

# AccuReview

An Independent Review Organization

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## Notice of Independent Review Decision

**[Date notice sent to all parties]:** September 26, 2012

### **IRO CASE #:**

### **DESCRIPTION OF THE SERVICE OR SERVICES IN DISPUTE:**

Anterior cervical discectomy and fusion C5-6, C6-7 with 2 day length-of-stay  
22551, 22552, 22554, 20931, 20930, 20936, 63081

### **A DESCRIPTION OF THE QUALIFICATIONS FOR EACH PHYSICIAN OR OTHER HEALTH CARE PROVIDER WHO REVIEWED THE DECISION:**

This physician is Board Certified in Neurological Surgery with over 40 years of experience.

### **REVIEW OUTCOME:**

Upon independent review, the reviewer finds that the previous adverse determination/adverse determinations should be:

Upheld (Agree)

Provide a description of the review outcome that clearly states whether medical necessity exists for each of the health care services in dispute.

### **INFORMATION PROVIDED TO THE IRO FOR REVIEW:**

### **PATIENT CLINICAL HISTORY [SUMMARY]:**

The claimant was involved in a MVA on xx/xx/xx when she ran into another car at

40 miles an hour. The claimant sustained a whiplash injury to her neck but no loss of consciousness. The injury resulted in pain in her neck, into her right shoulder, a little numbness or tingling down her right arm, and a little bit into her left arm; pain in her mid back and some into her lower back.

02-09-11: Cervical Spine (5 views) X-ray Report dictated by MD. Findings: There is no fracture, dislocation, or degenerative disease.

03-09-11: Office Visit dictated by MD. Claimant stated that over the last month her pain has been relatively persistent; neck pain and upper shoulders. The pain increases while at work when looking down or using her right hand and when she awakens in the morning and both hands throughout the day. Claimant takes Soma to aid in sleep disturbances; which helps some. Claimant is taking Celebrex with some relief from pain. Physical Examination: Tenderness noted over upper thoracic lower cervical region. Reflexes are 2+ in the upper extremities, 2+ at her knees, 1 at her ankles. Radiographic evaluation Cervical Spine: Radiographs (03-09-11) of her cervical spine show degenerative change at C7-T1. There is straightening of normal cervical lordosis. Minimal degenerative change at 4-5. There is retrolisthesis at C4 on C5. Impression: 1. Status post lumbar fusion 4-5, 5-1 with minimal degenerative changes. 2. Thoracic degenerative change. 3. Cervical retrolisthesis at C4 on C5 with cervical strain status post MVA. Plan: Given claimant anti-inflammatory: Celebrex and Soma. Exercise program discussed: walking, biking, swimming, StairMaster, treadmill, elliptical, core exercises, light weights. Handouts have been given to claimant for neck and back exercises. Claimant will continue working doing her job and occupation, try to get on the exercise regimen and recheck in 4-6 weeks. May order MRI if no improvement to numbness and tingling in her hand. At current time she has not reached her MMI and can return back to her job.

05-09-11: Office Visit dictated by MD. Overall, the claimant stated her neck pain has improved some. She is still having pain in her neck and upper thoracic region when driving, some working at computer, some lifting or using her shoulders. Complaints of shoulder pain with grooming and overhead activities or even trying to lift some weights. She gets some numbness down her arm which radiates to her thumb, index and long finger. At the time of the accident the claimant was gripping the steering wheel which could have aggravated her carpal tunnel or this could be cervical radiculopathy from her neck radiating down into her arm. Physical examination: Mildly positive Spurling's to the right and negative on the left. Claimant has impingement symptomatology with her shoulder. She can clearly determine the numbness in her thumb, index, and long finger. Impression: 1. Cervical spondylosis with cervical strain status post MVA with right C6 cervical radiculopathy. 2. Impingement symptomatology – right shoulder. 3. Thoracic discogenic – based pain. Plan: Continue Soma and Celebrex PRN. Claimant is trying to do exercises and stretching with therapist and has about a 20% improvement over a 3 month period of time. Continue physical therapy to neck, upper thoracic region and right shoulder. MRI ordered.

