

Two patients presenting with cervical spine disc replacement surgery with complications: Two case reports

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Abstract: Objective/Clinical Features: Two patients presented at this office post-surgery for a cervical disc replacement and subsequent complications. A 30-year-old male presented at this office July-2016, 1½-years following C-5/6 disc replacement surgery for a ski-related injury with loss of sensation/function of his right 3rd-4th fingers. Three-months following surgery he felt fine but then noted significant pain in the right neck, scapula, and arm, and occasionally on the left.

A 52-year-old female who was suffering from significant neck pain, which radiated down her right arm to her second-third fingers with paresthesia and muscle weakness. Disc replacement surgery was performed April-2015 to the C5-C7 discs and initially her symptoms resolved and then returned with symptoms on the contralateral side. Both patients had concomitant TMJ related disorders.

Intervention/Outcomes: Patient were treated with prone SOT pelvic block placement (category-one), intraoral cranial adjustments, and co-treated with a dentist immediately following care to balance a lower occlusal splint. The 30-year-old male patient could hike and run for the first time in 3-years and the 52-year-old female patient had her VAS constant pain levels decreased from a 8-9/10 to 3/10, paresthesia significantly decreased with normal ranges-of-motion, and muscles strength had returned.

Conclusion: This case suggests a relationship between the patient's TMJ disorder and cervical spine limited function and pain.

Indexing Terms: Chiropractic, cervical disc, surgery, sacro-occipital technique.

Introduction

Mechanical stress loading to the cervical intervertebral disc is associated with degeneration of the disc and subsequent neurological sequelae, with treatments ranging from conservative to invasive surgery. (1, 2) Historically, anterior surgical approaches in the cervical spine have included anterior cervical discectomy alone (ACD), anterior cervical discectomy with fusion (ACDF) and ACDF with anterior plating. (3, 4) While surgical fusion has been used to reduce cervical vertebra segmental motion and disc hypermobility, sometimes patients may still experience pain following surgery. Cervical fusion 'may also lead to adjacent level degeneration, (5, 6, 7) pseudarthrosis, (8, 9) and donor site pain.' (1)

In contrast to fusion techniques, cervical disc replacement surgery aims to preserve cervical motion, thus preventing complications associated with rigid

... SOT is an appropriate technique for patients post-cervical disc surgery. These two reports suggest a relationship between a TMJ disorder and cervical spine limited function and pain'



arthrodesis and subsequent segmental loss of motion. (4, 10, 11, 12, 13) It also is intended to help avoid the morbidity associated with cervical immobilization and autologous bone graft harvesting and eliminates the potential infective risks associated with the allograft bone. (14) Post-surgical assessment of cervical spine segmental motion has been, and continues to be, a challenge. Generally, clinical studies reporting the data have placed lesser emphasis on kinematics following intervertebral disc replacements with a greater focus on pain reduction. (1) Clinical reports of success of cervical total disc replacement are encouraging but are also quite preliminary. (15) While long-term studies have not yet been reported, (3) the short-to-intermediate term studies appear promising. (16, 17, 18, 19, 20)

These case reports focus on two separate unrelated patients presenting for chiropractic care due to complications following cervical disc replacement surgery.

Case #1 History

A 30-year-old male was injured due to a fall (February 15, 2014) during skiing, traumatizing his neck. His condition progressively became worse, resulting in loss of sensation to his right third and fourth fingers. After undergoing five months of physical therapy he noted there was no improvement. Believing that he had exhausted all conservative means of care he had C5-6 disc replacement surgery in December 2015. Initially he felt improved for initial three months post-surgery, but then began to experience pain in the right side of his neck, right shoulder blade, and occasional upper right arm pain. Additionally, approximately two times a week he would also feel the same types of pain on the left side of his neck and upper extremity.

He consulted the spinal surgery center at Stanford where an MRI was taken three months post-surgery, which was found negative for pathology. He was prescribed Neurontin, which helped somewhat, but still experienced significant pain. He returned for physical therapy at a clinic in Lincoln, Nebraska; however, he didn't experience any significant improvement in his pain. In April 2016 he was prescribed a lower dental mandibular mouth-guard for nighttime clenching and bruxism (possibly unrelated to his cervical spine condition). The patient presented at this clinic for treatment on July 14, 2016 and noted that prior to the trauma and surgery he was an avid runner but since the injury (February 2014) he was unable to run or even walk more than half a mile due to the pain.

