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Cervical Spondylosis Developing Post Anterior Cervical Discectomy and Fusion– A Case Study

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Case Report

Keywords: Cervical Spondylosis, Spinal Fusion, Postoperative Complications, Rehabilitation, Case Reports, Neck Pain

Posted Date: March 10th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9009122/v1

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Additional Declarations: The authors declare no competing interests.

Abstract

Background

Cervical spondylosis, a degenerative condition with > 85% prevalence in those over 60, often requires anterior cervical discectomy and fusion (ACDF) for symptomatic C5-C6 herniations refractory to conservative care. Postoperative rehabilitation gaps, however, lead to myofascial tightness in trapezius, rhomboids, levator scapulae, and cervical muscles, causing bilateral shoulder radicular pain, restricted range of motion (ROM), sleep disruption, low back pain from kinetic chain deficits, and functional limitations in standing or household tasks.

Case Presentation

A 67-year-old active woman underwent ACDF at C5-C6 in March 2025 following traumatic strangulation-induced disc herniation with cord compression and multilevel prolapses (C3-C4, C4-C5). Without formal rehab for one year, she presented in February 2026 with NPRS 8/10 bilateral shoulder pain radiating to hands, hypertonicity eliciting pain on light palpation, minimal neck/shoulder ROM, rapid leg fatigue, and inability to stand for chores.

Intervention

A 4-week program applied muscle energy technique (MET) using post-isometric reciprocal inhibition to lengthen hypertonic upper trapezius while activating antagonists (lower trapezius, serratus anterior). Trapezius inhibition via sustained isometric holds and manual pressure addressed hypersensitivity, complemented by gentle active-assisted ROM exercises, core stabilization, posture training, and progressive strengthening.

Outcomes

NPRS dropped to 2/10; cervical lateral flexion and shoulder flexion reached moderate ROM; low back pain and leg fatigue resolved; full household task tolerance and prolonged standing achieved.

Conclusion

MET and trapezius inhibition rapidly reversed post-ACDF deconditioning despite delayed presentation, restoring function in elderly patients. Early referral prevents adjacent segment disease and secondary deficits; controlled trials in post-ACDF cohorts are needed.

Introduction

Cervical spondylosis is a common degenerative musculoskeletal condition that mainly presents with neck pain. This pain can interfere with everyday activities, reduce physical function, and negatively affect a person's ability to work efficiently. In addition, persistent neck discomfort can disturb sleep and may also have a negative impact on mental and emotional well-being, ultimately reducing overall quality of life(Huang et al., 2025). Its epidemiological data indicating a prevalence exceeding 85% in those aged 60 and older, predominantly impacting the lower cervical segments (C5-C6, C6-C7)(Jull et al., 2025). This age-related disorder arises from disc dehydration, osteophyte formation, and facet joint arthritis, with risk factors including prior trauma, repetitive neck strain, and genetic predisposition. (Lv et al. 2018).

Clinically, cervical spondylosis presents with insidious neck pain radiating to shoulders or arms, accompanied by stiffness and reduced range of motion. Radicular symptoms like arm paresthesia or weakness occur due to foraminal narrowing, while myelopathy from spinal cord compression may cause gait instability, hand clumsiness, or hyperreflexia in advanced cases. (Iyer2016). Diagnosis relies on detailed history and physical exam, supplemented by imaging: plain radiographs reveal osteophytes and disc space narrowing, MRI detects soft tissue pathology like herniations or cord signal changes, and CT aids bony assessment when MRI is contraindicated. (Tetreault et al., 2015).

Anterior cervical discectomy and fusion (ACDF) serves as the gold standard surgical intervention for symptomatic cervical spondylosis refractory to conservative measures. The procedure involves an anterior neck incision to remove the offending disc and decompress neural elements, followed by interbody graft and plate fixation to achieve arthrodesis and stabilize the segment. (Mayo et al., 2016). Long-term side effects include adjacent segment disease (ASD) accelerating degeneration at neighboring levels (rates up to 25% at 10 years), pseudarthrosis (non-union, 5–15% for multilevel), chronic dysphagia, and reduced cervical lordosis potentially worsening motion. (Hilibrand et al., 1999; Fekete&Vannemreddy, 2010).

While conservative treatments like physical therapy, NSAIDs, and cervical collars effectively manage 80–90% of cases initially, surgery such as ACDF is indicated for progressive neurology or intractable pain Postoperative rehabilitation emphasizes early mobilization, isometric exercises, and posture training to optimize fusion rates and functional recovery, typically spanning6-12 weeks (Wu, T. K., et al. 2017).

Kinetic chain deficits in cervical spondylosis occur when degenerative changes like disc bulges and cord compression at C5-C6 disrupt proximal cervical stability, propagating compensatory overload distally through scapulothoracic dysfunction (e.g., trapezius dominance) and altered posture, ultimately fatiguing thoracolumbar stabilizers and contributing to low back pain (Filipkowski et al. 2006).Movement impairment syndrome in cervical spondylosis presents as directional biases, such as restricted rotation with scapular dyskinesis, where spondylotic stiffness promotes upper trapezius overactivity, impairs lower trapezius/serratus coordination, and sustains radicular symptoms during functional tasks (Mesregah et al. 2024).