05-25-11: Office Visit dictated by MD. Claimant continues to have neck pain that

radiates down her shoulder and down into her right arm. Claimant complains when performing PT it really bothers her and gives her difficulty. MRI reviewed. Impression: Cervical spondylosis mildly at 3-4, 4-5, 5-6, and 6-7 and right paracentral protrusion with posterior annular tear C4-5 with right cervical radiculopathy. Plan: Claimants options are: continue Soma and Celebrex, exercising, PT and try to live with pain; ESI. Claimant wants ESI.

07-06-11: Operative note at & LLP dictated by MD. Postoperative Diagnosis: The patient had about 50% relief after the right C5 nerve root sleeve block. Procedure: 1. fluoroscopically guided needle localization of the right C5 spinal nerve with transforaminal epidural steroid injection. 2. Transforaminal epidurogram at right C5.

07-25-11: Office Visit dictated by MD. Claimant continues having neck pain, down her shoulder, down into her right arm. ESI did not give claimant good relief. Claimant gets some numbness into her thumb and index finger and into her long finger or some pain or some dysesthesias. Impression: 1. Mild lateral epicondylitis. 2. Cervical radiculopathy in the right C6 distribution with multiple level cervical spondylosis. 3. Upper thoracic pain. Plan: Without significant compression in her neck region on the cord, claimant needs to have an MRI of the thoracic region, also because of the pain and dysesthesias without significant compression, MRI right shoulder to rule out contributing factors to symptoms in right upper extremity and right arm. EMG ordered.

08-18-11: Consultation note at xxxxx dictated by MD. Impression/Diagnosis: Cervical Radiculopathy w/Disc Displacement 722.0: Right C6 and Right C7. Recommendations: Cervical Spine: Claimant has decreased (hypalgesia) sensation right C6, C7 distribution and positive right Spurling's. This claimant has suffered for greater than 2 weeks from radicular symptoms without a specifically identifiable spinal nerve level etiology. There are documented findings on examination supporting a radicular pathology. MRI findings are consistent with multilevel pathology, either central, lateral recess or foraminal stenosis, likely to cause radicular pathology, however exact source pain is ambiguous. Physical therapy/NSAID's/muscle relaxants have failed to control symptoms. There are no positive Waddell's signs or evidence of psychological pathology that would preclude performance of the recommended transforaminal injection procedure. Cervical Selective Nerve Root Block/Transforaminal Epidural Steroid Injection: Right C6 and C7. Recommendations: Lifestyle/Work: Activity modifications were discussed with the claimant to accommodate for their spinal pathology.

09-06-11: Office visit/Electromyography at xxxxxr dictated by MD. Claimant stated that her right arm is heavy, but not sure if there is any weakness. Claimant complains of a burning sensation in the right upper extremity diffusely. Claimant has a constant headache like "a vice grip". Current medications: Lisinopril 10 mg PO daily, Tricor 145 mg PO daily, Effexor XR 75 mg PO daily, Celebrex 200 mg PO daily, Prilosec 20 mg PO daily, Soma 350 mg PO QID PRN. Physical Examination: Minimal tenderness of the cervical paraspinal muscles. Assessments: 1. Causalgia of upper limb – 354.4; 2. Neck Pain – 723.1. "Based on claimant's history, exam and normal EMG study of right  
LHL602 REV 05/12

upper extremity and cervical paraspinal muscles, I find no evidence of focal cervical radiculopathy or brachial plexopathy. There is no evidence of myelopathy on claimant's neurologic examination. I suspect we are dealing with significant mechanical neck pain and my recommendation was to continue Soma, start aggressive physical therapy to strengthen neck and right shoulder. If this conservative intervention is not helpful, consideration of more aggressive intervention should be next step".

09-30-11: Office Visit dictated by MD. Claimant continues to have pain in her neck, in her shoulder, down her right arm and predominantly her thumb, index and long finger of her right upper extremity. The pain was there on a day to day basis to the point where she is having a hard time living with it. Right shoulder ESI helped some, but she is still having neck and arm pain that is really giving her a great deal of difficulty on a day to day basis. Cervical nerve root block has been denied. Physical Exam: Positive Spurling's to the right which reproduces numbness into her thumb and slightly into her index finger. Impression: Multiple level cervical spondylosis with right C6-7 cervical radiculopathy and lesser degree to the left. Plan: Request CT/Myelogram for further evaluation of neck to determine whether surgical decompression would be indicated as she now has ongoing symptoms for six months and limiting her ability to work although she is continuing to do her job and occupation with numbness, tingling and pain into her right upper extremity and to a lesser degree to the left of which the etiology is not entirely clear from her MRI and therefore; the remainder of the diagnostic testing is warranted.

