

How does the 7-letter-code work?

Step 1

You get a concise case presentation consisting of

- History
- Score of degenerative cervical myelopathy (DCM) according to **mJOA**
- **Comorbidities** enclosing generic (ASA) and bone quality affecting diseases (rheumatoid arthritis [RA], osteoporosis, and ankylosing spondylitis [AS])

Eur Spine J
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ORIGINAL ARTICLE



**The modified Japanese Orthopaedic Association scale:
establishing criteria for mild, moderate and severe impairment
in patients with degenerative cervical myelopathy**

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Demo-case

Male, 69 yrs

Myelopathy: EMS grade I, 12 (JOA 11/17)

Comorbidities:

- Myocardial infarction 2003, treatment with implantation of stents
- Arrhythmia absoluta, treatment with warfarin
- Hypertonia & hyperlipemia, carotid arteries plaques
- Diabetes mellitus Typ II, oral antidiabetic drugs
- Sleep-apnea
- Overweight (BMI = 43)
- No osteoporosis
- No RA
- ASA 3-4

Step 2

The 7-letter code (7LC), a decision making algorithm for the surgical treatment of multi-level degenerative cervical myelopathy, analyzes 7 parameters concerning:

- Location (1) & extension (2) of the spinal cord impingement
- Alignment (3) & Instability (4) of the C-spine
- Generic (5) & bone quality affecting (6) comorbidity
- Specific circumstances (7) recommending a combined surgical approach

Compression

1. Location
2. Extension

● Gray as stone

Spine

3. Alignment
4. Instability

● Brown as bone

Morbidity

5. <>ASA 3
6. Bone diseases
(Osteoporosis, RA, AS)

● Red as alarm

C-Modifier

7. K-line neg.,
Corpectomy > 2
level

● Blue changes all

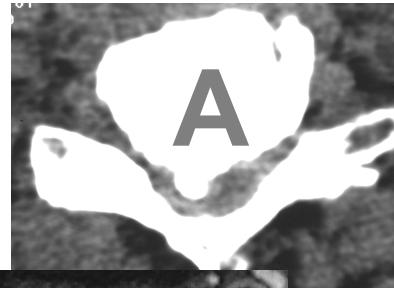
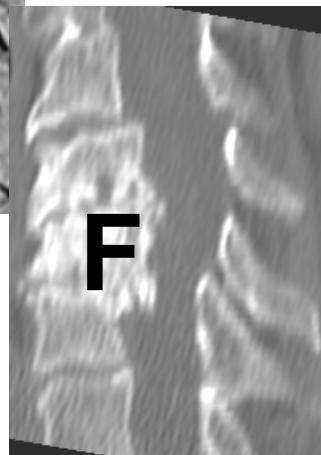
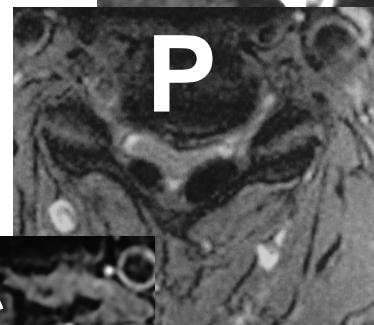
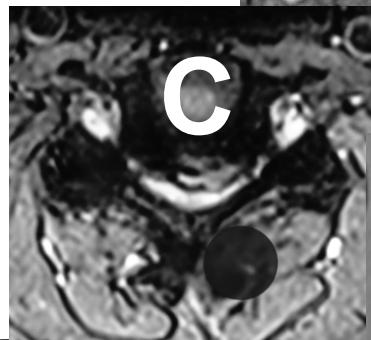
Compression