This case study examines patient outcomes following ACDF for cervical spondylosis, highlighting symptom resolution, complications, and quality-of-life metrics at long-term follow-up. Such analyses are

crucial for refining surgical indications and patient counseling in an aging population

Case Study

In March 2025, a 67-year-old mesomorphic woman, right-hand dominant and habitually active, endured a harrowing incident when her shawl became entangled around her neck, resulting in acute strangulation. She was urgently transported to the hospital, where magnetic resonance imaging (MRI) revealed a herniated disc at the C5-C6 level with moderate spinal cord compression, accompanied by disc prolapses at C3-C4 and C4-C5. She underwent anterior cervical discectomy and fusion (ACDF) surgery at C5-C6 and was discharged home just three days postoperatively. Lacking formal rehabilitation over the ensuing year, she developed bilateral shoulder pain radiating to the hands, which profoundly disrupted her sleep, curtailed her ability to perform household tasks, and precipitated low back pain that intensified after only brief periods of standing.

The patient presented to the centre in early February 2026, reporting severe discomfort with a Numeric Pain Rating Scale (NPRS) score of 8/10. Standing to perform household chores had become untenable, and she experienced rapid-onset leg fatigue. Physical examination revealed pronounced hypertonicity in the trapezius, rhomboid, levator scapulae, and cervical musculature, with even light palpation eliciting significant pain. Ranges of motion in the neck and shoulders were markedly restricted, permitting only minimal rotation. Her primary objectives were to resume daily household activities and to stand comfortably for prolonged periods.

Rehabilitation commenced promptly during the first week of February, incorporating gentle active and assisted exercises tailored to her low pain tolerance. The regimen prioritized strengthening of the cervical and shoulder musculature, core stabilization, and progressive restoration of range of motion.

By the end of the fourth week in late February, her pain had diminished to a manageable 2/10 on the NPRS. Shoulder flexion and cervical lateral flexion exhibited notable improvements to moderate ranges of motion, low back pain substantially resolved, and leg fatigue onset was significantly delayed. Most gratifyingly, she could now perform household chores for extended durations without discomfort, fully achieving her functional goals. Ongoing progressionother training program will aim to consolidate and sustain these gains.

Discussion

This case demonstrates the effectiveness of muscle energy technique (MET) using reciprocal inhibition and targeted trapezius inhibition in managing post-anterior cervical discectomy and fusion (ACDF) complications in a 67-year-old female. Following her March 2025 traumatic neck injury and surgery, the absence of rehabilitation for one year led to myofascial tightness in the trapezius, rhomboids, levator scapulae, and neck muscles, resulting in bilateral shoulder radicular pain (8/10 NPRS), restricted cervical/shoulder range of motion (ROM), sleep disruption, low back pain, and severe limitations in standing household activities. Such delayed recovery aligns with literature noting high rates of persistent

trapezius pain and dysfunction after cervical fusion due to compensatory overload, altered cervical biomechanics, and inadequate post-operative rehabilitation. The rapid 4-week improvement—to 2/10 NPRS, moderate ROM gains, reduced fatigue, and restored functional tolerance—highlights these manual therapies' role in older adults with poor pain tolerance.

MET, employing post-isometric reciprocal inhibition, induces autogenic inhibition via Golgi tendon organ activation, lengthening hypertonic upper trapezius while strengthening antagonists like lower trapezius and serratus anterior. Jawade et al. (2023) reported in a randomized controlled trial (n = 30) that 10 sessions of MET for upper trapezitis significantly reduced NPRS ($p < 0.001$; effect size 1.45), improved cervical flexion/extension/rotation by 15–25%, and lowered Neck Disability Index scores by 42%, with effects sustained at follow-up—directly paralleling our patient's cervical side flexion and shoulder flexion progress alongside pain relief (Jawade et al., 2023). This technique's active-assisted adaptation minimized discomfort, promoting neuromuscular re-education critical post-ACDF, where scapular dyskinesis exacerbates symptoms (Yu, D et al., 2022).

Trapezius inhibition techniques, involving sustained isometric holds or manual pressure to inhibit overactive upper fibers, complemented MET by addressing palpation hypersensitivity (even mild effleurage provoked pain). Kashyap et al. (2018) compared MET to manual pressure release in 45 patients with upper trapezius trigger points, finding equivalent reductions in Visual Analog Scale pain (30–40% drop), increased pressure pain thresholds ($p = 0.002$), and enhanced rotation ROM persisting 15 days post-treatment (Kashyap et al., 2018). These align with our case's myofascial release effects, reducing guarding and enabling core/strength progression for low back stabilization—vital as lumbar pain often emerges secondarily in cervical pathologies (Tamai et al., 2024).

Combined, these interventions targeted the biopsychosocial model, restoring self-efficacy for household goals. Evidence supports early post-surgical trapezius-focused rehab to prevent adjacent segment degeneration and deconditioning (Gross et al., 2016). Controlled trials validating MET-inhibition protocols in post-ACDF cohorts, especially elderly females, are warranted. Nonetheless, this approach underscores tailored manual therapy's value in bridging rehab gaps, promoting sustainable gains in function and quality of life.