10-21-11: Radiology report dictated by MD. CT scan of the cervical spine post myelography reconstruction: Diagnosis: 1. At C1-2, there is no subluxation or central canal stenosis. 2. At C2-3, mild disc degeneration. No central canal stenosis. Mild left foraminal stenosis. 3. At C3-4, mild disc degeneration. 4. C4-5, mild disc degeneration. 5. At C5-6, moderate disc degeneration. Mild facet arthropathy. 6. At C6-7, mild disc degeneration. 2 mm disc bulging. 7. C7-T1, moderate disc degeneration. 8. There is straightening of the cervical spine with loss of cervical lordosis. Cervical Myelogram: Diagnosis: Normal.

10-31-11: Office Visit dictated by MD. Claimant continues to have pain in her neck, in her shoulder, and down into her right upper extremity, in a C6 distribution with numbness and tingling in her thumb and index finger. It bothers her more when she is doing her hair or toward the end of the day. It also radiates in her left arm but not all the way down. Physical Examination: Positive Spurling's to the right and negative to the left. Impression: Right C6 cervical radiculopathy. Plan: On review of her CT/myelogram the claimant does have a left paracentral protrusion at C6-7 and a broad diffuse disc bulge at C5-6 to the anterior aspect of the cord not noted by the radiologist. "I think the majority of this emanates from the C6 interval. I think for diagnostic and therapeutic purposes at C6 a selective nerve root block would be reasonable to try to give her some symptomatic relief and to prove that this may be where the etiology of her symptoms come from". Return two weeks post injection.

12-02-11: Operative note dictated by MD. Postoperative Diagnosis: Right C6  
LHL602 REV 05/12

radiculopathy. Procedure: 1. fluoroscopically guided needle localization of the right C5 spinal nerve with transforaminal epidural steroid injection. 2. Transforaminal epidurogram at right C6. Findings: There was concordant provocation in the lateral aspect of the arm. The root did not fill well. Postblock, the claimant's pain went from a 3 to a 0.

12-21-11: Office Visit dictated by MD. Claimant is really frustrated with her neck. She stated that the injection did help quite a bit, for the first two weeks she felt really quite well, then gradually has had a reoccurrence of pain in her neck, into her shoulders. The pain is in her neck, the upper aspect of the thoracic region radiating down into her shoulders. When it gets severe it still radiates down into her arm. Physical Examination: Claimant has limited range of motion of her neck. Impression: Cervical spondylosis 5-6, 6-7 with right C6 radiculopathy. Plan: Possible options: continue current management with anti-inflammatory, exercises, stretching and living with it; receive another injection, since the first did give some relief; with no improvement, surgical intervention would be warranted. Discussed acupuncture, a TENS unit, massage, return back to physical therapy where she already knows how to do exercises and stretches to do for her neck. Claimant chose to receive another injection, which will be scheduled.

01-17-12: Office Visit dictated by MD. Impression/Diagnosis: Cervical Radiculopathy w/ Disc Displacement 722.0: Right C6, Final diagnosis pending further evaluation. Recommendations: Cervical Spine: Cervical Selective Nerve Root Block / Transforaminal Epidural Steroid Injection: (CPT -4: 64479 Single) (CPT-4: 64480 Additional): Right C6; Epidurogram Interpretation (CPT-4: 72275) or Fluoroscopy (CPT-4: 77003). This claimant continues for greater than 2 weeks from recurrent radicular symptoms despite greater than 50% overall improvement, that persists to date, from the initial positive response to the first transforaminal injection. Past conservative measures including physical therapy/NSAIDs/muscle relaxants failed to control symptoms. The claimant has documented findings on examination supporting a radicular pathology. MRI findings are consistent with stenosis, either central, lateral recess or foraminal, likely causative of the radicular pathology. There are no positive Waddell's signs or evidence of psychosocial pathology that would preclude performance of the recommended repeat transforaminal injection procedure. Fluoroscopic guidance is indicated to assure proper placement of the steroid and optimize outcome. The claimant has not had over 3 injections in the prior 12 months. This treatment is medically necessary to allow this claimant to progress with active ongoing rehabilitation efforts. Activity modifications were divorced with the claimant to accommodate for their spinal pathology.

