Chiropractic Treatment of Temporomandibular Disorders Using the Activator Adjusting Instrument: A Prospective Case Series

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Abstract

Objective: To determine if there was a basis for the treatment of temporomandibular disease (TMD) using the chiropractic protocol developed by Activator Methods, International.

Setting: Private, solo practice of an Activator advanced proficiency rated chiropractor with 15 years experience.

Design: Prospective case series.

Participants: Nine adult volunteers with articular TMD recruited from the practice of the treating clinician.

Main Outcome Measures: Change from baseline to follow-up of Visual Analog Scale (VAS) for temporomandibular joint (TMJ) pain and maximum active mouth opening without pain.

Interventions: Full spine and TMJ adjusting in accordance with the advanced protocol of Activator Methods, International. Participants were typically seen 3 times per week for 2 weeks and according to individual progress thereafter for 6 more weeks.

Results: Eight participants completed outcome assessments. The median VAS decrease was 45 mm (range 21-71); all experienced improvement. The median increase of mouth opening was 9 mm (range 1-15); all showed improvement.

Conclusion: The results of this prospective case series indicated that the TMD symptoms of these participants improved following a course of treatment using the Activator Methods, International protocol. Consequently, further investigation of this type of chiropractic treatment for patients with the articular type of TMD is warranted. (J Manipulative Physiol Ther 2003;26:421-5)

Key Indexing Terms: *Temporomandibular Disorder; Temporomandibular Joint; Chiropractic Manipulation*

Introduction

Temporomandibular disorder (TMD) is a term that refers to 1 or more conditions that adversely affect the temporomandibular joint or the surrounding masticatory musculature. In general, TMD symptoms consist of pain at rest and/or during jaw function, limited range or disturbances of mandibular motion, and noises from within the temporomandibular joint (TMJ). The most common and general categorization of TMD is to dichotomize it into masticatory muscle disorders (myofascial disorders that affect the masticatory musculature) or TMJ articular disorders (those that directly affect the TMJ itself).

The demographics of those with TMD seeking care are primarily female (approximately 3 females to every male) and in the 25- to 44-year age bracket.[1] An extensive study has been conducted by ECRI, formerly the Emergency Care Research Institute, an independent nonprofit health services research agency with the main research campus in Plymouth, Pennsylvania. The study concluded that although 10 million Americans are estimated to experience clinically significant symptoms of TMD, treatment is often nonspecific and palliative, because the etiology of most forms of TMD is not well established.[2] Fricton et al[3] approximates that the annual cost for treating chronic craniomandibular pain is $32 billion. Epker et al[4] states that the high cost of that treatment is directly related to the unresponsiveness of

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TMD to traditional medical treatment approaches. Consequently, there is a wide range of therapies that are used in treating patients with TMD, including pharmacotherapy, splints, intra-articular injections of lubricants or anti-inflammatory agents, arthrocentesis (puncture and aspiration of the TMJ using an inflow and an outflow needle), physical therapy, and acupuncture. Less commonly used methods include ultrasound, low-level lasers, and transcutaneous electrical neuromuscular stimulation (TENS). Although there are some thousand papers in the literature concerning TMD, the effectiveness of the various treatments for TMD in general have been poor, inconsistent, or not well established. Therefore, it is not surprising that none of the numerous methods currently being used have come to be generally accepted as the treatment of choice for TMD.

Many chiropractors also treat patients with TMD. However, there are few articles in the peer-reviewed literature on this topic. Most are case histories with favorable results or descriptions of treatment protocols, such as those by Curl[5] or Alcantara et al.[6] Only 3 references were located involving chiropractic manipulation of the TMJ itself[7-9]; all were case reports. Only 1 prospective study was located; it described a pilot study involving 12 patients who were randomly assigned to a sham or a chiropractic treatment group. Improvement was reportedly similar in each group, although the authors were concerned that the sham treatment they used may have had an actual therapeutic effect. The treatment did not include manipulation of the TMJ itself.[10] None of the papers concerning chiropractic care of TMD included any use of the Activator Adjusting Instrument. (Activator Methods International, Phoenix, Ariz)

In view of the dearth of information about the efficacy of chiropractic treatment for patients with TMD, this prospective case series was undertaken as a preliminary effort to determine if there is any basis for the treatment of TMJ articular disorder type of TMD using 1 particular chiropractic protocol developed by Activator Methods, International, which is commonly claimed by its practitioners to provide good results.

