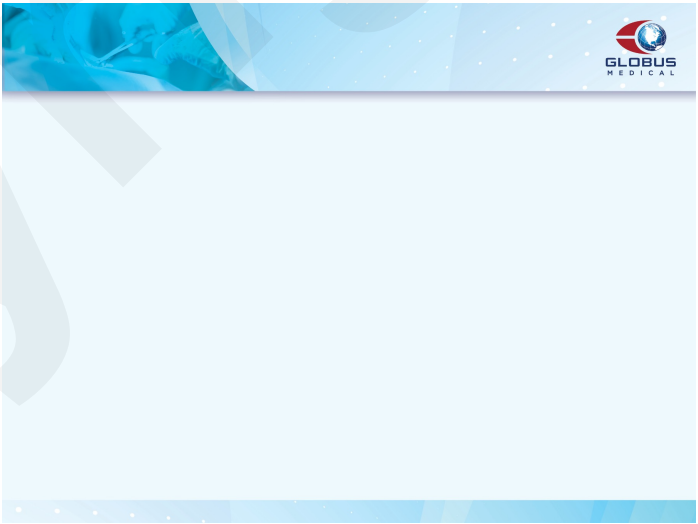
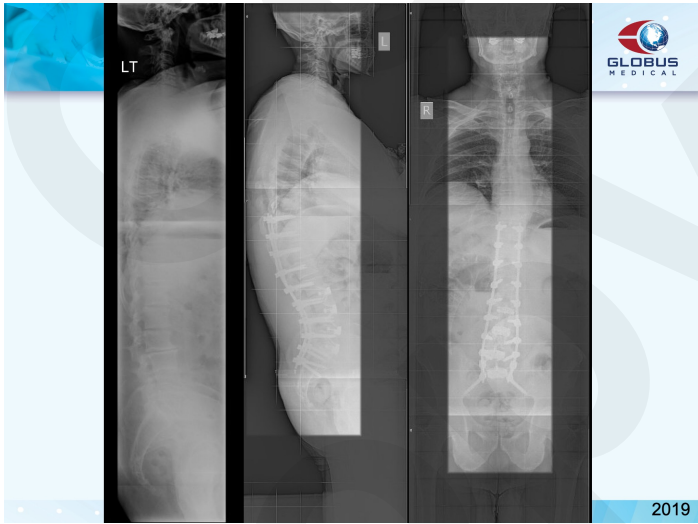
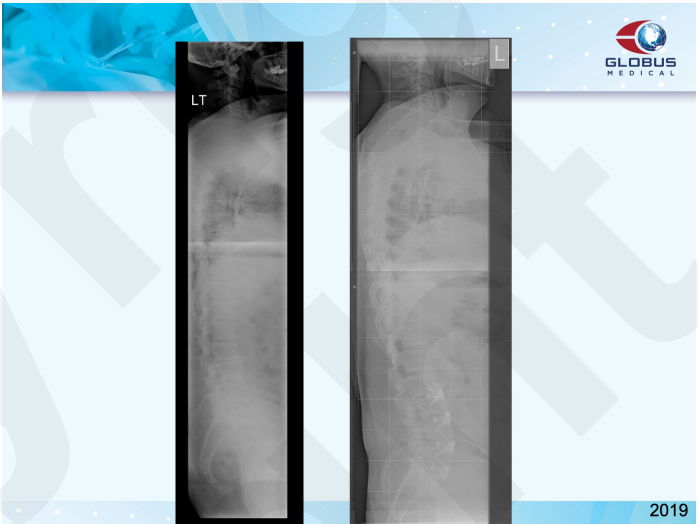
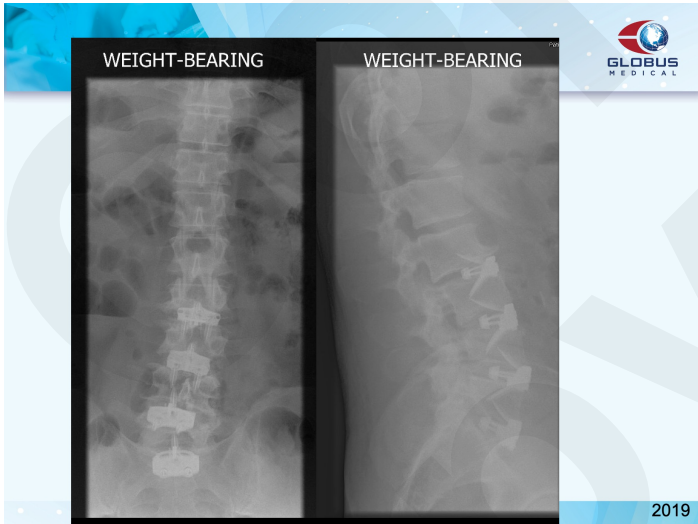
Preoperative Planning