02-01-12: Office Visit dictated by MD. Claimant continues to have pain predominantly in her right arm in a C6 distribution and some into her left arm; bothering her and giving her difficulty. Physical examination: Positive Spurling's. Claimant has some numbness in her index, long, and ring finger. Plan: Injection denied by workers' comp. Discussed with claimant her MRI as well as her CT myelogram which show degenerative change but not severe narrowing to the right at C5-6. "I think the major component of this is mechanical where it compresses on the C6 nerve and gives her pain into her right upper extremity. If claimant can

live with it; because injections give her such a great relief, doing a fusion at 5-6 and 6-7 to alleviate her symptoms is reasonable with the understanding there is no guarantee of full relief of pain”.

04-11-12: Office Visit dictated by MD. Overall the claimant is still having pain in her neck and shoulder, down her arm in a C6 distribution, still bothering her on a daily basis; all in the right. Impression: Right C6-7 cervical radiculopathy. Plan: Conservative exercise, stretching, and strengthening program. Continue to resubmit it workers' comp. Reevaluate in two months.

08-14-12: UR performed by DO. Reason for denial: The request for anterior cervical discectomy and fusion C5-6, C6-7 with 2-day length-of-stay was non-authorized. The clinical documentation provided for review does not support the request for anterior cervical discectomy and fusion at C5-6 and C6-7. The claimant's clinical documentation does not reveal any significant pathology in the cervical spine that would reasonably require fusion procedures. No MRI or CT myelogram studies of the cervical spine were provided for review. Initial radiographs of the cervical spine were unremarkable and electrodiagnostic studies were negative. The clinical documentation provided for review does not demonstrate any objective evidence of severe or progressive neurological deficits in the upper extremities that would reasonably require the requested surgical procedures. Additionally there is minimal clinical documentation regarding prior conservative treatment such as physical therapy. As the clinical documentation provided for review does not support the request per guideline recommendations, medical necessity is not established.

08-27-12: UR performed by MD. Reason for denial: The ODG indicate, “Recommended as an option in combination with anterior cervical discectomy for approved indications, although current evidence is conflicting about benefit of fusion in general. (See Discectomy/laminectomy/laminoplasty.) Evidence is also conflicting as to whether autograft or allograft is preferable and/or what specific benefits are provided with fixation devices. Many patients have been found to have excellent outcomes while undergoing simple discectomy alone (for one- to two-level procedures), and have also been found to go on to develop spontaneous fusion after an anterior discectomy. Cervical fusion for degenerative disease resulting in axial neck pain and no radiculopathy remains controversial and conservative therapy remains the choice if there is no evidence of instability. This appeal request for an anterior cervical discectomy and fusion at C5-7 is given an adverse determination. The previous adverse determination was based on lack of objective physical examination findings or evidence of motor weakness involving the upper and lower extremities. With no evidence of focal motor deficit or spinal instability, the request could not be approved. No additional records were provided for review. The previous adverse determination is supported. The claimant was not noted to have any significant findings of radiculopathy or instability of the cervical spine to support the request for a two-level cervical fusion at C5-6 and C6-7. There was no significant documentation of instability to support the request for a two-level fusion. Electrodiagnostic studies were negative and the physical examination findings did not document objective cervical

radiculopathy. The request for appeal for anterior cervical discectomy and fusion at C5-6 and C6-7 is given an adverse determination.

**ANALYSIS AND EXPLANATION OF THE DECISION INCLUDE CLINICAL BASIS, FINDINGS, AND CONCLUSIONS USED TO SUPPORT THE DECISION:**

After review of the medical records and documentation provided, I uphold the adverse determination to deny the anterior cervical discectomy and fusion at C5-6 and C6-7. Under reasonable medical probability, there is no evidence of muscle weakness in the C6 myotome, no evidence of sensory deficit, no atrophy; therefore there is no radiculopathy. The request for Anterior cervical discectomy and fusion C5-6, C6-7 with 2 day length-of-stay 22551, 22552, 22554, 20931, 20930, 20936, 63081 is not medically necessary and denied.

