The Use of Strain-Counterstrain in the Treatment of Patients with Low Back Pain

Cynan Lewis, MScPT, MTC, MAPA
Timothy W. Flynn, PT, PhD, OCS, FAAOMPT

Abstract: Strain-Counterstrain (S-CS) is a manipulative technique routinely used by manual practitioners to treat somatic dysfunction. However, no peer-reviewed literature to support or refute its use has been reported. In the four clinical cases reported, S-CS was initially provided as the sole treatment for low back pain. The S-CS intervention phase for each case took approximately one week and consisted of 2 to 3 treatment sessions to resolve perceived "aberrant neuromuscular activity." Outcome measures were derived from the McGill Pain Questionnaire and the Oswestry Low Back Pain Disability Questionnaire. All patients registered reductions in pain and disability following S-CS intervention. No experimental evidence for the effectiveness of S-CS is offered, although outcomes do suggest that a controlled study is warranted to examine the effectiveness of S-CS for the treatment of low back pain.

Key Words: Strain-counterstrain, Case series, Low back pain

Strain-Counterstrain (S-CS) is a gentle, indirect manipulative technique for the treatment of somatic dysfunction. It is one of several treatment approaches where positioning of the body is used to evoke a therapeutic effect. These approaches have been categorized as "positional release" and include "functional technique" and "facilitated positional release"[1]. When using the S-CS technique, a dysfunctional joint is passively moved to a position of ease rather than into the motion restriction. The technique was reported by Jones[2], who initially referred to it as "spontaneous release by positioning"[2] and later as "positional release technique"[3], before settling on the current label. He suggested that myofascial "tender points" were associated with specific somatic dysfunctions and could be used to diagnose and guide treatment for these dysfunctions[4].

Tender points have been described as small zones of intense, tender, edematous muscle and fascial tissue about a centimeter in diameter[4]. S-CS techniques reportedly require the clinician to perform a scan of potential tender point sites. Certain tender points are reportedly significant in the treatment of lower back pain, including the lower four thoracic, lumbar, and sacral points, and the anterior and posterior pelvic points[5,6]. Typically, more than one tender point is identified. Re-

Address all correspondence and request for reprints to:
Cynan Lewis
P.O. Box 630,
Stanthorpe, Qld, Australia.
cynan_lewis@hotmail.com

The Journal of Manual & Manipulative Therapy
Vol. 9 No. 2 (2001), 92 - 98

portedly, release of these tender points will result in decreased pain and improved function in individuals with low back pain though, to our knowledge, no peer-reviewed evidence supports this.

Release of tender points is achieved by passively positioning the client/patient at what is termed the "mobile point"[5]. The mobile point is the point of maximum ease or relaxation from which any movement produces an increase in tissue tension beneath the monitoring finger at the selected tender point site[4,5]. The mobile point is further defined as the position in which there is a two-thirds reduction in tenderness at the monitored tender point site[4]. Both perceived tissue tension and patient-reported tenderness with intermittent probing are used to guide the clinician to the mobile point[5,7]. Tenderness at the selected point may persist in the position of ease for approximately 20-30 seconds[5]. Once the mobile point is located, the clinician maintains the relaxed position for approximately 90 seconds before slowly returning the patient to a neutral position[4,5]. Both the maintenance of the relaxed position for 90 seconds and the slow return to neutral following positioning are reportedly critical for effective treatment[4,5].

To date, support for the use of S-CS in treating low back pain is largely anecdotal and takes the form of personal testimonies[3,4,5,7,8]. To our knowledge, peer-reviewed evidence that supports S-CS as an effective treatment for low back pain is nonexistant. Prior to a randomized clinical trial to examine S-CS, a logical first step is to report its potential value in a series of cases[9]. This case report describes the application and outcomes of S-CS in four patients referred with lower back pain.

Methods

Universal Health Systems and the Institutional Review Board of the University of St. Augustine for Health Sciences (Florida) approved the study. The patients described in the case report were referred to a comprehensive outpatient rehabilitation facility for treatment of lower back pain. All patients selected were English-speaking and signed informed consent. Exclusion criteria were a diagnosis of systemic inflammatory disease or an absence of two or more S-CS tender points at scanned sites.