Methods

The effect of the normal course of the Activator treatment protocol for TMD was documented in a private chiropractic office for participants with articular type disorders. The study was approved by the Institutional Review Boards of both the University of Iowa and Palmer College of Chiropractic. All study participants gave written informed consent. No compensation was provided to patients for their participation in this study and there was no additional cost to participants beyond that of their normal treatment.

Participants were recruited over a 3-month period in 2001 from patients presenting in the clinician's private solo practice of about 100 patient visits per week in a US midwestern community with a population of 70,000. No advertising was done to solicit participants for this study. Every patient who was approached agreed to be a participant in the study. The clinician for this study, 1 of the authors (WS), used the Activator Adjusting Instrument II (AAI) and the treatment protocol prescribed by the advanced protocol of Activator Methods, International in treating patients. He has 15 years experience with this method and is advanced rated by and a platform instructor for Activator Methods, International.

Inclusion requirements for patients to be participants in this study were:

1. TMD symptoms that were *articular* in nature, defined as having 1 or more of the following: pain within the TMJ, audible clicking or popping noises from the TMJ while chewing, difficulty in opening the mouth wide, and jaw locking in either the fully open position or while opening.
2. Symptoms of TMD for at least 6 months duration.
3. At least 18 years old.

Exclusion criteria were:

1. All TMD symptoms were of *myofascial* nature, defined as pain localized within the muscles around the jaw but not within the TMJ itself and no noises emanating from within the TMJ.
2. Other major health issues, such as cancer.

Participants received the Activator Methods, International protocol that this clinician typically used in treating patients with TMD. This included normal full spine adjusting with the AAI, 3 additional checks pertaining to the TMJ, and if indicated, the corresponding thrusts. Specifically, these checks were for anterior mandible, superior mandible, and lateral mandible. The corresponding thrusts, using the AAI, were contact on anterior aspect of the condyle below the TMJ with line of drive anterior to posterior and slightly inferior to superior, contact on upper third of the ramus with line of drive superior to inferior and slightly medial, and contact on the angle of the mandible with a line of drive straight medial. The AAI was set at 1 ring (low thrust) with the clinician's thumb placed between the tip of the AAI and the point of contact to prevent injury to the joint. The joint itself was not contacted directly, as shown in Figure 1.

Participants were seen 2 or 3 times per week for the first 2 weeks and then less frequently, depending on the progress of the individual participant. Participants were released from care when the treating clinician felt that maximum improvement had been reached.

At the first visit, prior to treatment, participants completed forms on demographic information and history of their TMD symptoms. The 2 outcome variables used in this study were a Visual Analog Scale (VAS) for TMJ pain and a measurement of maximum active mouth opening without pain. Participants indicated their baseline pain level on the VAS scale prior to the first treatment. The baseline mouth opening measurement was made according to a set protocol (see below) by the treating chiropractor prior to treatment.

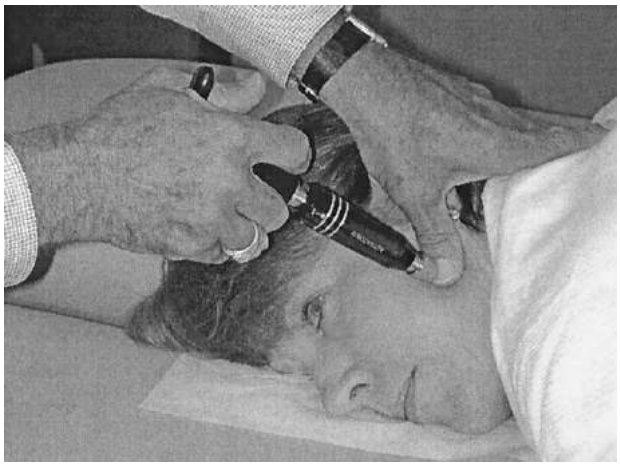

Fig 1. *Patient in position to be adjusted for temporomandibular dysfunction with an Activator Adjusting Instrument.*

The VAS is an instrument that has been widely used to quantify the intensity of pain of numerous types. Although subjective in nature, the VAS has been repeatedly shown to be both reliable and sensitive. The minimum clinically significant difference in VAS pain scores has been found to be 9 mm on a 100-mm scale, regardless of gender, age, or the cause of pain.[11] It has also been shown that the minimum clinically significant difference in the VAS pain score does not differ with the severity of the pain being experienced.[12] For the VAS in this study, the patient placed a vertical mark on a continuous 100-mm line to indicate their current pain status, ranging from no pain or discomfort to the worst pain you could possibly feel in the face or jaw.