Per ODG:

<p>Discectomy-laminectomy-laminoplasty</p>	<p><b>ODG Indications for Surgery -- Discectomy/laminectomy (excluding fractures):</b></p> <p>Washington State has published guidelines for cervical surgery for the entrapment of a single nerve root and/or multiple nerve roots. (<a href="#">Washington, 2004</a>) Their recommendations require the presence of all of the following criteria prior to surgery for each nerve root that has been planned for intervention (but ODG does not agree with the EMG requirement):</p> <p>A. There must be evidence of radicular pain and sensory symptoms in a cervical distribution that correlate with the involved cervical level or presence of a positive Spurling test.</p> <p>B. There should be evidence of motor deficit or reflex changes or positive EMG findings that correlate with the cervical level. <i>Note:</i> Despite what the Washington State guidelines say, ODG recommends that EMG is optional if there is other evidence of motor deficit or reflex changes. EMG is useful in cases where clinical findings are unclear, there is a discrepancy in imaging, or to identify other etiologies of symptoms such as metabolic (diabetes/thyroid) or peripheral pathology (such as carpal tunnel). For more information, see <a href="#">EMG</a>.</p> <p>C. An abnormal imaging (CT/myelogram and/or MRI) study must show positive findings that correlate with nerve root involvement that is found with the previous objective physical and/or diagnostic findings. If there is no evidence of sensory, motor, reflex or EMG changes, confirmatory selective nerve root blocks may be substituted if these blocks correlate with the imaging study. The block should produce pain in the abnormal nerve root and provide at least 75% pain relief for the duration of the local anesthetic.</p> <p>D. Etiologies of pain such as metabolic sources (diabetes/thyroid disease) non-structural radiculopathies (inflammatory, malignant or motor neuron disease), and/or peripheral sources (carpal tunnel syndrome) should be addressed prior to cervical surgical procedures.</p> <p>E. There must be evidence that the patient has received and failed at least a 6-8 week trial of conservative care.</p> <p>For hospital LOS after admission criteria are met, see <a href="#">Hospital length of stay</a> (LOS).</p>
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<p>Fusion, anterior cervical</p>	<p>Recommended as an option in combination with anterior cervical discectomy for approved indications, although current evidence is conflicting about the benefit of fusion in general. (See <a href="#">Discectomy/laminectomy/laminoplasty</a>.) Evidence is also conflicting as to whether autograft or allograft is preferable and/or what specific benefits are provided with fixation devices. Many patients have been found to have excellent outcomes while undergoing simple discectomy alone (for one- to two-level procedures), and have also been found to go on to develop spontaneous fusion after an anterior discectomy. (<a href="#">Bertalanffy, 1988</a>) (<a href="#">Savolainen, 1998</a>) (<a href="#">Donaldson, 2002</a>) (<a href="#">Rosenorn, 1983</a>) Cervical fusion for degenerative disease resulting in axial neck pain and no radiculopathy remains controversial and conservative therapy remains the choice if there is no evidence of instability. (<a href="#">Bambakidis, 2005</a>) Conservative anterior cervical fusion techniques appear to be equally effective compared to techniques using allografts, plates or cages. (<a href="#">Savolainen, 1998</a>) (<a href="#">Dowd, 1999</a>) (<a href="#">Colorado, 2001</a>) (<a href="#">Fouyas-Cochrane, 2002</a>) (<a href="#">Goffin, 2003</a>) Cervical fusion may demonstrate good results in appropriately chosen patients with cervical spondylosis and axial neck pain. (<a href="#">Wieser, 2007</a>) This evidence was substantiated in a recent Cochrane review that stated that hard evidence for the need for a fusion procedure after discectomy was lacking, as outlined below:</p> <p><i>(1) Anterior cervical discectomy compared to anterior cervical discectomy with interbody fusion with a bone graft or substitute:</i> Three of the six randomized controlled studies discussed in the 2004 Cochrane review found no difference between the two techniques and/or that fusion was not necessary. The Cochrane review felt there was conflicting evidence of the relative effectiveness of either</p>
