Cervical spinal surgery

Compare and contrast indications for anterior and posterior approaches to the cervical spine for the treatment of degenerative disease

Posterior approaches include foraminotomy for radiculopathy and laminectomy w/wo instrumentation and laminoplasty for myelopathy. Anterior approaches include disectomy, disectomy and fusion, disectomy and disc replacement and corpectomy with fusion. The selection of the approach depends on the location of the compression, age and the characteristics of the spine. **Patient with anterior pathology and patients with loss of lordosis or cervical Kyphosis are better approached from the front**.

Posterior approach

	Advantages	Disadvantages
1.	Less surgical effort in exposing multiple levels	Does not address anterior pathology adequately (OPLL, anterior central disc or osteophyte)
2.	Frequently do not require fusion, instrumentation as part of the procedure and therefore does not accelerate adjacent level disease	Potential for spinal instability. Kyphotic deformity (swan neck deformity) (lateral mass fusion)
3.	Little risk to major blood vessels, no risk to the esophagus and recurrent laryngeal nerve	More postoperative neck pain
4.	No need for bone graft with its associated pain and morbidity	

Anterior approach

	Advantages	Disadvantages
1.	Good access to anterior osteophyte and central disc OPLL	
2.	Does not result in instability	Adjacent level disease from fusion. Potentially can be reduced by disc replacement (no long term studies)
3.	Less postoperative pain	Little risk of injury to major blood vessels, esophagus and recurrent laryngeal nerve

Compare and contrast the indications for anterior cervical disectomy with and with out interbody fusion:

Anterior cervical disectomy can be performed

1. With fusion using the following techniques with or without plating (plates are used for more than 2 level disectomy). There is no evidence that plating improves the fusion rate for single level discectomy, however there is class 3 evidence for improved fusion rate for 2 or more levels discectomy

A. Smith Robinson:
B. Cloward
C. Synthetic cages and bone graft or osteoconductive (calcium triphosphate)

These techniques require the use of bone graft with its associated pain and morbidity. Potentially fused spine increases the mechanical stress on adjacent levels leading to the development of degenerative changes in the disc above and below.

2. Without interposition graft (avoids the complications of the graft , but results in foraminal collapse with potential root compression and recurrent radiculopathy
3. Disc replacement: theoretically avoids the risk of adjacent level disease. On the other hand, it is expensive and the long term result is not known.

Discuss arthrodesis vs. arthroplasty in the spine:

Arthrodesis = fusion using bone graft +- instrumentation can reduce the abnormal movements in the motion segment and theoretically decreases the degenerative changes in the facet joint at that level. This operation is successful in treating patients with radiculopathy and myelopathy. The long term results of this procedure are known and it can be done with minimal risk of complications.

On the other hand arthrodesis results in increased biomechanical stress at the levels above and below the fusion which can exacerbate the degenerative changes at these levels leading to disc prolapse and or stenosis. Arthroplasty (Bryan disc and others) can in theory maintain relatively normal movements of the motion segment after disectomy and in theory prevents the development of adjacent level disease, however the prosthesis is expensive, the long term results of arthroplasty are not known and it requires more dissection which may result in potential increase in the risk of complications (recurrent laryngeal paresis, esophageal injury)