	Current Angle	Calculated 'Ideal'	Correction Required
SS	17.0°	42.6°	25.6°
L1-S1	17.0°	64.3°	47.3°
L4-S1	24.0°	39.2°	15.2°
GT	40.0°	12.4°	-27.6°

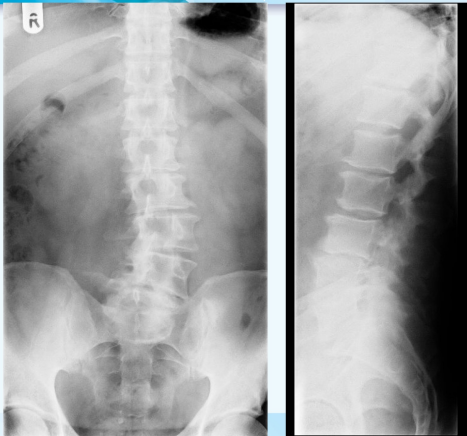
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Setting surgical goals in the sagittal plane on the basis of the proportional indices reflected by the GAP score may decrease the rate of mechanical complications.

[Fullmed Link](#)



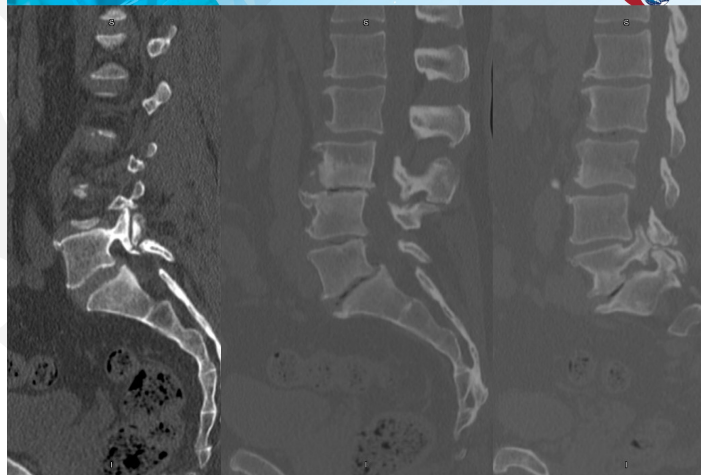
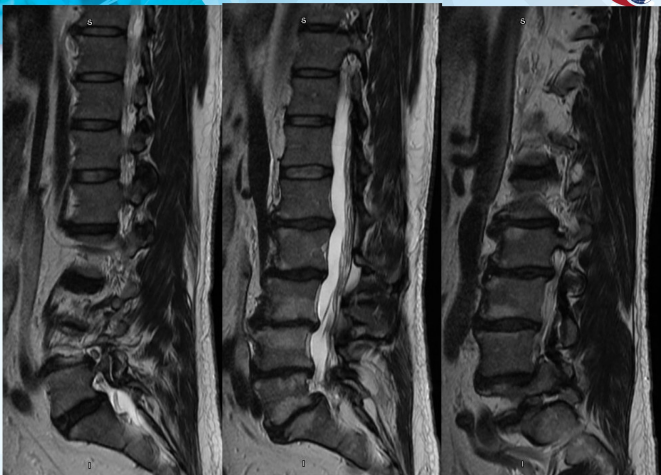
Case 4 – 50 year old male



2015



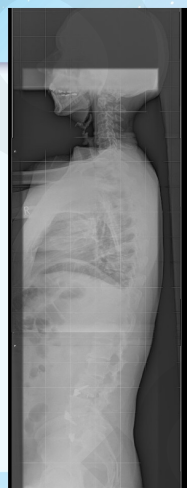
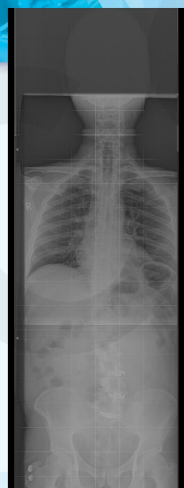
2015





WEIGHT-BEARING

2016



2016

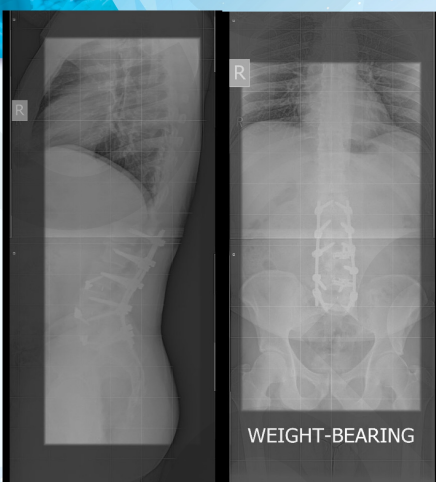


WEIGHT BEA



L
WEIGHT B

2016



R

WEIGHT-BEARING

2017



2018

