Rescued Root Canal: A Case Report on OMT for Jaw Pain Following Repeat Root Canal Procedure

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CASE REPORT

Abstract

Jaw pain after dental and orthodontic procedures presents commonly in primary care and osteopathic manipulative medicine (OMM) clinics. Osteopathic cranial manipulative medicine (OCMM) treatment of the jaw and head can both provide pain relief and improve temporomandibular joint function after dental procedures.

In this case report, a 47-year-old woman with severe jaw pain had worsening pain after a repeated root canal procedure and was unable to chew solid foods. She was scheduled for another root canal for the affected tooth but after serial cranial osteopathic treatments, she was to avoid a third procedure due to periodontal tissue improvement. To the author's knowledge, this is the first case report involving the use of osteopathic manipulative treatment (OMT) for jaw pain following root canal procedures.

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Introduction

Osteopathic cranial manipulative medicine and dentistry are closely connected when treating somatic dysfunctions of the mouth, teeth, jaw, and face.[1] After dental work, patients can have weeks of discomfort, including neuropathic pain, temporomandibular joint disorder, headache, neck pain, and head pain.[2] In dentistry procedures like the root canal, prolonged protrusion of the mandible with operator-induced inferior forces can induce strains and misalign cranial articulations in the rest of the head.[2]

Root canal therapy is the most commonly used method for treating pulpitis and periapical periodontitis.[3] As the American Association of Endodontists website explains, "Endodontic treatment is necessary when the pulp, the soft tissue inside the root canal, becomes inflamed or infected. The inflammation or infection can have a variety of causes: deep decay[,] repeated dental procedures on the tooth or a crack or chip in the tooth. "[4] A dentist or an endodontist can evaluate and assess if a root canal procedure is necessary to treat and save a tooth.

Postoperative pain, defined as any degree of pain that occurs after root canal treatment, has a reported frequency ranging from 3% to 58%.[3] Postoperative pain is multifactorial and can affect the quality of life of the patient, which is frustrating for both the patient and clinician. Cranial osteopathic treatment of the jaw and head can be beneficial post–root canal procedure to treat induced somatic dysfunctions and may prevent the need for additional endodontic procedures.

Report of Case

A 47-year-old woman presented with neck pain that radiated to the right side of her jaw and face. Symptoms began 2 years previously after having root canal procedures on teeth 28 and 29, the first and second premolars. One month prior to presentation, the patient had a repeat root canal procedure on tooth 28 due to persistent tooth pain with suspected reinfection. She characterized her jaw pain as "sharp and shooting or throbbing," sometimes with muscle spasm. The pain was intermittent, and the severity was rated 6/10 at worst. Aggravating triggers included chewing, menstruation, and stress. She could tolerate soft foods only. Pain improved with over-the-counter analgesics, essential oils, and heat. She denied weakness, paresthesia, and headaches. The patient worked as a realtor, and her insomnia secondary to jaw pain further exacerbated

(continued on page 16)

(continued from page 15)

job stressors. Social history was positive for tobacco, caffeine, and weekly alcohol consumption.

Patient History

The patient's medical history was significant for a motor vehicle accident in 2000 in which she suffered a mild whiplash injury. The patient had no known drug allergies. Her current medication consisted of carisoprodol for sleep as needed secondary for jaw pain. Review of systems was positive for insomnia. Otherwise, her remaining review of systems was negative.

Evaluation

A physical exam revealed normal vital signs. The patient had a BMI of 40.7. Results of the neurological exam were unremarkable. Osteopathic findings for the head and neck were rated 3/3 severity by the treating physician. Other findings in different regions were diagnosed; however, they were not as severe as the reported findings below.

Head and face dysfunctions

- head sidebent right, rotated left
- right eye more inferior than left
- atlanto-occipital joint flexed, sidebent right and rotated left
- left sphenobasilar synchondrosis (SBS) torsion
- vertex compression
- internally rotated right temporal
- externally rotated left maxillary zygoma
- multiple teeth inferiorly compressed
- mandibular compression with inferior alveolar contracture
- left maxilla more prominent

Cervical dysfunctions

- atlanto-axial joint rotated right
- C2-C5 neutral side bent right, rotated left
- C6 extended side bent left rotated left
- C7 flexed side bent left rotated left

The patient was diagnosed with sphenobasilar synchondrosis (SBS) compression, inferior alveolar nerve contracture, compression of multiple teeth, and somatic dysfunctions of the head. Other differential diagnoses were trigeminal neuralgia, temporomandibular joint disorder (TMJD), cluster headache, and myofascial pain syndrome.