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<p>procedure. Overall it was noted that patients with discectomy only had shorter hospital stays, and shorter length of operation. There was moderate evidence that pain relief after five to six weeks was higher for the patients who had discectomy with fusion. Return to work was higher early on (five weeks) in the patients with discectomy with fusion, but there was no significant difference at ten weeks. (<a href="#">Jacobs-Cochrane, 2004</a>) (<a href="#">Abd-Alrahman, 1999</a>) (<a href="#">Dowd, 1999</a>) (<a href="#">Martins, 1976</a>) (<a href="#">van den Bent, 1996</a>) (<a href="#">Savolainen, 1998</a>) One disadvantage of fusion appears to be abnormal kinematic strain on adjacent spinal levels. (<a href="#">Ragab, 2006</a>) (<a href="#">Eck, 2002</a>) (<a href="#">Matsunaga, 1999</a>) (<a href="#">Katsuura, 2001</a>) The advantage of fusion appears to be a decreased rate of kyphosis in the operated segments. (<a href="#">Yamamoto, 1991</a>) (<a href="#">Abd-Alrahman, 1999</a>)</p> <p>(2) <i>Fusion with autograft versus allograft:</i> The Cochrane review found limited evidence that the use of autograft provided better pain reduction than animal allograft. It also found that there was no difference between biocompatible osteoconductive polymer or autograft (limited evidence). (<a href="#">Jacobs-Cochrane, 2004</a>) (<a href="#">McConnell, 2003</a>) A problem with autograft is morbidity as related to the donor site including infection, prolonged drainage, hematomas, persistent pain and sensory loss. (<a href="#">Younger, 1989</a>) (<a href="#">Sawin, 1998</a>) (<a href="#">Sasso, 2005</a>) Autograft is thought to increase fusion rates with less graft collapse. (<a href="#">Deutsch, 2007</a>). See <a href="#">Decompression, myelopathy</a>.</p> <p>(3) <i>Fusion with autograft with plate fixation versus allograft with plate fixation, Single level:</i> A recent retrospective review of patients who received allograft with plate fixation versus autograft with plate fixation at a single level found fusion rates in 100% versus 90.3% respectively. This was not statistically significant. Satisfactory outcomes were noted in all non-union patients. (<a href="#">Samartzis, 2005</a>)</p> <p>(4) <i>Fusion with different types of autograft:</i> The Cochrane review did not find evidence that a vertebral body graft was superior to an iliac crest graft. (<a href="#">McGuire, 1994</a>)</p> <p>(5) <i>Fusion with autograft versus fusion with autograft and additional instrumentation:</i>  <i>Plate Fixation:</i> In single-level surgery there is limited evidence that there is any difference between the use of plates and fusion with autograft in terms of union rates. For two-level surgery, there was moderate evidence that there was more improvement in arm pain for patients treated with a plate than for those without a plate. Fusion rate is improved with plating in multi-level surgery. (<a href="#">Wright, 2007</a>) See <a href="#">Plate fixation, cervical spine surgery</a>.  <i>Cage:</i> Donor site pain may be decreased with the use of a cage rather than a plate, but donor site pain was not presented in a standardized manner. At two years pseudoarthrosis rate has been found to be lower in the fusion group (15%) versus the cage group (44%). A six-year follow-up of the same study group revealed no significant difference in outcome variables between the two treatment groups (both groups had pain relief). In the subgroup of patients with the cage who attained fusion, the overall outcome was better than with fusion alone. Patients treated with cage instrumentation have less segmental kyphosis and better-preserved disc height. This only appears to affect outcome in a positive way in cage patients that achieve fusion (versus cage patients with pseudoarthrosis). (<a href="#">Poelsson, 2007</a>) (<a href="#">Varuch, 2002</a>) (<a href="#">Hacker 2000</a>) See also <a href="#">Adjacent segment disease/degeneration</a> (fusion).</p> <p>(6) <i>Fusion with allograft alone versus with allograft and additional instrumentation:</i>  <i>Plate Fixation:</i> Retrospective studies indicate high levels of pseudoarthrosis rates (as high as 20% for one-level and 50% for two-level procedures) using allograft alone. In a recent comparative retrospective study examining fusion rate with plating, successful fusion was achieved in 96% of single-level cases and 91% of two-level procedures. This could be compared to a previous retrospective study by the same authors of non-plated cases that achieved successful fusion in 90% of single-level procedures and 72% of two-level procedures. (<a href="#">Kaiser, 2002</a>) (<a href="#">Martin, 1999</a>) See <a href="#">Plate fixation, cervical spine surgery</a>.</p>
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	<p><i>Complications:</i></p> <p><i>Collapse of the grafted bone and loss of cervical lordosis:</i> collapse of grafted bone has been found to be less likely in plated groups for patients with multiple-level fusion. Plating has been found to maintain cervical lordosis in both multi-level and one-level procedures. (<a href="#">Trojanovich, 2002</a>) (<a href="#">Herrmann, 2004</a>) (<a href="#">Katsuura, 1996</a>) The significance on outcome of kyphosis or loss of cervical lordosis in terms of prediction of clinical outcome remains under investigation. (<a href="#">Peolsson, 2004</a>) (<a href="#">Haden, 2005</a>) (<a href="#">Poelsson, 2007</a>) (<a href="#">Hwang, 2007</a>)</p> <p><i>Pseudoarthrosis:</i> This is recognized as an etiology of continued cervical pain and unsatisfactory outcome. Treatment options include a revision anterior approach vs. a posterior approach. Regardless of approach, there is a high rate of continued moderate to severe pain even after solid fusion is achieved. (<a href="#">Kuhns, 2005</a>) (<a href="#">Mummaneni, 2004</a>) (<a href="#">Coric, 