Chiropractic management of frozen shoulder syndrome using a novel technique: a retrospective case series of 50 patients

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Abstract

Objective: The purpose of this case series is to describe the treatment and outcomes of a series of patients presenting with frozen shoulder syndrome who received a novel chiropractic approach (OTZ Tension Adjustment).

Methods: The files of 50 consecutive patients who presented to a private chiropractic practice with frozen shoulder syndrome were reviewed retrospectively. Two primary outcomes were extracted from the files for initial examination and at final evaluation: (1) the 11-point numeric pain rating scale and (2) the percentage change in shoulder abduction. Each patient received a series of chiropractic manipulative procedures that focused on the cervical and thoracic spine.

Results: Of the case files reviewed, 20 were male and 30 were female; and all were between the ages of 40 and 70 years. The median number of days under care was 28 days (range, 11 to 51 days). The median change in Numeric Pain Rating Scale score was –7 (range, 0 to –10). Of the 50 cases, 16 resolved completely (100% improvement), 25 showed 75% to 90% improvement, 8 showed 50% to 75% improvement, and 1 showed 0% to 50% improvement.

Conclusion: Most patients with frozen shoulder syndrome in this case series appeared to improve with the chiropractic treatment.

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Introduction

Frozen shoulder syndrome (FSS) is a common condition presenting to a variety of health care practitioners including chiropractors, osteopaths, medical doctors, and physical therapists. Also referred to as *adhesive capsulitis*, FSS remains one of the most poorly understood shoulder conditions,¹ with its etiology and pathogenesis largely disputed.² Recently, a consensus definition of FSS was reached by the American Shoulder and Elbow Surgeons to be “a condition characterized by functional restriction of both active and passive shoulder motion for which radiographs of the glenohumeral joint are essentially unremarkable...”¹

The prevalence of FSS is thought to be 2% to 5% of the general population.^{2,3} It occurs usually between 40 and 60 years of age,³ is 3 to 7 times more prevalent in women than men,⁴ and can be classified as either primary or secondary.¹ A diagnosis of primary (or idiopathic) FSS is made if no causative factors are identified on history or examination.³ Secondary FSS is thought to develop following some trauma or systemic condition.¹ For instance, there is a high comorbidity of FSS in patients with diabetes, with incidence rates nearing 40%.⁵ In addition, FSS is also commonly found in those with Parkinson disease, cardiovascular disease, thyroid disease, and stroke.^{6,7}

In the absence of other pathological processes, a diagnosis of FSS is made if the following criteria are present: an insidious onset, night pain, painful restriction of passive scapulohumeral elevation causing shoulder abduction of less than 100°, and shoulder external rotation of less than half of normal.³

The current medical paradigm divides the natural history of FSS into 3 stages (Fig 1): (1) the freezing stage, characterized by diffuse pain and loss of motion (2-9 months); (2) the frozen stage, where pain decreases and

stiffness has maximized (4-12 months); and (3) the thawing stage, characterized by a gradual normalization of mobility and function (4-12 months).^{3,8} Reeves,⁸ who first described the 3 stages of the condition, reported that FSS usually lasts from 1 to 3.5 years with a mean duration of 30 months. However, Shaffer et al reported that, after 7 years, 50% of the cohort they studied continued to have residual pain and/or loss of shoulder function.⁹

The underlying etiology of FSS is largely disputed; but it is commonly thought that its origins lie in biologic factors, mechanical stress, and/or neovascularization of the shoulder joint complex.³ However, it is hypothesized that the etiology of FSS is not as the current paradigm describes, but rather is neuromechanical in nature, originating in the cervical spine, cranium, occipitoatlantal joints, and/or cranial nerve 11 (CNXI) and causing malfunction of the trapezius muscle resulting in a breakdown of the entire dynamic shoulder complex.¹⁰ In fact, the literature well describes the most common symptoms of CNXI injury as (1) reduced shoulder abduction, (1) drooped shoulder (tie), and (3) shoulder pain,¹¹ which are also common symptoms of FSS.^{1,3} The inference that CNXI might be related to FSS is the next logical step.

Support for a chiropractic approach toward FSS is currently limited to a small pilot study¹² and a number of case reports.^{13,14} Common medical approaches toward intervention focus on addressing the medical etiology, namely, the shoulder joint complex. These include nonsteroidal anti-inflammatory drugs,^{3,15} steroid injection,^{2,15,16} and shoulder surgery.^{2,17} Interventions that physical therapists frequently use include moist heat, ultrasonography, passive stretching, and shoulder mobilization.¹⁸⁻²¹ In addition, there is some evidence in the physical therapy literature to support manipulation of the cervical spine or cervicothoracic spine for shoulder complaints.²²⁻²⁶ Patients may experience resolution when treated by these various methods, but some may have residual pain and reduced shoulder function even several years after treatment.³ It is clear that a more durable intervention is needed.

