Coronal Cervical Deformity
- Is There a Role for Osteotomies?

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No Disclosures
Coronal Cervical Deformity

Is there a role for osteotomies?

- Correction required
  - Severe deformity
  - Progression expected during growth
  - Insufficient compensation

- Rigid deformity
  - Synostosis
  - Bar formations

Osteotomy should be considered
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Problems

- Often associated with other anomalies (Klippel Feil)
- Few mobile segments
- Less possibility for compensation (coronal plane)
- Head obliquity
- Trunk shift to the convexity of the deformity
- Compensatory curves in the thoracic spine
- Risk of instability and myelopathy
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Klippel-Feil/ mobile segments

HV C3a, Synostosis Occ./C1, C2-C3a, C5/6

- few mobile segments
- less possibility for compensation
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Trunk balance

Sagittal plane

14y, m.

Coronal plane

15y, m.
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Trunk balance

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Compensatory curves

HV C3a and C7
- compensatory thoracic scoliosis
- trunk shift to the convex side
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Goals

- Correction of the deformity in frontal and sagittal plane
- Sacrifice as less mobile segments as possible
- Resection of the hemivertebra and the adjacent disc
- Wedge osteotomy within the fused area
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Technique

- **posterior approach:**
  - resection of the posterior parts of the HV
  - decompression/ exposure of spinal cord, nerve roots, vertebral artery

- **anterior approach:**
  - resection of the anterior parts of the HV
  - exposure of the vertebral artery
  - reduction (and instrumentation)

- **posterior approach (if necessary):**
  - posterior instrumentation

K.V., f., 4 y. Hemivertebra C2a left, semi-segmented

- Posterior-anterior osteotomy C2,
  resection of the hemivertebra and the adjacent rudimentary disc,
  fusion C2/3
K.V., f., 4 y. Hemivertebra C2a left, semi-segmented
F.K., 8y, f. HV C2a + C4, atlantoocc. synostosis, bloc C5/6

- Posterior-anterior-posterior osteotomy C3, resection C4, fusion C2-5
- Postop. C5 root lesion, resolved with shorter screw
A.E., 42y, f. Synostosis Occiput-C1, hemivertebra C2, status post instrumentation C1-3

- Wedge osteotomy of C2
- Visualisation of the vertebral artery
- Resection of the odontoid to prevent encroachment of the brain stem
First surgery:

- transoral approach
- visualization of the vertebral artery
- resection of the vertebral body of the hemivertebra C2
- resection of the odontoid
Second surgery:

- posterior approach
- instrumentation Occiput to C4
- visualization of the vertebral artery
- resection of the lamina and pedicle of the hemivertebra
- compression at the convex side / closing the gap
A.S., 6y f. Klippel-Feil, hemivertebra C7, concave bar and rib synostosis T1-3
A.S., 6y f. Klippel-Feil, hemivertebra C7, concave bar and rib synostosis T1-3

- Transpedicular screw placement
- Resection of the laminae, visualization of the spinal cord and the nerve roots
- Resection of the hemivertebra C7
- Wedge resection of T1
- Insufficient mobility, resection of the concave rib heads/rib synostosis
- Compression via the instrumentation
Osteotomy?

K.L. 4y, m.
Rot.-lux. C1/2, muscular torticollis, insufficient treatment

Sectioning of the sternocleidomastoideus muscle, halo extension
Osteotomy?

B.C. 8y, f.
Rot.-lux. C1/2, minor trauma one year ago

• Halo extension
• insufficient correction
• anterior release
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- Conclusion -

There is a role for cervical osteotomies!

- Correction of rigid deformities in frontal and sagittal plane
- Preservation of mobile segments
consider early correction before rigidity increases and osteotomy is necessary!

But…

C.L., 7y, f.
hemivertebra
C4 left

5 mos.
6 yrs.
7 yrs.
pop.
Thank you