Location

- Ant
 - hill type (A)
 - flat (F)
- Post
- Comb

Extension

< 3
3
> 3



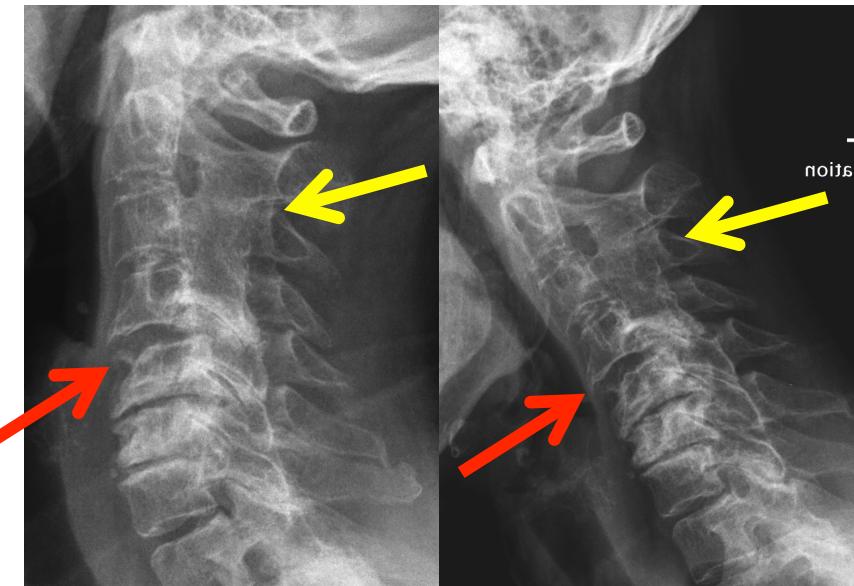
Spine

Alignment

- lordotic
- kyphotic → flex or $< 10^\circ$
→ fixed or $> 10^\circ$

Instability

$< 6 \text{ mm}$
 $> 6 \text{ mm}$



Morbidity

- ASA < 3
- ASA \geq 3
- Relevant osteoporosis (history of spontaneous # or T- score worse than -2.5),
R(heumatoid) A(rthritis)
A(nkylosing) S(pondylitis)

The C(ombined approach) modifier

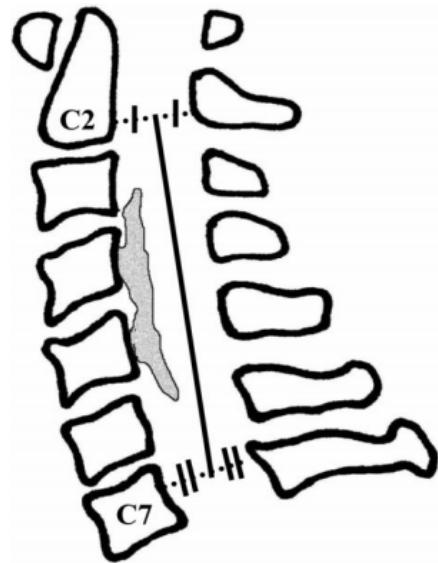
The previously shown descriptors lead to the 7LC decision aid.
Additionally, the following parameters suggest to consider a 360°approach.

“K-line(–)” type compression

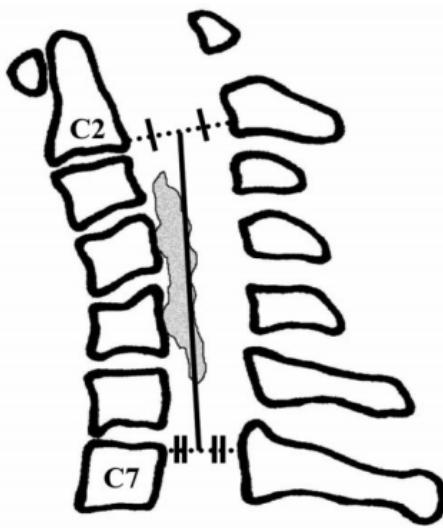
Corpectomy ≥ 2 level

Fujiyoshi et al (2008) A new concept for making decisions regarding the surgical approach for cervical ossification of the posterior longitudinal ligament. Spine 33(26):990-993

The K-line



K-line(+)



K-line(-)

The K-line is a straight line that connects the midpoints of the spinal canal at C2 and C7 on the lateral cervical radiographs or on the midsagittal T2WI.

K-line (+): Osteophytes/OPLL do not exceed the K-line

K-line (-): Osteophytes/OPLL do exceed the K-line

A K-line(-) compression usually requires a combined surgical approach, sometimes as back-front option.