The purpose of this article is to describe the outcomes of patients with FSS presenting to a private chiropractic practice that used a novel chiropractic treatment, the OTZ Tension Adjustment.

Case series

Case files of 50 consecutive patients presenting with medically diagnosed FSS between May 2007 and

Fig 1. The three phases of FSS, first described by Reeves.⁸ (Adapted from Hsu et al.³)

March 2008 were identified and reviewed retrospectively. Institutional Review Board approval was obtained for this retrospective case series (Parker University IRB Approval # R03_11).

The patients initially presented with active shoulder abduction restricted to 90° or less in the affected shoulder. Two primary outcomes were extracted from the patient records at 2 points in time, upon initial examination and at the final evaluation: (1) the 11-point verbal Numeric Pain Rating Scale (NPRS; 0 = no pain to 10 = worst pain possible), which has been shown to be a valid and reliable measure in patients with shoulder pain,²⁷ and (2) the percentage change in active shoulder abduction, with 100% improvement meaning the patient achieved the norm of 180° of pain-free active abduction.²⁸ Shoulder abduction was measured twice, at the initial and final visits, by the same assessor using a wall goniometer (Fig 2) with the patient's humeral head positioned in the center of the circle. Each patient received a series of chiropractic manipulation treatments, by the same practitioner, focusing on the cervical and thoracic spine.

The manipulation included an adjustment called the *One-to-Zero (OTZ) Tension Adjustment* (OTZ Health Education Systems, Dallas, TX). The OTZ Tension Adjustment aims to correct occipitoatlantal articular dysfunction (C0-C1 chiropractic subluxation).²⁹ It is theorized that the technique identifies aberrant alignment of the occipitoatlantal articulation through visual inspection and motion palpation.²⁹ In the procedure,

the doctor is seated at the head of the supine patient and first performs a specific skull glide to determine the exact orientation of the dysfunctional joint¹⁰ (Fig 3). A high-velocity, low-amplitude thrust is delivered at the level of the dysfunctional C0-C1 joint into the direction of maximal restriction. The general line of drive is posterior to anterior, lateral to medial, and slightly superior to inferior (Fig 4).¹⁰ After the adjustment is made, the skull glide palpation is performed again to confirm correction of the dysfunction.

Results

Of the 50 case files reviewed, 40% were male ($n = 20$) and 60% were female ($n = 30$); and all were between the ages of 40 and 70 years. The median number of days in the treatment program was 28 days, with a range of 11 to 51 days, and interquartile range (IQR) of 12.5 days. The median initial NPRS score was 9 out of 10 with a range of 7 to 10 and an ICQ of 1.0. The median final NPRS score was 2 with a range of 0 to 10. The median change in NPRS score was -7 with a range of 0 to -10 . Of the 50 cases, 16 resolved completely, regaining 180° of pain-free active shoulder abduction (and 0 NPRS score). Another 25 showed 75% to 90% improvement in active abduction, 8 showed 50% to 75% improvement, and 1 showed 0% to 50% improvement (Table 1).

Fig 2. Example of one patient with FSS before (left) and after (right) an OTZ Tension Adjustment. (Color version of figure is available online.)

Fig 3. OTZ specific skull glide example positioning. (Color version of figure is available online.)

Discussion

Frozen shoulder syndrome is a common condition of insidious onset affecting middle-aged persons, yet its etiology is still unclear. The current medical approach is slow to show progress; and also, there is presently little evidence to support chiropractic management of this condition. The results of this case series are encouraging in that many of these patients' complaints seemed to improve or resolve within 1 month of presentation, whereas, in general, it is thought that FSS symptoms can persist for 2 years or more.⁸

It is speculated that the etiology of FSS lies in altered neuromechanical function of the trapezius muscle. Increased hypertonicity of the upper fibers of the upper trapezius and sternocleidomastoideus (SCM) creates an adverse positioning of the occipitoatlantal articulation.³⁰ It is posited that forward head posture results in this

Fig 4. OTZ Tension Adjustment setup positioning. (Color version of figure is available online.)