The maximum mouth opening without pain measurement is commonly used in the dental profession as an outcome measure that is indicative of proper functioning of the TMJ. It has been shown to be reliable[13] and to have significant correlation with chewing ability as determined by patient self-report.[14] More specifically, it has been shown that the clinician must measure at least 9-mm improvement in maximal mouth opening to indicate clinical success in painfully restricted TMJ patients.[15] The mouth opening was measured by the chiropractor after he told the patient to open his or her mouth as far as possible without any pain or discomfort. The chiropractor then laid a disposable paper ruler across the mouth opening going from the right central incisor (tooth 8) to the opposing tooth. The width of the opening was recorded to the nearest millimeter.

The protocol for this measurement was established prior to beginning the study. The treating chiropractor was trained by a dentist in the Department of Hospital Dentistry in the University of Iowa Hospital and Clinics in the exact manner in which the dentist makes these measurements. Subsequently, 24 normal participants were measured 4 times using a disposable paper ruler, twice each by the dentist and by the chiropractor. The order of the measurements was by a predetermined randomized sequence, and the doctors were blinded to all previous measurements. Interclass correlation coefficients (ICC) and 95% confidence intervals (CI) were calculated to assess reliability of the measurements. The intrarater reliability for the chiropractor was ICC = 0.90 (CI: 0.78, 0.96) and for the dentist was ICC = 0.96 (CI: 0.90, 0.98). The interrater reliability for sequence 1 (dentist first, followed by chiropractor) was ICC = 0.86 (CI: 0.71, 0.94) and for sequence 2 (chiropractor followed by dentist) was ICC = 0.97 (CI: 0.92, 0.99). Given these results, the reliability of this measurement was considered adequate to proceed to the current study.

All completed forms were filed at a location other than the treating chiropractor's office. Outcome measurements were to be assessed on each patient's last treatment visit prior to final treatment. These 2 measurements were not used to manage patient care. Since the records were kept off-site, neither the clinician nor the participants were able to refer to the baseline measurements during subsequent assessments.

Results

Nine participants were enrolled over the 3-month period of recruitment. Demographic information, TMD history, and the baseline mouth opening measurement were obtained for all 9 participants; however, only 8 participants completed the baseline VAS for TMJ pain. Baseline data for all participants are given in Table 1. Seven of the 9 participants were female, and the median age of all participants was 27 years, with a range of 21 to 47. The median self-reported duration of symptoms was 8 years, ranging from 1 to 40 years. At baseline, the median VAS was 65 mm, ranging from 17 mm to 85 mm, and the median mouth opening was 38 mm, with a range of 15 mm to 55 mm.

Each participant was evaluated using the protocol of Activator Methods, International on each visit for the whole spine as well as the TMJ. Adjustments were given as indicated in the evaluation rather than by any set number or types of adjustments per visit so as to provide the participants with the same care they would have received had they not been in this study. Spinal adjustments of various types were given on most but not all visits for these patients. However, TMJ adjustments were given on virtually every visit of every participant.

Outcome assessments were not completed for 1 participant, although she did present for 8 treatment visits. Three of the participants had outcome assessments completed on the final visit as planned. The remaining 5 participants had outcome assessments prior to the last visit, although all but 1 were more than halfway through their treatment duration at the time of their outcome assessments. The outcome assessments are given for each participant in Table 2. The median VAS at outcome was 15 mm, with a range of 1 mm to 53 mm, indicating a median improvement of 45 mm, with a range of 21 mm to 71 mm. The median maximum amount

Table 1. *Baseline characteristics of each participant*

ID No.	Sex	Age	Height (in)	Weight (lb)	Duration of symptoms (y)	VAS (mm)	Mouth opening (mm)	TMD was chief complaint	Other treatment*	Medications†
1	M	21	70	160	1	56	55	Y	N	N
2	F	22	66	130	2	49	27	Y	N	Y
3	M	47	73	215	3		43	Y	Y	N
4	F	27	65	130	5	72	47	Y	Y	N
5	F	23	67	130	8	76	23	Y	Y	Y
6	F	36	60	131	10	58	21	Y	N	N
7	F	28	64	145	10	85	16	N	Y	N
8	F	25	66	120	14	17	38	N	N	N
9	F	45	68	200	40	83	38	N	N	N

(n = 9).
TMD, temporomandibular disease; *TMJ*, temporomandibular joint, *VAS*, Visual Analogue Scale.
*Question asked was: "Have you ever received any type health care for TMD?"
†Question asked was: "Do you take any medications for your TMJ symptoms?"