Fujiyoshi et al (2008) A new concept for making decisions regarding the surgical approach for cervical ossification of the posterior longitudinal ligament. Spine 33(26):990-993

Overview of the 7LC

The analysis of 7 parameters

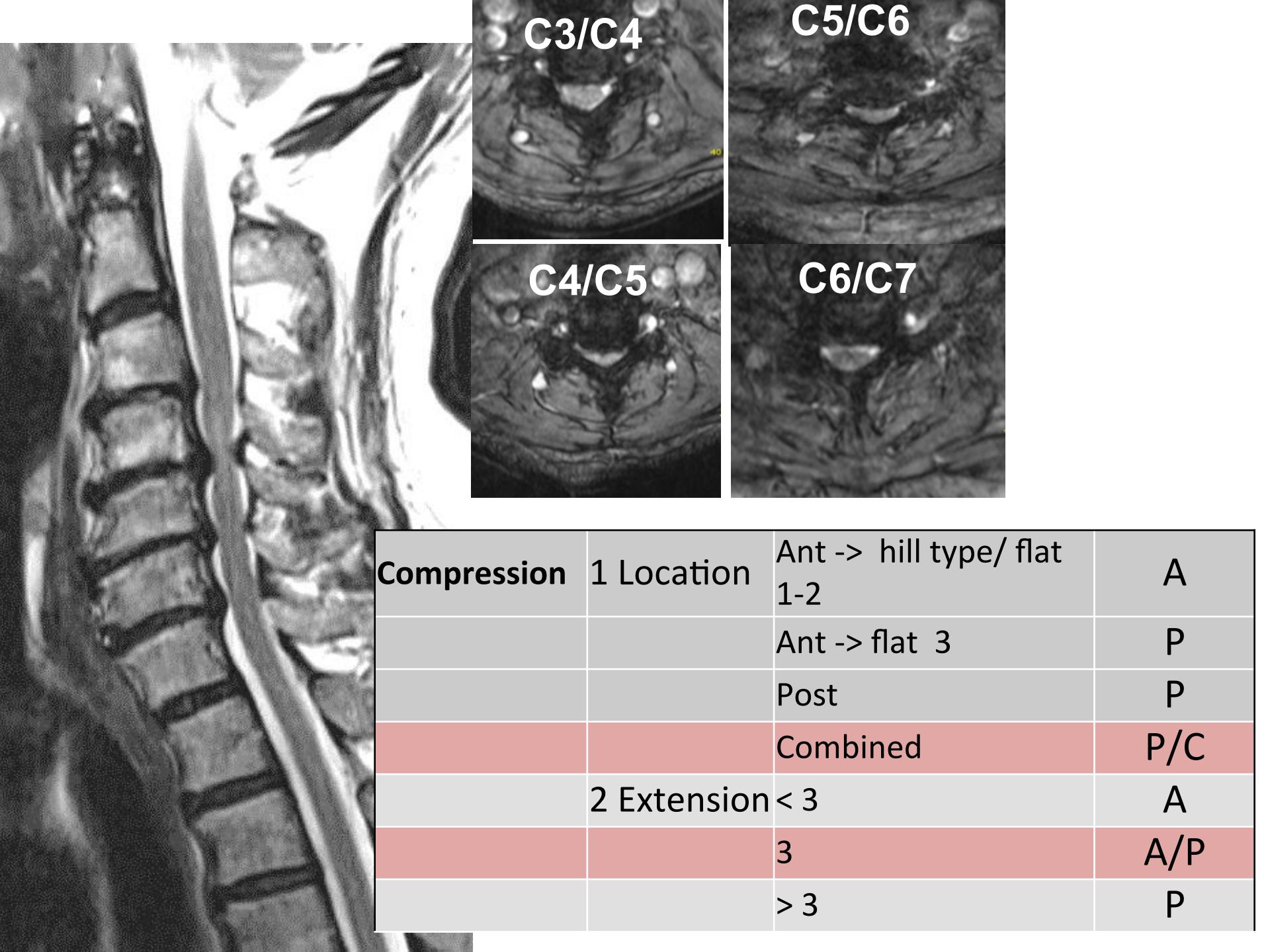
C₂S₃M₂

leads to the choice out of 19 different surgical options.