Initial evaluation for each patient included self-reporting instruments; history; observation; palpation for bony landmarks; neurological screening; spinal range of motion; and S-CS assessment. The self-reports included the McGill Pain Questionnaire (MPQ) and the Oswestry Low Back Pain Disability Questionnaire. The index generated from the Oswestry Questionnaire is the Oswestry Disability Index (ODI), which is reliable, valid, and responsive to change[10].

The MPQ included a body chart to allow subjects to illustrate their pain and designate pain depth. The index derived from the MPQ is the Pain Rating Index (PRI). Melzack[11] found this index to be the most valid and stable of those derived from the MPQ for reflecting changes in pain. The instructions provided on each questionnaire were read aloud to subjects. The S-CS assessment consisted of a scan of tender point sites reportedly associated with low back pain[5]. An anatomical site was defined as being a tender point if it was estimated to be, based on subjective feedback, four times more sensitive to palpatory pressure than the adjacent region[5].

Following initial evaluation, the subjects were informed that treatment would consist of release of their tender points. In addition, subjects were told that tender points are indicative of abnormal muscle activity that may be contributing to their back pain. Furthermore, they were told that passive positioning would be used to release this muscle activity.

Tender points were released according to the techniques and guidelines provided by Jones et al.[5] and Kusunose[4]. Release of tender points was achieved by passively positioning the patient at the respective mobile point for each tender point[5]. Both perceived tissue tension and edema, and patient-reported tenderness with intermittent probing were used to guide positioning to the mobile point[5,7]. No more than 6 tender points were released at each treatment session. A tender point was considered released if a reduction of greater than 70% tenderness was achieved[4]. Clinically, this was determined by first asking the patient to imagine that their initial tenderness was represented by one dollar. The patient was then asked to give a value in cents for the tenderness at the same site following tender point release. For follow-up treatments, only those tender points identified in the initial assessment were re-scanned[5]. Note: the S-CS treatment positions for patient 3 were modified to accommodate the fact that this patient was not able to lie prone. Instead, release of tender points typically treated in prone was performed in side-lying.

Three patients received three S-CS treatment sessions each while the remaining patient's tender points were released in two sessions. Treatment sessions were spaced 2 to 3 days apart. The S-SC treatments were provided within 7 days. No other physical therapy intervention was provided concurrently with S-CS treatment. Two days following the last S-CS treatment session, the patient responded again to the two self-report questionnaires. Furthermore, at discharge from physical therapy and 4-weeks post discharge, the patients responded using the two self-report questionnaires.

Cases

Patient 1

Patient 1 was a 28 year old Latin American female with a 12-year history of low back pain following a fall from a horse (Table 1). Prior to this, she could not recall

Table 1: Patient historical data

Patient	1	2	3	4
Age	28	37	19	70
Gender	Female	Male	Female	Female
Height (cm)	159	165	170	158
Weight (kg)	68	73	82	63
Occupation	Clerk	Physical Therapist	Student	Retiree
Medical history	Frequent kidney infections; cholecystectomy; removal of benign cervical tumor	Not significant	Not significant	Partial thyroidectomy; removal of calcium deposits at(R) shoulder, appendectomy; cholecystectomy; colon resection; diverticulitis
Medications	Alleve, Darvocet	No	Tylenol and Codeine	Norflex
Aerobic exercise per week	3	No	No	No
Smoker	No	No	No	No

having experienced low back pain. Pain was located at the lower to mid-lumbar region and at times extended laterally to the upper buttocks. Following the accident, the patient reported that the X-ray had revealed a "chipped" vertebra (level unknown) and the MRI had revealed a "bulging" disc (level unknown). These could not be located for viewing and no recent diagnostic imaging had been performed. Pain was experienced continuously but varied in intensity (minimum to maximum intensity on visual analog scale: 4/10 - 10/10). Pain was worsened by prolonged "upright" sitting (approximately 30 minutes) and standing (approximately 30 minutes) and was relieved with slumped sitting, walking and regular postural change. The patient's ODI and PRI scores on initial exam and 48 hours after the third S-CS treatment are presented in Table 2. Numbness was occasionally experienced at the anterior aspect of the left lower extremity (thigh and shin) with strenuous activity. Simultaneous "tingling" paraesthesia was also experienced at the lateral aspect of the fifth digit and at the end of the first digit of the right foot. According to Von Korff[12], this patient would be classified as having "chronic" pain, since pain had been experienced on at least half the days in a 12-month period. The patient did not display "illness behavior" or exhibit signs of "hopelessness" inferred from her selection of pain descriptors on the McGill Questionnaire and the fact that she continued to work full-time.