Table 2. *Outcome assessments of each participant*

ID No.	Total of treatment visits	Visit number of the outcome assessment	VAS (mm)	VAS improvement from baseline (mm)	VAS improvement from baseline (%)*	Mouth opening (mm)	Mouth opening improvement from baseline (mm)	Mouth opening improvement from baseline (%)
1	17	17	11	45	80	56	1	2
2	9	4	1	48	98	42	15	56
3	5	5	14			49	6	14
4	6	3	27	45	63	54	7	15
5	15	15	16	60	79	34	11	48
6	5	4	37	21	36	30	9	43
7	11	8	53	32	38	27	11	69
9	15	10	12	71	86	47	9	24

(n = 8); n is 1 less than for Table 1; there were no outcome assessments taken for 1 participant.
VAS, Visual Analogue Scale.
*The values in this column were calculated as [(outcome − baseline)/baseline] * 100.

of mouth opening without pain measurement at outcome was 44.5 mm, with a range of 27 mm to 56 mm, and the median improvement was 9 mm, with a range of 1 mm to 15 mm. There were no adverse reactions to treatment reported.

Discussion

Although the specific mechanisms of chiropractic treatment are not well understood or mutually agreed upon, they are commonly thought to improve the biomechanics of articulating structures. Chiropractic treatment is most often applied to the spine, but many chiropractic clinicians use well-established protocols to treat other structures, including hands, feet, knees, and even cranial bones, with the belief that they are improving the biomechanical functioning of those structures. Since articular TMD is believed to involve the biomechanical functioning of 1 or more of the structures within the TMJ, it seems reasonable to suppose that chiropractic treatment of the structures of the TMJ may well have a beneficial effect in cases of articular TMD. That notion is supported by the isolated events described in the case histories referred to in the Introduction and now also by the results of this preliminary study.

Maximum mouth opening was found to improve in every one of the 8 cases that had an outcome measure, with a median of a 9-mm increase. In view of Kropmans et al[15] finding that 9 mm was the smallest detectable difference, this result suggests clinical improvement. This is further strengthened by noting that all 3 of the cases with less than 9-mm improvement (1 mm, 6 mm, and 7 mm) had high baseline measurements (55 mm, 43 mm, and 47 mm, respectively), with the others in the case series being considerably lower.

VAS measurements were also seen to improve in each of the 7 cases that had both VAS measurements. The median decrease was 45 mm on a 100-mm scale, with a range of 21 mm to 71 mm. Inasmuch as Kelly[12] reports that 9 mm is the minimum clinically significant difference on a scale of 100 mm, the VAS results of this case series indicate a marked decrease in pain for the participants.

A limitation of this study is that there was no control group, which is inherent in a case-series type study. Therefore, any participant improvement noted over the course of the study may not be due specifically to the treatment given. This study was based on observing and documenting the condition of the participants before and after the clinician's regimen of treatment in his normal practice. However, it is of interest to note that the median duration of symptoms before beginning treatment was 8 years. Consequently, improvement seen over the course of the 3 to 8 weeks of care seen in this study may indicate an actual therapeutic effect. Future studies should include a control group.

One of the lessons learned in this preliminary study was the difficulty in obtaining follow-up for patients in ambulatory settings. The intent was to collect data at baseline and again at the last visit prior to treatment. However, that was not always possible. Fortunately, the clinician also collected data on some intermediate visits for most participants. Noting that 5 of 8 outcome assessments in this study were made before the last visit of the participant, we feel that the improvement reported here may actually be a conservative estimate of the overall effect.

The patients who were asked by the clinician and subsequently volunteered to become participants in this case series seem to be representative of the typical TMD sufferer seeking treatment, as described by Shimshak et al.[1] However, eligibility criteria will need to be more rigorous and verified in future studies.

Conclusion

The quantified results of both outcome measures used in this prospective case series indicate that the TMD symptoms of participants in this study improved following a course of treatment using the Activator Methods, International protocol for adjusting the TMJ. Consequently, further investigation of this type of chiropractic treatment for patients with the articular type of TMD is warranted.

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