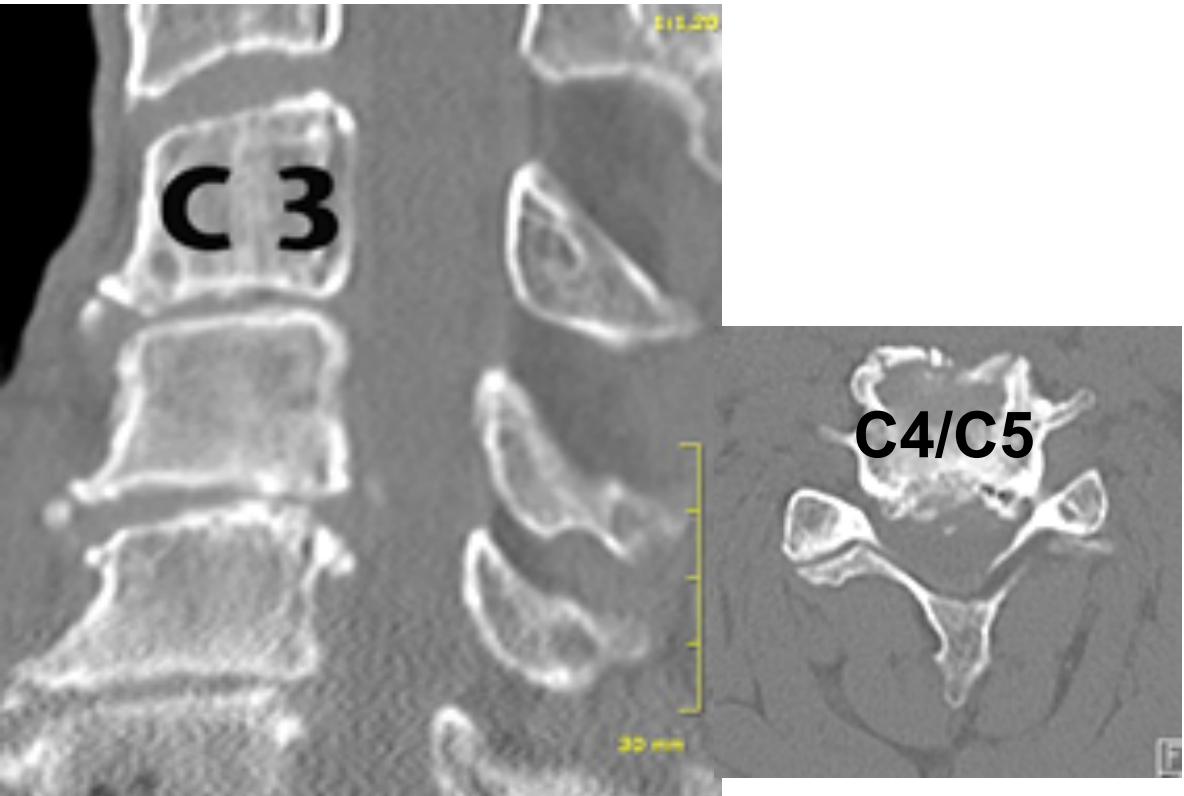
Additional consideration of the **C** (ombined approach) **Modifier** makes the final decision.

Compression	1 Location	Ant -> hill type/ flat 1-2	A
		Ant -> flat 3	P
		Post	P
		Combined	P/C
Spine	2 Extension	< 3	A
		3	A/P
		> 3	P
		3 Alignment	A/P
		Kyphotic -> flex or < 10 °	A/P
		Kyphotic -> fix or > 10°	A/C
		4 Instability	A/P
		< 6 mm	A/P
Morbidity	5	> 6 mm	C
		ASA < 3	A/P
		ASA ≥ 3	P
		6 bone diseases	P/C
C- modifier	7	Relevant Osteoporosis	
		Rheumatoid Arthritis, Ankylosing Spondylitis	
		K-line neg. type of compression	
		Corpectomy > 2 level	C