During physical examination, an endo-mesomorph body type was noted. The thoracic spine was flattened, particularly the upper thoracic segments and a reduced lumbar lordosis extending superiorly to lower thoracic levels was observed. Bony landmarks were symmetrical. Neurological assessment was within normal limits (Table 3). During spinal movement assessment, an audible click was noted on forward bending with gross range of movement (ROM) within normal limits and no increased pain reported. Tape measurement for lumbar forward bend was 5.5cm[13]. Increased movement with backward bending was observed at lower lumbar levels; however, gross ROM was within normal limits with no increased pain reported.

Fifteen tender points were found at multiple locations (Table 4). The following 11 points were manually released during 3 sessions over 5 days: L anterior: AT7, AL5; R anterior: AL1, Ing; L posterior: PL2, LPL5; R posterior: UPL5, PL3 iliac, PS1, PS5, LT while the remaining 4 tender points (L anterior: AT12, AL1; L posterior: HISI, PIR) released without specific treatment. After the patient returned following the last S-CS session, she was provided with an exercise program for spinal stabilization. Four weeks later, her PRI and ODI scores remained the same as noted at the conclusion of S-CS treatment.

Table 2: Pre and Posts-CS intervention PRI and ODI scores and the number of tender points released for each patient

Patient	Pre Rx S-CS		No. of S-CS pts. rel.	Post Rx S-CS		Discharge from PT		4 weeks post discharge	
	PRI	ODI		PRI	ODI	PRI	ODI	PRI	ODI
1	10	26	11	0	10	-	-	0	10
2	14	26	3	0	0	-	-	0	0
3	15	71	7	0	31	-	-	-	-
4	23	31	9	6	17	0	0	0	0

- = not assessed
Patient 1&3: PT post S-CS treatment consisted of a home exercise program.
Patient 2: Discharged from PT occurred following the S-CS treatment.
Patient 4: Only subject with a complete set of results.

Patient 2

Patient 2 was a 37 year old Asian male (Indian subcontinent) with a 4-year history of pain in the region of the lumbosacral junction (Table 1). Onset of pain had been gradual and had worsened in the last year. Prior to this, he could not recall having experienced low back pain of any significance. No diagnostic imaging tests had been performed. Pain was intermittent, exacerbated by prolonged sitting (approximately 10 minutes), standing (approximately 30 minutes), and walking (approximately a mile). Pain was eased with postural change, side-lying (with pillow between knees), and supine-lying with knees flexed. Pain was variable with minimum to maximum intensity on visual analog scale: 0/10 - 8/10. Occasionally, following prolonged standing, numbness was experienced in the posterolateral buttocks and the posterior aspects of the lower extremities to the level of the midcalf. Classification for this patient by Von Korff[12] would be "chronic" pain.

An endo-ectomorph body type was noted during physical examination, with a forward head position (lower cervical forward bend with upper cervical backward bend), flat thoracic spine, accentuated lumbosacral angle, protruding abdomen, and apparent increased muscle tone at the thoracic and lumbar paraspinals bilaterally. Bony landmarks were level, and neurological assessment was within normal limits (Table 3). During spinal movement assessment, reduced movement was noted in the mid to upper thoracic segments for forward bending, though gross ROM was within normal limits and painfree. Tape measurement for lumbar forward bending was 6.0cm[13]. Backward-bending ROM was within normal range but pain was reported at end of range. Sidebending ROM was within normal range, symmetrical and painfree.

Tender points were found at three locations (Table 4). The following points were manually released during 2 sessions over 4 days: R posterior: PS1, PS3 and PS5. After the patient returned following the last S-CS session, he was discharged without further treatment. Four weeks later his PRI and ODI scores remained at zero (Table 2).

