Complex Spine Surgery: Intraoperative Perspectives

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Objectives

1. Describe and illustrate intraoperative surgical goals through imaging, intraoperative photos, and video.
2. The case examples will educate non-surgical staff on complex spinal interventions that patients undergo to treat various spinal pathologies.
3. This in turn will provide improvement in overall patient care by now knowledgeable staff who are involved in the patient's postoperative care.
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Palomar 6th Annual Ortho/Spine Symposium
September 27, 2019
Overview

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Background

• High School: Irvine High
• College: UCLA
• Medical School: Northwestern University
• Residency: USC Neurosurgery
• Fellowship (enfolded): USC Spine Center
• Fellowship (postgrad): Columbia Spine Hospital

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Pham (PGY-4)
Background
National Trends in the Surgical Management of Lumbar Spinal Stenosis in Adult Spinal Deformity Patients.

Al Jammal OM, Delavar A, Hirshman BR, Wall AR, Kazzaz M, Maguire KR, Pham MH.

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1 Department of Neurological Surgery, University of California San Diego, San Diego, CA.

Transpedicular lag screw placement in traumatic cervical spondylolisthesis: Case report and systematic review of the literature.

Bakhsheshian J, Sizdahkhani S, Ohiorhenuan I, Buchanan IA, Strickland B, Pham MH.

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Bilateral vertebral artery occlusion after cervical spine fracture dislocation.

Strickland B, Lewis CS, Pham MH.

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Evaluation of C2 pedicle screw placement via the freehand technique by neurosurgical trainees.

Pham MH, Bakhsheshian J, Reid PC, Buchanan IA, Fredrickson VL, Liu JC.
Posterolateral cervical transpedicular corpectomy for the surgical management of metastatic tumor.

Pham MH, Bakhsheshian J.

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A Novel Lumbar Motion Segment Classification to Predict Changes in Segmental Sagittal Alignment After Lateral Interbody Fixation.


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Intraoperative Perspectives

• Case Vignettes
Deformity –
Fixed Cervical Kyphosis

• C7 pedicle subtraction osteotomy
Deformity – Fixed Cervical Deformity
Deformity – Fixed Cervical Deformity
Deformity – Fixed Cervical Deformity

C2-C7 SVA: 5.8 cm
Deformity – Fixed Cervical Deformity

compensatory lordosis
Deformity – Fixed Cervical Deformity
Plan:
- C7 pedicle subtraction osteotomy (PSO) with C2-T4 PSF
Bivector Traction
flexion rope
Deformity –
Fixed Cervicothoracic Kyphosis

T2 extended pedicle subtraction osteotomy
Deformity – Fixed Cervicothoracic Deformity

13.4 cm
Plan:
- T2 extended PSO, revision C2-pelvis PSF (C2-T7, L3-pelvis)
15 lbs traction weight

extension rope

gardner wells tongs

flexion rope
release after osteotomy
compression closure of osteotomy
contouring rod placement
placing rod
final construct
preop 6.9 cm
postop 2.3 cm
Deformity –
Sagittal Imbalance, Flat-Back Syndrome

T4-pelvis deformity correction with navigated spinal robotics
Deformity – Sagittal Imbalance, Flat-Back Syndrome
Deformity – Sagittal Imbalance, Flat-Back Syndrome
**Plan:**
- T4-ilium PSF, L4-S1 TLIF, T11-L3 PCO, removal T10-L4 Harrington rod; with navigated robotic assistance
Navigated robotics
navigated robotics
Spinal Oncology –
Metastatic Spinal Cord Compression

L1 corpectomy for metastatic cancer
Neoplastic Pathologic Fracture
Neoplastic Pathologic Fracture
Plan:
- L1 posterior corpectomy with cage placement, T11-L3 posterior spinal fusion
traversing nerve root
transpedicular corpectomy corridor
psoas muscle
exiting nerve root
traversing nerve root
Intraoperative Perspectives

Intraoperative Spinal Anatomy
C3 screw

T5 screw

C8 nerve root

T1 nerve root

T2-4 ribs removed

T1-3 corpectomy defect

T1-3 corpectomy defect

T1-3 corpectomy defect

T1-3 corpectomy defect
C3 screw

C8 nerve root

T1 nerve root

T2-4 ribs removed

T5 screw

T1-3 corpectomy defect
C3 screw
C8 nerve root
T1 nerve root
T2-4 ribs removed
T5 screw
T1-3 corpectomy defect
T1-3 corpectomy defect
cervical spinal cord
tumor inside spinal cord
opening up spinal cord for decompression
duraplasty graft
expansive duraplasty
lysis dorsal arachnoid web
cauda equina nerve roots

subdural blood
IG: “neurosurgery in 30 seconds”
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I CAN SHOW YOU THE SPINE...
Thank you
spine is cool
even my kid thinks so
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