Table 1 Profile of patients in study (N = 50)

Age range (y)	40-70
Male:female	20:30
Median # days in treatment (IQR)	28 (12.5)
Median # treatments (IQR)	7 (4.0)
Median treatment frequency: #/mo (IQR)	8 (2.0)
Median initial NPRS score (IQR)	9 (1.0)
Median final NPRS score (IQR)	2 (2.0)
Median change in NPRS score (IQR)	-7 (2.0)
Percent improvement in active abduction * (n)	
90%-100%	16
75%-900%	25
50%-75%	8
Less than 50%	1

NPRS: 0 to 10 (with 0 = no pain, 10 = worst pain ever). *IQR*, interquartile range.

* Percentage improvement in active shoulder abduction of affected shoulder at final assessment.

abnormal tonus and may therefore cause dysfunction in the spinal accessory nerve and/or trapezius and/or SCM. This dysfunction may then cause the inability of the trapezius to properly position the scapula in preparation for shoulder abduction greater than 90°. This will produce the first hallmark of FSS: a decrease in shoulder range of motion (ROM). Improper positioning of the scapula may result in the humeral head compressing sensitive tissue in the subacromial space, which would cause the second hallmark of FSS: pain on scapulohumeral elevation. This biomechanical alteration will result in inflammation and, over time, in inter- and intraarticular adhesions and fibrosis, often seen in long-standing disease and evidenced by radiographic or arthroscopic examinations.³ However, it is hypothesized that the fibrosis and adhesions are the sequelae of neurobiomechanical alterations involving forward head posture and trapezius and scapulocostal articulation dysfunctions, and not the cause of the syndrome itself (Fig 5).

It is further hypothesized that the OTZ Tension Adjustment restores normal function of C0-C1, trapezius, and SCM, thereby restoring normal glenohumeral mechanics, improving shoulder ROM, and reducing pain on elevation of the arm.

Conservative (ie, nonsurgical) medical interventions for FSS include nonsteroidal anti-inflammatory drugs, steroid injections and oral steroids, nerve blockades, hydrodilatation, heat therapy, stretching, and manipulation under anesthesia.³ The evidence suggests that, after 3 or more months of traditional treatment, patients experience a reduction in pain and improved function.³ In addition, although manipulation under anesthesia has been extensively described in the medical literature, it is routinely only performed on the shoulder joint

Fig 5. One hypothesized mechanism of the etiology of FSS.

complex, does not involve any spinal joints, and has also been associated with a number of serious iatrogenic complications.³ A safer and more immediate conservative therapy is needed.

It has been previously shown that some shoulder complaints resolve after practitioner-applied manipulation.^{18,22-26,31-33} However, with regard to the efficacy of chiropractic adjustments specifically for shoulder complaints, the current evidence is limited,³⁴ consisting of one small pilot study,¹² a qualitative study,³⁵ and a number of case reports^{13,14,34,36} (such as this one). It is clear that additional efficacy research is needed.

In this case series, patients presented with medically diagnosed FSS; however, they all exhibited some degree of shoulder pain and reduced shoulder abduction. Because syndrome diagnoses are often vague and confusing, there is currently a trend away from many shoulder diagnoses, such as *FSS* or *adhesive capsulitis*, and toward a more descriptive term such as *shoulder pain* or *shoulder pain and dysfunction*.^{24,31} Future research should follow this trend.

Limitations and future research

Because there have been no studies yet published on this technique, a case series format was the logical place to start. As a result, the limitations of this study are those for any case series, such as that the management of these patients occurred within a private chiropractic practice, which was not controlled.³⁷ Another limitation is the use of a measure that itself lacks evidence of validity. A more accepted measure of joint ROM would have strengthened our findings, as would the use of continuous rather than discrete data. The inclusion of additional clinical information, such as duration of symptomatology before presentation and number of adjustments given, would have also strengthened this case series.

Caution is urged when drawing definitive conclusions from these results or when generalizing to other patients.³⁷ This study would have been strengthened by the reporting of the length of time the patients had the FSS symptoms before presentation. As well, long-term follow up to identify if there was reoccurrence is suggested for future studies.

Future research could include a 2-pronged approach. First, a randomized controlled clinical trial could be conducted to ascertain if a cause-and-effect relationship exists between the OTZ Tension Adjustment and relief of FSS symptoms. Second, basic science research could be applied to determine if neurological dysfunction (including CNXI) is involved in FSS pathogenesis. Future research is warranted and should consist of experimental clinical trials testing the effectiveness of the OTZ Tension Adjustment in a controlled setting.

Conclusion

This retrospective case series of the outcome of chiropractic treatment for patients with FSS using the OTZ Tension Adjustment for FSS was reported with encouraging preliminary results.

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