Patient 3

Patient 3 was a 19 year old Latin American female, 18 weeks into her first pregnancy and complaining of pain from the lumbosacral region to the left greater trochanter area (Table 1). Pain began 5 days prior to the first consultation after the patient had reportedly fallen out of bed. Prior to this pain, the patient had experienced an intermittent ache at the lower back since approximately the sixth week of her pregnancy. No diagnostic imaging had been performed. Pain was continuous and worsened by sitting for approximately 15 minutes; sooner in a motor vehicle and particularly intense on rough roads (minimum to maximum intensity on visual analog scale: 8/10 - 10/10). Walking for more than a couple of minutes also worsened the pain. Short-term relief for pain was provided by medication. The patient also reported numbness in both legs, extending to the feet, after approximately 5 minutes of sitting. This patient was categorized as having "acute" low back pain[12].

During physical exam an endo-mesomorph body type was noted with spinal curves within normal limits. Bony landmarks were level. Neurological evaluation revealed reduction in muscle strength (4/5) and sensation at the left L5 and S1 myotomes and dermatomes respectively (Table 3). Testing of the left L5 and S1 myotomes (extensor hallucis longus, peroneals, and gastrocnemius) was accompanied by increased back pain. During spinal movement assessment, increased pain was noted with initiation of lumbar forward bending. Gross forward bending movement was reduced with a tape measurement for lumbar

Table 3: Pre S-CS intervedntion-neurological screening

Objective Measure	Patient 1	Patient 2	Patient 3	Patient 4
SLR: (L) SLR: (R)	80° (-ve) 80°(-ve)	50° (-ve) 45° (-ve)	25° (+ve) 30° (+ve)	75° (-ve) 75° (-ve)
Dermatomes Myotomes DTRs	Normal Normal Normal	Normal Normal Normal	L5, S1 deficits L5, S1 deficits Normal	Normal Normal Normal (with Jendrassik)

Table 4: S-CS tender points for each patients

Patient	S-CS Tenderpoints	
	Anterior	**Posterior**
1	L: AT7, AT12, AL1, AL5; R: AL1, Ing	L: PL2, LPL5, HISI, PIR; R: UPL5, PL3 iliac, PS1, PS5, LT
2	R: PS1, PS3, PS5	
3	L: AT11, AT12, AL1, AL5	L: UPL5, LPL5, PS5; R: PS5, QL3, PL3
4	R: AT9, AbL2	R: PL2, PL3, PL4, PL5, QL2, QL3, QL4

forward bend of 2.5cm[13]. Backward bending ROM was within normal limits with increased pain reported near end range. Side-bending ROM was within normal limits and symmetrical but with increased pain reported at end range bilaterally.

Ten tender points were found at multiple locations (Table 4). The following 7 points were manually released during 3 treatments over 7 days: L anterior: AT11, AL1, AL5 ; L posterior: UPL5, PS5; R posterior: PS5, QL3 while the remaining 3 tender points (L anterior: AT12; L posterior: LPL5; R posterior PL3) released without specific treatment.

Following S-CS intervention, her PRI was zero and her ODI was 31 (Table 2). Patient 3 was given ergonomic instruction and provided with an exercise program to offset the postural spinal stresses of pregnancy. She did not respond to the questionnaires again.

Patient 4

Patient 4 was a 70 year old white female complaining of pain in the right lumbar region (Table 1). Pain began 5 days before the initial consultation, after the patient had lifted a 5-gallon water container. The patient had no history of low back pain prior to this episode. No diagnostic imaging had been performed. Pain was intermittent and exacerbated by standing approximately 5 minutes and eased with application of heat, ice, and use of a vibrator and massage (minimum to maximum intensity on visual analog scale: 0/10 - 7/10). Von Korff[12] would classify this patient as "first onset" (the first occurrence of pain in the person's life); De Rosa and Porterfield[14] would consider the patient to be "acute" and of Category 1 (back pain without radiation).

A mesomorph body type was noted during physical examination, with a slightly reduced lumbar lordosis and a slight dowager's hump. Bony landmarks were level and neurological assessment was normal with deep tendon reflexes elicited with the Jendrassik maneuver[15]. During spinal movement assessment, reduced movement was observed at lower lumbar segments in forward bending; however, gross ROM was within normal limits and pain free. Tape measurement for lumbar forward bend was 5.5cm[13]. Backward bending gross ROM was within normal limits and pain free. Side-bending ROM was within normal limits although mild LBP was reported at end range of right side bending. Tender points were found at multiple locations (Table 4). The following points were

manually released during 3 treatments over 7 days: R anterior: AT9, AbL2; R posterior: PL2, PL3, PL4, PL5, QL2, QL3, QL4. Following the last S-CS treatment session, her PRI was 6 and her ODI was 17 (Table 2). The patient attended 3 additional treatment sessions over 5 days. Treatment at these sessions included soft tissue manipulation, particularly targeting the lumbar paraspinals and right quadratus lumborum, and joint mobilization. PRI and ODI scores were both zero following this additional treatment. Four weeks following completion of treatment these scores remained unchanged.

