Surgical Management of Cervical Kyphosis

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Sagittal Balance
How to Measure

- Measure distance between
  - C2 SVA (centroid or dens)
  - C7 SVA (posterior superior corner)
  - 1.5 cm is desired

- Sagittal imbalance is poorly tolerated

- Consider T1 Tilt
  - May have to go quite distal to normalize T1

Chin Brow Angle

- Horizontal gaze is the one invariable variable that bipeds seek to establish despite pathology
  - Chin-Brow Vertical Angle (CBVA)
  - Vertical line compared
  - To line between chin and eyebrows
  - X-ray taken with knees and hips fully extended

Sagittal imbalance is poorly tolerated.
Mid-Cervical Spine
- Cervicothoracic junction
- Outside Vertebral artery territory, can use posterior closing wedge osteotomies

CT Scout or MRI show flexibility
X-rays are standing. CT/MRI is supine.

CT Scan to determine (Not MRI)

Fused Segments
METHODS FOR CORRECTION OF FLEXIBLE MID-CERVICAL KYPHOSIS

Posterior Only

Anterior Posterior

Anterior Only

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**Posterior Only Setup**

- Traction
- Posterior burr out facets
- Instrument as needed
- Reposition head using different ropes

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**Posterior Only**

PREOP INTRAOP
Cervical Spondylolisthesis and Mid Cervical Kyphosis (Flexible)

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Preop X-Ray

MRI: myelomalacia C3/4, C4/5, C5/6, C6/7

MRI: myelomalacia C3/4, C4/5, C5/6, C6/7
1. Anterior grafting to restore alignment and neuroforaminal height
2. Posterior Instrumented fusion with laminectomy

Cervical Spondylolisthesis Reduced
Foraminal Height Restored
Posterior Laminectomy

Before and After
Flexible Mid Cervical Kyphosis
Anterior treatment included

Assess Flexibility / autofusion

Anterior Releases ± Traction
- ACDF 4-5 Levels
  - Kyphosis facilitates
- If chin is on chest
  - 4 days postop traction
Caution with Caspar Pins

- A is flexible
- B is Rigid
- Release disc then distract pins to hold position

Video on method of releasing Auto-fused Disc Anteriorly

Use of a Plate to enhance Lordosis
Caution with plate anterior only

Comparison using AP methods

Fixed Mid Cervical Kyphosis 360° or 540°
Method:
-- Anterior Corpectomy and release to Vertebral Artery
-- Posterior Laminectomy Osteotomy
-- Anterior Definitive Fixation
Step 1:
- Perform Standard corpectomy
- 16 mm wide
- Measure cage

Alternative is use diamond burr

Burr out lateral wall

Place Cage ± Plate (top screws only)
- Maintain length / neuroforaminal height

Posterior burr out facets
- Place cobb into neofacet and twist to hear a pop

Reposition head

May go to front to place inferior screws
Cervicothoracic Flexible Posterior Only, normalize T1 Tilt

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Assess Flexibility
- CT or MRI are done supine and will give indication

Assess T1 Tilt

Plan to stop at Horizontal Thoracic vertebra
- T8 or T9

Assess Global Sagittal Balance

Before and After

Cervicothoracic Fixed
C7 or T1 PSO

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Assess T1 Tilt
Prior thoracic fusion

PATIENT POSITION
- Seated or prone

PATIENT WASHINGTOM UNIVERSITY
Method

- 3 Fixation points below osteotomy (T4)
- 4-6 above
- Skeletonize pedicle
- Skilled assistant moves head

Correction
End