

Collaborative Case of the Month- May 2007

Collaborative Case of the Month

This Case of the Month was chosen because it addressed a failed original attempt and had a challenging treatment algorithm with limited solutions. The advice of other SpineConnect surgeons helped with stabilization and other case details. The use of the [DePuy UNIPLATE Anterior Cervical Plate System](#) was helpful in avoiding previous broken screws and enabled solid fixation.

C7-T1 pseudoarthrosis

Urgent case posted by Dr. JY on 7 April 2007

Question:

This patient has a complex history. He has had a previous C3-7 anterior arthrodesis in the early 90's. He then underwent a multilevel laminectomy from C3-7 complicated with MRSA, multiple washouts and antibiotics with closure by secondary intent. This was done in mid 90's. As a result, his paraspinal muscles are diastased in the midline and it appears that skin and thin tissue cover the laminectomy defect. I tried to perform an ACDF at C7-T1 one year ago, but as you can see this failed. I have him scheduled for a revision ACDF, and posterior fusion C7-T1 with screws. Any thoughts or advice would be most appreciated. Thanks.

Specifics:

Spine Region: cervical C7 - T1

Primary Dx: Pseudoarthrosis

Injury Type: degenerative - adult

Pertinent Positives: bilateral numbness in arms, non-dermatomal; pain numbness in left arm, non-dermatomal; chronic neck pain

Previous Surgery:

1. cervical spine surgery
2. spine fusion: C7 - T4
3. spine decompression: C3 - T1

Other Medical History: infection

Work Related: no

Gender: m

Age: 56

Smoker: no

Medications: steroids, Lyrica

Allergies: NKDA

Date of surgery: 1/09/07

A/P X-Ray



Flexion X-Ray



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Here is the review chain as posted (chronologically)

Comment from: Dr. NW | 4/7/07 10:48 PM

That looks like a tough case. I agree with your plan, although you may want to consider having plastic surgery participate to rotate a muscular flap if you are concerned about the tissue coverage over the posterior hardware. In this setting, I would also discuss the use of BMP as an off-label application (both anteriorly and posteriorly) given the repeat pseudarthrosis.

Comment from: Dr. PS | 4/8/07 9:13 AM

Maybe consider longer fixation (anterior higher into fusion mass and posteriorly as well) to better control the level. Stopping at T1 anterior is logical but might be better off getting to T2 or T3 posterior. I would definitely use InFuse BMP. Good luck.

Comment from: Anonymous | 4/8/07 10:03 AM

I think PS is correct in his suggestion. This patient has bad sagittal balance with a resultant kyphotic deformity complicated by a long lever arm, limited posterior tension band and a failed jxnal level. To me, the biomechanics predicted failure given the variables. I think this guy needs a lot more support in his construct and I think the anterior deformity has a lot to do with it. BMP is nice but it won't replace good construct design to offset the forces this patient will have at this junctional level. I also think an argument can be made for doing osteotomies anteriorly and posteriorly to correct a bit of the deformity, but I think you have to fuse him longer posteriorly no matter what you do. How far is answered by what you choose to do with his previous anterior fusion mass. If you correct his sagittal balance a bit anteriorly you may be able to limit the posterior fusion to T3, but if you address only the jxnal area and accept the long kyphotic lever arm I think you have to fuse longer with BMP. Tough case. Let us know what you do.

Comment from: Dr. JYL | 4/8/07 11:15 AM

I would also agree with longer posterior fixation given his sagittal balance. I would consider at least C4 or 5 to T3, not much downside to including the previously fused levels. You gain much more fixation with additional levels. It think its matter of time he will be back with probs at upper cervical C2-4 levels.

Comment from: Dr. DR | 4/8/07 5:26 PM

In addition to what I said on the phone, other options include: osteotomy @4-5 +/- 5-6 and fuse C2-T3 or so circumferentially. Or you can go minimalistic and go back in anteriorly, redo ACDF @ C7-T1 and even include T1-2, if you want (it looks reachable on plain x-rays). Use a 12mg BMP kit and it will heal most of the time. In situations like this, biomechanics overwhelms biology and even 4mg of BMP

Lateral X-Ray



Sagittal CT



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does not work. You could also use a halo. You could also just do the posterior. Reapproximate the muscles and fuse from C2-T3 or just do C5-T3. The C7-T1 should fuse and the plate will not move any more, since it is only attached at the top and there are no more forces to make it back out further. As long as you get a good facet fusion, the anterior will fuse by itself. Good luck JY.