Discussion

The purpose of this case report was to describe the effect of S-CS intervention, as advocated by Jones et al.[5], for treatment of low back pain in four clinical patients. Patients were chosen for presentation to demonstrate the effect of S-CS for individuals from several patient categories. Additionally, they were chosen because S-CS treatment had been, for these patients, the sole intervention provided prior to re-evaluation with outcome measures, allowing the effect of the S-CS intervention to be examined in relative isolation from other therapeutic interventions. The McGill and Oswestry questionnaires were chosen to generate outcome measures that reflected the multidimensional nature of low back pain and associated loss of function. A challenging issue in LBP research continues to be the determination of minimum clinically relevant change and the responsiveness of instruments to capture this[16]. Beurskens et al noted that an 11.9 point change in ODI scores with an effect size of 0.8 (mean change score divided by the standard deviation of the mean change score) following 5 weeks of LBP treatment represented clinically meaningful change[17]. In the present study the mean change in ODI scores was 14.0 points (range 14 - 40) with an effect size of 2.0; thus, the ODI scores were reduced by greater than 11.9 points for all of the patients presented. Furthermore, the change occurred within 9 days of initial treatment. All patients reported a dramatic reduction in pain: three reported complete relief and the fourth a 74% reduction (PRI post S-CS intervention expressed as a percentage of PRI pre S-CS intervention).

From an analysis of disability in 480 patients, Waddell[13] identified 8 items of assessment that were significant in predicting of future disability for patients with low back pain. These were anatomic pattern of pain, time pattern of attacks, lumbar flexion, straight leg raising (both left and right), nerve compression signs, previous lumbar surgery, and previous spinal fracture. Roland and Morris[18] identified as significant prognostic risk factors for poor outcome the following: straight leg raise (SLR) less than 60 degrees in either leg, gradual onset of pain ($p < 0.01$), duration of pain for greater than one week prior to consultation, and painful lumbar flexion ($p < 0.05$). Abnormal neurological signs were found by these researchers to be of prognostic value for sickness absence but not for disability, as measured by their questionnaire[18].

Patient 1 reported pain of sudden onset, localized to the lower back and buttocks. Lumbar flexion and neurological assessment, including bilateral SLR, were within normal limits. These characteristics, and the fact that she had not undergone lumbar surgery, would suggest a good prognosis for disability. Conversely, the history of spinal fracture with the initial injury to the low back and of exacerbations for 12 years following this would indicate that disability would persist. Following S-CS intervention, this patient obtained complete relief of low back pain and a reduction of 16% points in disability.

Characteristics of the low back pain of Patient 2 that would suggest poor prognosis were gradual onset and frequent exacerbation for 4 years. Paraesthesia in the lower extremities and buttocks might also be an indicator of poor prognosis. However, this patient had both normal neurological assessment (including bilateral SLR) and lumbar flexion. She also had no history of spinal fracture or lumbar surgery. This patient obtained complete relief of pain and absence of disability following S-CS intervention.

Several characteristics of the low back pain for Patient 3 were suggestive of poor prognosis. These included limited forward bend, SLR, and other neurological deficits. Features that pointed to a good prognosis were the sudden and recent onset of low back pain that was confined to the lumbosacral and left trochanteric regions. Additionally, this patient had no history of spinal fracture or lumbar surgery. Her pregnancy was a potentially confounding factor. The effect of S-CS intervention for this patient was particularly dramatic, with complete relief of pain and reduction by 40% points in disability.

Patient 4 had low back pain characteristics that overwhelmingly indicated a good prognosis. These included pain of sudden and recent onset that was localized to the right lumbar region. She had normal objective measures and no history of spinal fractures or lumbar surgery. A factor that might have indicated a poor prognosis was her age (70 years), presumably with significant degenerative changes to the spine; although this had not been confirmed with diagnostic imagery. With S-CS intervention, this patient had a modest reduction in disability (14% points) and a pronounced reduction in pain (74%).