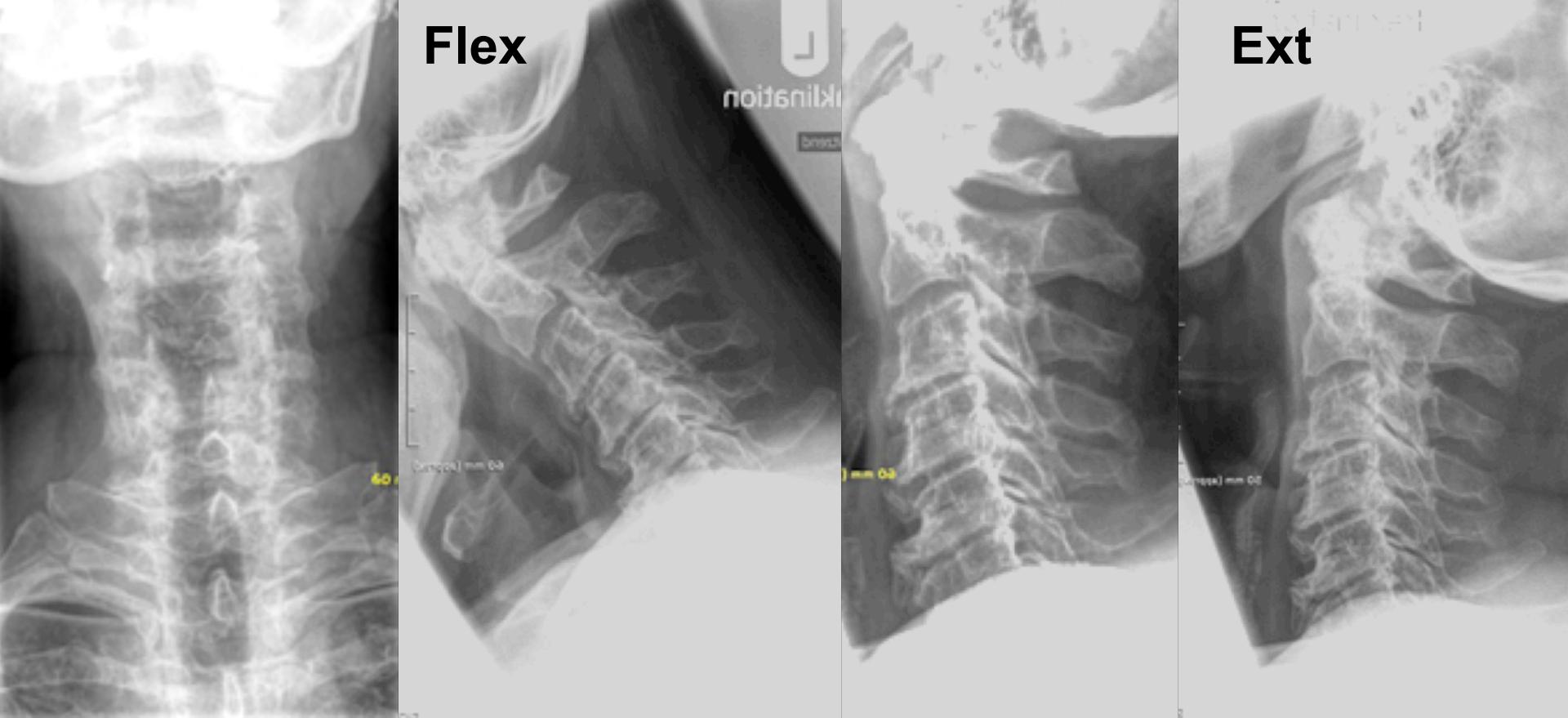
Demo-case



Compression	1 Location		
	Ant -> hill type/ flat 1-2		A
	Ant -> flat 3		P
	Post		P
	Combined		P/C
	2 Extension < 3		A
	3		A/P
	> 3		P



Compression	1 Location	Ant -> hill type/ flat 1-2	A
		Ant -> flat 3	P
		Post	P
		Combined	P/C
	2 Extension < 3		A
		3	A/P
		> 3	P