Comment from: Dr. MM | 4/8/07 10:00 PM

I agree with revision ACDF. I would recommend a surface demineralized (DBM) cortical allograft spacer (osteotech graftech) to enhance fusion rather than infuse, due to concerns about BMP reactions in the anterior cervical spine. If you do use infuse then some people put patients on a medrol dose pak for 5 days.

I think Dr. DR makes an excellent point about adding the T1-T2 ACDF, and anterior osteotomies at C4-5 and C5-6. They will certainly help your sag deformity reduction. I would personally stage the anterior and posterior procedures if you add osteotomies to this case.

For the posterior, I would recommend going from C4 to T2 or T3 to truly get control of this kyphotic deformity. You will get a better construct with more points of fixation. If you go long, then you can leave out the C7 pedicle screws because they make connecting to the construct difficult.

Osteotech grafton matrix (DBM) strips are also good if using Infuse even if the posterior cervical spine is worrisome.

Plastics consult for the posterior - no doubt.

I definitely would love to see a follow-up x-ray when you are done.

Comment from: Dr. PN | 4/8/07 10:25 PM

What a tough case. I agree in principle with all that has been said. Rather than do an osteotomy, I would perform an ACF at C3-4. You can use the same skin incision, but perform a "new" approach at the higher level, rather than extend the entire approach to that level. If you can get to the T1-T2 disk space, I would recommend including that.

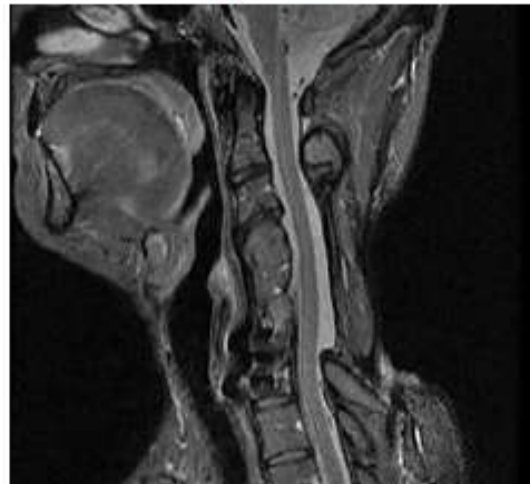
Posteriorly, I would recommend C3-T3. If the anterior went well, I would not stage it.

I would have plastics on standby, but if you raise a thick flap, due to the vascularity of the region, I think you will be surprised how well it will approximate.

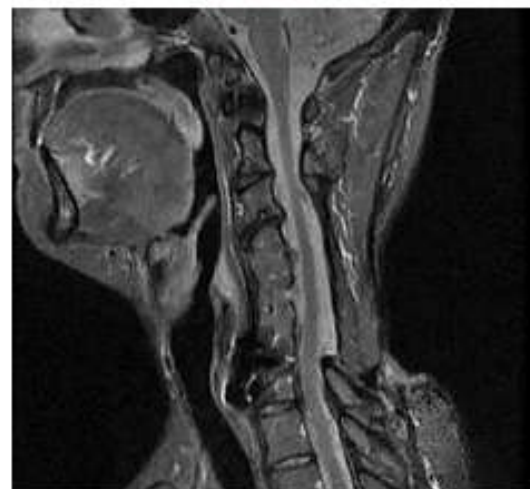
Make sure the patient is not expecting the "stars and the moon".

Good luck, my friend.

Sagittal MRI



Sagittal MRI II



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Comment from: Dr. AP | 4/9/07 11:09 AM

The idea of a revision ACDF at 7-1 and T1-2 sounds good. I would back that up posteriorly C5 to T2 (you could go higher to C4, but I wouldn't want to even chance disrupting the C3-4 facet joints. Foraminotomies as needed. Plastics can develop flaps from what is left of his paraspinals laterally. They may also consider a trapezial flap. I would have them see the patient before surgery. This may also change how you drape out posteriorly.

rhBMP-2 sounds good. I don't think I would use as high of a dose as has been suggested, just enough sponge to fill the graft material anteriorly.

Postop, I would use a cervical collar. If you are less than thrilled with your anterior reconstruction, a CTO is an option. If you don't trust the patient, I would use a halo.

FOLLOW-UP from Dr. JY | 4/26/07 6:25 PM

Thanks for your help and input. Here are my post-op films. I revised him anteriorly with a [Uniplate](#) and supplemented posteriorly from C6-T3.

He is doing well.

Post-Op A/P X-Ray



Post-Op Lateral X-Ray