No experimental evidence for the effectiveness of S-CS is offered. The favorable outcome measures following S-CS intervention for the cases reported suggest that a larger case series or randomized trial is warranted to examine the effectiveness of S-CS for the treatment of low back pain, using the assessment and treatment protocols devised and advocated by Jones et al.[5].

Summary

Four clinical cases are reported in which Strain-Counterstrain (S-CS) was used to treat low back pain. For the cases reported, an attempt was made to isolate S-CS intervention from other therapeutic interventions. Outcome measures for pain and disability were derived from the McGill Pain Questionnaire and the Oswestry Low Back Pain Disability Questionnaire, respectively. For the cases reported, all patients had reductions in disability (ODI) scores greater than that expected for recovery without intervention. Also reported were pronounced reductions in pain following S-CS intervention. No experimental evidence is offered, although the favorable outcomes suggest that a randomized trial is warranted to examine the effects of S-CS intervention on low back pain.

Acknowledgments

This paper is an abbreviated form of one completed in partial fulfillment of the requirements for the Master of Science in Physical Therapy degree at the University of St. Augustine for Health Sciences in Florida The primary author would like to acknowledge David Morrisette, PT, PhD, for his advice during the course of the study and Richard Jensen, PT, PhD, the Director of Advanced Studies at the University of St. Augustine for Health Sciences, and Sandra Brito de la Tejera, PT, Director of Rehabilatation North, for their assistance.□

REFERENCES

1. Chaitow L. *Positional Release Techniques*. London: Churchill Livingstone, 1996.
2. Jones LH. Spontaneous release by positioning. *The D.O.* 1964 Jan: 109-116.
3. Jones LH. Foot treatment without hand trauma. *JAQA* 1973;72:481-489.
4. Kusunose R. Strain and Counterstrain. Chapter 13. *Rational Manual Therapies*. Basmajian JV, Nyberg R. eds). Baltimore: Williams and Wilkins, 1993.
5. Jones LH, Kusunose RS, Goering EK. *Jones Strain-Counterstrain*. Boise: Jones Strain-Counterstrain, 1995.
6. Kusunose RS, Wendorff R. *Strain and Counterstrain Syllabus*. Encinitas: Jones Institute, 1990.
7. Chaitow L. *Soft Tissue Manipulation: A Practitioner's Guide to the Diagnosis and Treatment of Soft Tissue Dysfunction and Reflex Activity*. Wellingborough: Thorsons Publishers Limited, 1988.
8. Weiselfish-Giammateo S. *Integrated Manual Therapy for the Upper and Lower Extremities*. Berkeley: North Atlantic Books, 1998.
9. Fritz JM, Erhard RE, Vignovic M. A nonsurgical treatment approach for patients with lumbar spinal stenosis. *Phys Ther* 1997;77(9):962-973.
10. Fairbank JCT, Couper J, Davies JB, O'Brien JP. The Oswestry Low Back Pain Disability Questionnaire. *Physiotherapy* 1980;66(8):271-273.
11. Melzack R. The McGill Pain Questionnaire: Major properties and scoring methods. *Pain* 1975;1:277-299.
12. Von Korff M. Studying the natural history of back pain. *Spine* 1994;19(18 Suppl):204 1S-65.
13. Waddell G. Clinical assessment of lumbar improvement. *Clin Orthop* 1987;221:110-120.
14. De Rosa C, Porterfield JA. A physical therapy model for the treatment of low back pain. *Phys Ther* 1992;72(4):261-269.
15. Winkel D, Aufdemkampe G, Matthijs 0, Meijer OG, Phelps P. *Diagnosis and Treatment of the Spine: Nonoperative Orthopaedic Medicine and Manual Therapy*. Gaithersurg: Aspen, 1996.
16. Bouter L, van Tulder M, Koes B. Methodological issues in low back pain research in primary care. *Spine* 1998;23(18):2014-2020.
17. Beurskens AJ, de Vet HC, Koke AJ. Responsiveness of functional status in low back pain: A comparison of different instruments. *Pain* 1996;65:71-6.
18. Roland M, Morris R. A study of the natural history of back pain. Part 2: Development of guidelines for trials of treatment in primary care. *Spine* 1983;8(2):145-150.