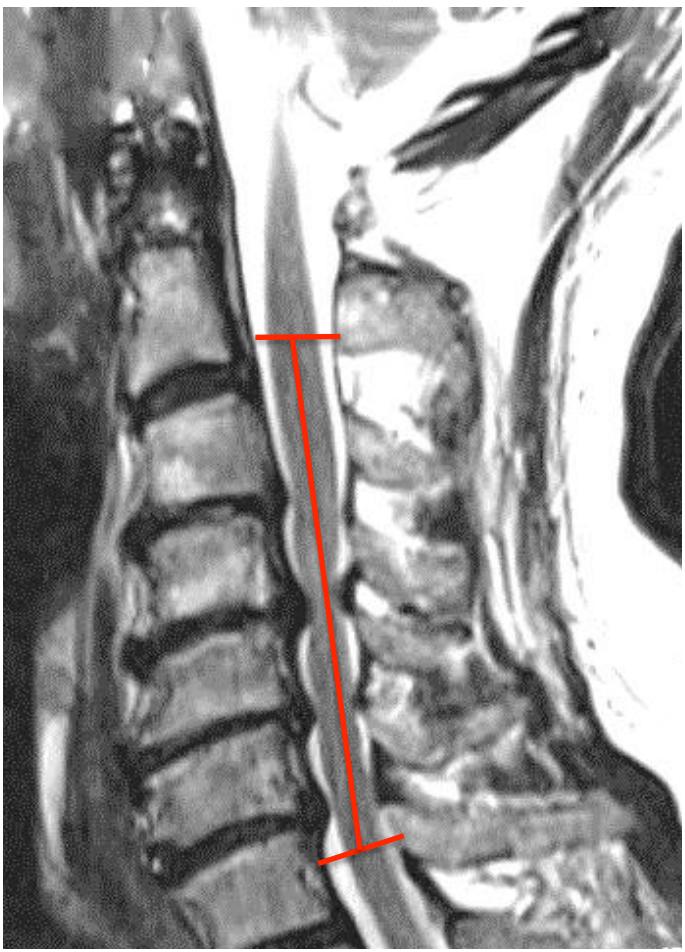


Spine	3 Alignment		A/P
		Kyphotic -> flex or < 10 °	A/P
		Kyphotic -> fix or > 10°	A/C
	4 Instability	< 6 mm	A/P
		> 6 mm	C

Comorbidities:

- Myocardial infarction 2003, treatment with implantation of stents
- Arrhythmia absoluta, treatment with warfarin
- Hypertonia & hyperlipemia, carotid arteries plaques
- Diabetes mellitus Typ II, oral antidiabetic drugs
- Sleep-apnea
- Overweight (BMI = 43)
- No osteoporosis
- No RA
- ASA 3-4

Morbidity	5	ASA < 3	A/P
		ASA \geq 3	P
	6 bone diseases	Relevant Osteoporosis Rheumatoid Arthritis, Ankylosing Spondylitis	P/C



K-Line negative

C- modifier

7

K-line neg. type of
compression
Corpectomy > 2 level

C

Overview of the 7LC

The analysis of 7 parameters

C₂S₃M₂
leads to the choice out of 19 different surgical options.

The majority of letters, suggests in this case an posterior approach.

Additional consideration of the **C** (ombined approach) **Modifier** makes the final decision.

Compression	1 Location	Ant -> hill type/ flat 1-2	A
		Ant -> flat 3	P
		Post	P
		Combined	P/C
Spine	2 Extension	< 3	A
		3	A/P
		> 3	P
		3 Alignment	A/P
	4 Instability	Kyphotic -> flex or < 10 °	A/P
		Kyphotic -> fix or > 10°	A/C
		< 6 mm	A/P
		> 6 mm	C
Morbidity	5	ASA < 3	A/P
		ASA ≥ 3	P
	6 bone diseases	Relevant Osteoporosis	
		Rheumatoid Arthritis, Ankylosing Spondylitis	P/C
C- modifier	7	K-line neg. type of compression	
		Corpectomy > 2 level	C