The clinician's plan was to schedule a follow-up appointment in 1 week and to reassess each visit to determine the need for follow-up. Lifestyle recommendations were given as follows:

- Exercise: Daily cardio for 20-30 minutes, yoga for belly breathing and flexibility.
- Nutrition: Reduce refined carbohydrates including alcohol, reduce caffeine intake, encourage tobacco cessation.

Treatment

Osteopathic manipulative treatment was performed 1 week after the initial visit. Cranial SBS compression was treated with osteopathic cranial manipulative medicine (OCMM) to allow for better articulation between bones and to increase cranial rhythmic impulse. The teeth were treated with indirect techniques, balanced ligamentous tension, and OCMM.

By the end of the 5 treatments, the patient's pain severity decreased from 6/10 to 4/10. Cranial motion between compressions increased significantly with decompression of the mandible and myofascial and cranial treatment of the inferior alveolar nerve sheath. After this first set of treatments, the patient was reevaluated by her endodontist who concluded that placing a post to stabilize tooth 29 was no longer indicated. Although she no longer needed a post, the patient's treatment course was mildly complicated by nightly teeth grinding, which caused incomplete stability of the new position with mild regression between each visit. Therefore, the patient required additional follow-up appointments to maintain full use with decreased pain. At her eleventh visit, her pain was reduced to 2/10, and she reported that she was now able to eat nuts.

Discussion

Meyer and Gustowski propose that molar extractions may induce cranial strains, but there is no review of the impact of root canals and cranial dysfunctions.[2]

The sphenoid bone is a significant structure that houses the foramina in which nerves, arteries, and veins pass.[2] Restricted sphenoid bone motion can cause abnormal tensions placed on the structures passing through the foramina; for example, Magoun proposed that patients post–tooth extraction were found to have dysfunctions of temporal, maxilla, mandibular, and sphenoid bones, concluding that they were predisposed to trigeminal neuralgia.[2] In the present patient, the dental trauma may have induced contracture of the right inferior alveolar nerve, multiple teeth compression, and mandibular compression. These are the key somatic dysfunctions that the treating physician addressed after SBS decompression.

The fetal development of the mandible is divided into 2 distinctive growth patterns characterized by intramembranous ossification of the mandibular body and endochondral ossification of the con-

(continued on page 17)

(continued from page 16)

dyle.[5] Lee et al suggest that the primary growth center of the mandible (MdPGC), located near the middle portion of the embryonal jaw, is an important anatomical landmark detected as a primary site of intramembranous and endochondral ossification from which the growth directions or amounts of mandible can be measured.[5]

The patient in this case had a compression located near the MdPGC at the division of the inferior alveolar and incisor nerve with enough compression on the nerve space to cause an adhesion and subsequent inferior alveolar nerve sheath contracture.

This mandibular compression may have caused reduced normal mobility in the mandible and altered compensatory pattern of motion holding the right temporal bone in internal rotation. As a result, the altered mechanics of the temporal bone may have physiologically induced an inferior and lateral strain on the right sphenoid. On the compensatory contralateral side, the left maxilla was externally rotated inducing a maxilla-zygoma compression.

Conclusion

Dental trauma and malocclusion can cause compression between cranial sutures which may disrupt normal physiologic motion. In this case, a patient with severe jaw pain after multiple root canal procedures was found to have multiple somatic dysfunctions, most notably an SBS compression, teeth compression and mandibular compression with an inferior alveolar nerve contracture. After a series of treatments to decompress and stabilize teeth to surrounding structures, the recommended endodontic procedure to insert a post to stabilize tooth 29 was no longer indicated. Therefore, through restoration of structure, near full function of the patient's teeth was restored, ultimately allowing her to chew solid foods again.

Addressing these key areas such as nerve contractures, compressed teeth and the mandibular-maxilla articulation with OMT can lead to clinically significant improvement in patients' cranial motion and ability to masticate with decreased pain. A patient with persistent head and jaw pain after dental work could significantly benefit from a referral to an osteopathic practitioner trained in OCMM to facilitate teeth restoration. This case suggests further research should be considered for the efficacy of cranial and osteopathic treatment for jaw pain after dental procedures.

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