Case #2 History

A 52-year-old female who was suffering from significant neck pain, which radiated down her right arm to her hand and into her second and third fingers. The pain was described as an electric, buzzing, tingling type pain, which was accompanied by weakness (inability to hold simple objects such as a cup). Disc replacement surgery was performed on April 2015 to the C5/C6 and C6/C7 discs, and initially her symptoms were resolved but shortly returned. She also began to feel pain down her left arm to the thumb and first finger, and noted that her right arm symptoms were worse than before the surgery. An MRI was performed that was determined ultimately to be negative, however her neurologist believed there may be a suspicious lesion in the cervical region possibly associated to multiple sclerosis or a dural fistula.

Methods/Intervention

Case #1 Patient Assessment

Chiropractic assessment determined the patient had malocclusion, anterior premature contact with right working interference and decreased translation of the right temporomandibular joint. Evidence was found of clenching, significant maxillary exostosis, and mandibular tori. Palpatory pain was noted at the bilateral zygomatic maxillary joints, right zygomatic arch, bilateral sphenoid wings, bilateral coronal suture, squamosal sutures along with palpatory pain and hypertonicity of right temporalis and masseter muscles. Palpation revealed his right occiput was

in a cranial extension distortion pattern. Cervical spine antalgia was noted with decreased ranges of motion and significant palpatory pain to the cervical spine that was greater on the right side. Muscle assessment found 4+ weaknesses of right supraspinatus, right infraspinatus, right subscapularis, right teres minor, right tricep, and bilateral deltoid muscles.

Case #1 Treatment

Treatment consisted of category one sacro occipital technique (SOT) blocking (reducing pelvic torsion and improving sacral nutation) (21) with SOT intraoral cranial adjustments, (22) and sphenomaxillary cranial treatment²³. He was treated in a collaborative cranial dental model for the first four treatments, going immediately to the dental office to balance the dental appliance following chiropractic and cranial treatment at this office.

Case #2 Patient Assessment

Chiropractic assessment revealed a maxillary deficiency. The patient reported sensitivity to palpation of bilateral temporal mandibular joints, bilateral zygomatic maxillary joints, bilateral maxillary frontal joints, bilateral zygomatic arches, bilateral sphenoid wings, mid sagittal suture, bilateral coronal and squamosal sutures. Sensitivity to palpation and hypertonicity was also noted to the bilateral *masseter*, *temporalis*, and medial lateral *pterygoid* muscles. There was evidence of clenching, excessive tooth wear, malocclusion, and anterior premature contact with bilateral working interference. Assessing temporal mandibular joint (TMJ) translation and opening determined that she had limited opening with a left anterior displaced TM disc with reduction. Cranial evaluation revealed a right occiput in an extension cranial distortion pattern.

The patient's cervical spine was antalgically positioned at rest and she had decreased cervical rotation with active range of motion of only 10° bilaterally, which was accompanied by pain at the limits of rotation. Cervical spine flexion, extension, and bilateral lateral flexion also produced neck pain during motion. Palpatory pain and hypertonicity was noted bilaterally along the trapezius and suboccipital muscles with sensitivity to palpation bilaterally along the cervical lamina from C1-5. Muscle testing revealed a 4+ weakness of bilateral deltoid muscles, supraspinatus, and infraspinatus, along with 4+ weaknesses of the right subscapularis, teres minor, tricep, and bicep muscles.

Case #2 Treatment

Following assessment and beginning care at this office the patient was referred for dental care to take impressions for a lower occlusal dental appliance. The patient was treated at this office for 10 visits from March 31, 2016 through May 5, 2016. Treatment consisted of SOT category one blocking (reducing pelvic torsion and improving sacral nutation) (21) with SOT intraoral cranial adjustments, (22) and incorporating sphenomaxillary cranial treatment. (23) On three of those office visits following treatment she was seen immediately by her dentist to balance and equilibrate the lower occlusal dental appliance that she was using.