1997</a>)</p> <p><i>Anterior versus posterior fusion:</i> In a study based on 932,009 hospital discharges associated with cervical spine surgery, anterior fusions were shown to have a much lower rate of complications compared to posterior fusions, with the overall percent of cases with complications being 2.40% for anterior decompression, 3.44% for anterior fusion, and 10.49% for posterior fusion. (<a href="#">Wang, 2007</a>)</p> <p><i>Predictors of outcome of ACDF:</i> Predictors of good outcome include non-smoking, a pre-operative lower pain level, soft disc disease, disease in one level, greater segmental kyphosis pre-operatively, radicular pain without additional neck or lumbar pain, short duration of symptoms, younger age, no use of analgesics, gainful employment, higher preoperative NDI and normal ratings on biopsychosocial tests such as the Distress and Risk Assessment Method (DRAM). Predictors of poor outcomes include non-specific neck pain, psychological distress, psychosomatic problems and poor general health, litigation and workers' compensation. (<a href="#">Anderson, 2009</a>) (<a href="#">Peolsson, 2006</a>) (<a href="#">Peolsson, 2003</a>) Patients who smoke have compromised fusion outcomes. (<a href="#">Peolsson, 2008</a>)</p> <p>See <a href="#">Plate fixation, cervical spine surgery</a>. See also <a href="#">Adjacent segment disease/degeneration</a> (fusion) &amp; <a href="#">Iliac crest donor-site pain treatment</a>.</p> <p><i>Use of Bone-morphogenetic protein (BMP):</i> FDA informed healthcare professionals of reports of life-threatening complications associated with recombinant human Bone Morphogenetic Protein (rhBMP) when used in the cervical spine for spinal fusion. The safety and effectiveness of rhBMP in the cervical spine have not been demonstrated, and these products are not approved for this use. These complications were associated with swelling of neck and throat tissue, which resulted in compression of the airway and/or neurological structures in the neck. (<a href="#">FDA MedWatch, 2008</a>) Bone-morphogenetic protein was used in approximately 25% of all spinal fusions nationally in 2006, with use associated with more frequent complications for anterior cervical fusions. No differences were seen for lumbar, thoracic, or posterior cervical procedures, but the use of BMP in anterior cervical fusion procedures was associated with a higher rate of complication occurrence (7.09% with BMP vs 4.68% without BMP) with the primary increases seen in wound-related complications (1.22% with vs 0.65% without) and dysphagia or hoarseness (4.35% with vs 2.45% without). (<a href="#">Cahill-JAMA, 2009</a>)</p> <p>For hospital LOS after admission criteria are met, see <a href="#">Hospital length of stay</a> (LOS).</p>
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Hospital length of stay (LOS)	<p><b>ODG hospital length of stay (LOS) guidelines:</b></p> <p><b>Discectomy/ Corpectomy</b> (<i>icd 80.51 - Excision of intervertebral disc</i>)  Actual data -- median 1 day; mean 2.1 days (± 0.0); discharges 109,057; charges (mean) \$26,219  Best practice target (no complications) -- 1 day</p> <p><b>Laminectomy</b> (<i>icd 03.09 - Laminectomy/laminotomy for decompression of spinal nerve root</i>)  Actual data -- median 2 days; mean 3.5 days (±0.1); discharges 100,600; charges</p>
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	<p>(mean) \$34,978  Best practice target (no complications) -- 1 day  <b>Cervical Fusion, Anterior</b> (81.02 -- <i>Other cervical fusion, anterior technique</i>)  Actual data -- median 1 day; mean 2.2 days (<math>\pm 0.1</math>); discharges 161,761; charges (mean) \$50,653  Best practice target (no complications) -- 1 days  <b>Cervical Fusion, Posterior</b> (81.03 -- <i>Other cervical fusion, posterior technique</i>)  Actual data -- median 4 days; mean 5.7 days (<math>\pm 0.2</math>); discharges 16,852; charges (mean) \$97,781  Best practice target (no complications) -- 4 days  <b>Craniocervical Atlas-Axis Fusion</b> (81.01 -- <i>Atlas-axis spinal fusion</i>)  Actual data -- median 5 days; mean 7.8 days (<math>\pm 0.3</math>); discharges 2,966; charges (mean) \$117,838  Best practice target (no complications) -- 5 days  <b>Artificial Disc</b> (84.62 -- <i>Insertion of total spinal disc prosthesis, cervical</i>)  Actual data -- median 1 days; mean 1.4 days (<math>\pm 0.1</math>); discharges 2,146; charges (mean) \$40,203  Best practice target (no complications) -- 1 day  <b>Artificial Disc revision</b> (84.66 -- <i>Replacement of artificial spinal disc prosthesis, cervical</i>)  Actual data -- median 2 days; mean 2.1 days (<math>\pm 0.3</math>); discharges 148; charges (mean) \$45,761  Best practice target (no complications) -- 2 days  <b>Fracture of vertebral column</b> (03.53 - <i>Repair of vertebral fracture</i>)  Actual data -- median 9 days; mean 13.4 days (<math>\pm 0.6</math>); discharges 3,458; charges (mean) \$156,940  Best practice target (no complications) -- 9 days</p>
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**A DESCRIPTION AND THE SOURCE OF THE SCREENING CRITERIA OR OTHER CLINICAL BASIS USED TO MAKE THE DECISION:**