Conclusion

This case highlights reversing post-ACDF deconditioning, restoring function within four weeks despite a one-year rehab delay; however, "*adjacent segment dysfunction (ASD)"* remains a critical long-term risk, necessitating vigilant radiographic monitoring and posture education. Physicians must prioritize early physiotherapy referral through preoperative counseling to prevent secondary kinetic chain deficits, reduce ASD progression, and ensure sustained surgical outcomes—transforming isolated procedures into comprehensive recovery partnerships.e. This teamwork between surgeons and therapists is the real game-changer for patients.

Declarations

The patient provided written informed consent to participate in the study and publish the findings.

Ethical Considerations

Compliance with ethical guidelines

Informed consent was obtained from the patient.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Authors' contributions

All authors equally contributed to preparing the article.

Conflict of interest

The authors declared no conflict of interest.

References

1. Filipkowski DE (2006) Upper quarter kinetic chain response to cervical manipulation: A case report. J Chiropr Med 5(2):69–71. https://doi.org/10.1016/S0899-3467(07)60136-0
2. Huang L, Song W, Luan X, Shi L, Li S, Cai M, Du J, Shi P, Fang F (2025) Efficacy and safety of transcutaneous acupoint electrical stimulation in the treatment of cervical spondylosis: A multicenter randomized open-labeled controlled clinical study. *Pain Research and Management, 2025*, Article 3949302. https://doi.org/10.1155/prm/3949302
3. Iyer A, Azad TD, Tharin S (2016) Cervical spondylotic myelopathy. *Clinical Spine Surgery, 29*(10), 408–414. https://doi.org/10.1097/BSD.0000000000000397 Jull, G., Thomas, L., Liang, Z., & Treleaven, J. (2025). Current and future advances in practice: Cervical spondylosis and mechanical neck pain. *Rheumatology Advances in Practice, 9*(4), Article rkaf127. https://doi.org/10.1093/rap/rkaf127
4. Kashyap R, Iqbal A, Alghadir AH (2018) Controlled intervention to compare the efficacies of manual pressure release and the muscle energy technique for treating mechanical neck pain due to upper trapezius trigger points. J Pain Res 11:3151–3160. https://doi.org/10.2147/JPR.S172711
5. Lv Y, Tian W, Chen D, Liu Y, Wang L, Duan F (2018) The prevalence and associated factors of symptomatic cervical spondylosis in Chinese adults: A community-based cross-sectional study. BMC Musculoskelet Disord 19(1). Article 325. https://doi.org/10.1186/s12891-018-2234-0

6. Mayo BC, Massel DH, Bohl DD, Long WW, Modi KD, Singh K (2016) Anterior cervical discectomy and fusion: The surgical learning curve. Spine 41(20):1580–1585. https://doi.org/10.1097/BRS.0000000000001588
7. Mesregah MK, Baker M, Yoon C, Meisel H-J, Hsieh P, Wang JC, Yoon ST, Buser Z, AO Spine Knowledge Forum Degenerative (2024) Radiographic risk factors for adjacent segment disease following anterior cervical discectomy and fusion (ACDF): A systematic review and meta-analysis. Global Spine J. Advance online publication https://doi.org/10.1177/21925682241237500
8. Stull JD, Goyal DKC, Mangan JJ, Divi SN, McKenzie JC, Casper DS, Okroj K, Kepler CK, Vaccaro AR, Schroeder GD, Hilibrand AS (2020) The outcomes of patients with neck pain following ACDF: A comparison of patients with radiculopathy, myelopathy, or mixed symptomatology. Spine 45(21):1485–1490. https://doi.org/10.1097/BRS.0000000000003613
9. Tetreault LA, Karpova A, Fehlings MG (2015) Predictors of outcome in patients with degenerative cervical spondylotic myelopathy undergoing surgical treatment: Results of a systematic review. Eur Spine J 24(Suppl 2):236–251. https://doi.org/10.1007/s00586-013-2658-z
10. Wu TK, Wang BY, Deng MD, Hong Y, Rong X, Chen H, Meng Y, Liu H (2017) A comparison of anterior cervical discectomy and fusion combined with cervical disc arthroplasty and cervical disc arthroplasty for the treatment of skip-level cervical degenerative disc disease: A retrospective study. Medicine 96(41) Article e8112. https://doi.org/10.1097/MD.0000000000008112
11. Yu D, Panesar PS, Delman C, Van BW, Wilson MD, Le HV, Roberto R, Javidan Y, Klineberg EO (2022) Comparing fusion rates between fresh-frozen and freeze-dried allografts in anterior cervical discectomy and fusion. *World Neurosurgery: X, 16*, Article 100126. https://doi.org/10.1016/j.wnsx.2022.100126

Figures



Figure 1

X Ray showing ACDF implant



Figure 2

Week 1 of rehab



Figure 3

Week 4 of rehab