Results

Case #1 Results

The patient's response to treatment was dramatic. Following the fourth visit he was able to hike 10 miles in Yosemite national Park, which he claimed he had been unable to do for two and half years. He was then treated for 11 visits between July 25, 2016 and September 8, 2016, and he began to run again and was able to run one mile without experiencing any symptoms. By September 8, 2016 he reported his cervical spine and arm pain were gone and was only experiencing occasional pain in the right shoulder blade. His cervical spine antalgia was no longer present and his cervical spine active range of motion returned to normal in all directions.

Case #2 Results

At her reevaluation on May 5, 2016 her neck pain, which was originally rated as constant and 8 to 9/10, with 10 being most pain possible, was reduced to a 3/10 and only occurred when performing activities like making a bed, driving, laying over sink, and sitting at the computer. The right arm pain radiation to the fingers was significantly reduced. Her left arm symptoms were completely eliminated. Cervical spine antalgia was improved and normal ranges of motion were restored. The 4+ weaknesses of right shoulder and arm muscles were resolved and tested at 5+ or normal. Follow-up MRI tests were performed and found to be normal with the suspicious lesion on the prior MRI no longer visible.

The patient was treated for an additional 14 visits between May 9, 2016 and September 8, 2016. Many of those visits involved treatment of her lumbar spine, sacroiliac joint, and thoracic spine. By September 2016 she reported only occasional pain into the right shoulder and bicep muscle, which occurred three times a month, though only after participating in strenuous physical activities.

Discussion

Clinically it is theorized that both patients' TMJ cranial mandibular distortion was affecting their forward head posture, which would increase stress to his cervical spine. Correction of their cranial mandibular distortion along with balancing their dental mandibular appliance appeared to contribute to improvement of forward head posture and help restore normal cervical ranges of motion, leading to decreases in pain and improvement of cervical spine function. (24, 25, 26, 27)

One reason why TMJ disorders are so critical in the management of cervical spine-related disorders is their relationship with the cervical spine and forward head posture. (24, 25, 26, 27) It is unclear whether the patients would have been able to forego the surgical interventions if they had received care at this office; however, following the surgery as their symptoms began to return and worsen, the care rendered had a significant effect. It may be important to consider this type of chiropractic, cranial, and dental care as a part of the post-surgical regimen for patients that fit the criteria of having pelvic imbalance and TMJ/cranial related dysfunction. (28, 29, 30)

There are various reasons why TMJ disorders might affect the cervical spine, with one reason related to the work of Guzay. Guzay, a student of physics and engineering, attempted to determine where forces from occlusion, masticatory muscles, TM ligaments, and stomatognathic functions would summate. He performed extensive study into this 'puzzle' and developed a comprehensive solution that he termed The Quadrant Theorem. (31, 32, 33) He determined that the summation of forces related to muscles controlling a pivotal axis of mandibular function occurred at the dens between the atlas and axis vertebrae. Therefore, he expected that, kinematically, there would likely be a relationship between the cervical spine function and the TMJ, as well as TMJ function and the cervical spine.

Stomatognathic or TMJ-related disorders can often have airway-related issues, which affect head and neck positioning. Gelb described how the *'airway governs our ability to breathe and to achieve a restful, oxygenated, restorative night's sleep, as well as to perform optimally during the day. Any temporomandibular joint or occlusal philosophy must address airway patency while managing pain and dysfunction, identifying contributing factors, and alleviating perpetuating factors.'* (34, 35) Therefore, in some patients TMJ-related disorders can contribute to a compromised airway issue, and the cervical spine will have a forward position as a means to compensate for a compromised upper airway passage. (36, 37, 38, 39)

With any case report, caution must be made in generalizing the outcome to the population at large, particularly since this is only a two-subject case study that cannot include controls, sham

grouping, and randomization. In addition, various possibilities for the positive outcomes in a case report such as placebo or ideomotor effects, regression to the mean, and others cannot be ruled out.

Conclusion

These two case reports suggest that with a subset of patients having complications following cervical spine disc replacement surgery, it may be prudent considering SOT-related chiropractic care that incorporates both cranial and dental interdisciplinary care. A temporal relationship between care for these patients' TMJ disorders and improvement of cervical spine function and pain made the outcomes of these cases compelling.

Further research with other patients suffering from failed cervical disc replacement surgery might help determine if these patients were an anomaly or possibly represent an important subset of patient that can be helped with this novel conservative care.

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Informed consent to chiropractic care is held by the practitioner.

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