- ACOEM- AMERICAN COLLEGE OF OCCUPATIONAL & ENVIRONMENTAL MEDICINE UM KNOWLEDGEBASE**
- AHCPR- AGENCY FOR HEALTHCARE RESEARCH & QUALITY GUIDELINES**
- DWC- DIVISION OF WORKERS COMPENSATION POLICIES OR GUIDELINES**
- EUROPEAN GUIDELINES FOR MANAGEMENT OF CHRONIC LOW BACK PAIN**
- INTERQUAL CRITERIA**
- MEDICAL JUDGEMENT, CLINICAL EXPERIENCE, AND EXPERTISE IN ACCORDANCE WITH ACCEPTED MEDICAL STANDARDS**
- MERCY CENTER CONSENSUS CONFERENCE GUIDELINES**
- MILLIMAN CARE GUIDELINES**
- ODG- OFFICIAL DISABILITY GUIDELINES & TREATMENT GUIDELINES**
- PRESSLEY REED, THE MEDICAL DISABILITY ADVISOR**
- TEXAS GUIDELINES FOR CHIROPRACTIC QUALITY ASSURANCE & PRACTICE PARAMETERS**
- TEXAS TACADA GUIDELINES**
- TMF SCREENING CRITERIA MANUAL**
- PEER REVIEWED NATIONALLY ACCEPTED MEDICAL LITERATURE (PROVIDE A DESCRIPTION)**
- OTHER EVIDENCE BASED, SCIENTIFICALLY VALID, OUTCOME FOCUSED GUIDELINES (PROVIDE A DESCRIPTION)**