



Effect of Therapeutic Yoga on Pain and Functional Disability in a Patient with Cervical Dystonia: A Case Report

*¹Dr. Sunitha KM

*¹Senior Physician, Vaidyaratnam Nursing Home, Thakkattussery, Ollur, Thrissur, Kerala, India.

Abstract

Cervical dystonia is a focal movement disorder characterized by involuntary contraction of neck muscles, leading to abnormal head posture, pain, and functional limitation. Conventional management primarily includes botulinum toxin injections and pharmacotherapy. Complementary approaches such as yoga may help reduce muscle tension and stress-related exacerbations. This study is to evaluate the effect of a structured therapeutic yoga protocol on pain intensity, cervical range of motion, and quality of life in a patient with cervical dystonia. A 52-year-old female diagnosed with cervical dystonia underwent a 12-week structured yoga intervention (45 minutes/session, 5 days/week). Outcome measures included Visual Analog Scale (VAS) for pain, Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS), cervical range of motion (ROM), and WHOQOL-BREF. Assessments were performed at baseline, 6 weeks, and 12 weeks. After 12 weeks, VAS reduced from 8/10 to 3/10. TWSTRS score improved by 35%. Cervical ROM improved in all planes. WHOQOL-BREF showed significant improvement in physical and psychological domains. The patient reported reduced muscle tightness, improved sleep, and better emotional control. Therapeutic yoga may serve as a beneficial adjunct therapy in managing cervical dystonia by reducing pain, improving function, and enhancing quality of life. Larger controlled studies are recommended.

Keywords: Cervical dystonia, Therapeutic yoga, Quality of life.

Introduction

Cervical dystonia (CD), also known as spasmodic torticollis, is the most common form of focal dystonia encountered in adults. It is characterized by involuntary, sustained, or intermittent contractions of cervical muscles leading to abnormal movements and postures of the head and neck, frequently accompanied by pain, tremor, stiffness, and functional disability. The disorder significantly affects activities of daily living and quality of life due to chronic pain, social embarrassment, sleep disturbances, and psychological stress. Women are affected more commonly than men, and onset usually occurs during middle adulthood [1].

The exact pathophysiology of cervical dystonia remains incompletely understood. Current evidence suggests involvement of dysfunction within basal ganglia-thalamo-cortical circuits, altered sensorimotor integration, impaired inhibition, maladaptive neuroplasticity, and abnormalities in proprioceptive processing [2, 3]. Neurophysiological studies have demonstrated abnormalities in cortical excitability and defective inhibitory mechanisms, contributing to abnormal motor output and persistent muscle contractions. In addition to motor symptoms, non-motor manifestations such as

anxiety, depression, fatigue, and stress are increasingly recognized as major contributors to disease burden [4].

Botulinum toxin injections are considered the gold standard and first-line treatment for cervical dystonia because they effectively reduce muscle overactivity and pain [5]. However, many patients continue to experience residual symptoms including pain, restricted mobility, postural imbalance, fatigue, emotional distress, and recurrence of symptoms before subsequent injections. Long-term pharmacological therapy may also be associated with variable response, adverse effects, or incomplete functional recovery. Consequently, there is growing interest in complementary and integrative approaches that may enhance rehabilitation outcomes and improve overall well-being.

Yoga is a traditional mind-body practice that combines physical postures (asanas), breath regulation (pranayama), relaxation techniques, and meditative practices. Increasing evidence suggests that yoga may improve autonomic regulation, reduce sympathetic overactivity, enhance vagal tone, improve proprioceptive awareness, and reduce stress-related exacerbation of neurological disorders [6]. Therapeutic yoga has demonstrated beneficial effects in conditions such as Parkinson's disease, chronic pain syndromes, anxiety

disorders, stroke rehabilitation, and movement disorders through mechanisms involving neuromuscular coordination, emotional regulation, and neuroplastic modulation [7].

A few preliminary studies and case observations have explored the role of yoga and relaxation-based interventions in dystonia and related neurological conditions. Improvements have been reported in pain, muscle tension, emotional stress, balance, flexibility, and quality of life following yoga-based interventions [8]. Nevertheless, scientific literature specifically addressing yoga as an adjunct therapy in cervical dystonia remains sparse. Most available studies are limited by small sample size, heterogeneity of intervention protocols, lack of long-term follow-up, and insufficient clinical documentation. Standardized yoga modules tailored specifically for cervical dystonia are also inadequately studied.

Despite increasing recognition of non-pharmacological therapies in neurological rehabilitation, there is limited evidence regarding the therapeutic role of yoga in cervical dystonia. Existing literature predominantly focuses on pharmacological management and botulinum toxin therapy, while integrative approaches addressing psychosomatic factors, autonomic dysfunction, and quality of life remain underexplored. Furthermore, there is a lack of detailed clinical case reports examining individualized yoga interventions and their potential effects on pain, posture, stress modulation, and functional outcomes in patients with cervical dystonia.

The purpose of this case report is to explore the potential role of a structured therapeutic yoga intervention as an adjunctive treatment in the management of cervical dystonia. The study aims to evaluate whether yoga practices incorporating postures, breathing techniques, relaxation, and mindfulness can contribute to symptomatic improvement, enhanced functional capacity, and better quality of life in an individual with cervical dystonia.

This study contributes to the growing field of integrative neurology and yoga-based rehabilitation. It highlights the possible role of yoga as a complementary therapy alongside conventional medical management in cervical dystonia. The findings may encourage further clinical trials investigating standardized yoga protocols for movement disorders and support incorporation of holistic approaches into neurorehabilitation programs.

This work is limited by its nature as a single-case report, restricting generalizability of findings to larger populations. Objective neurophysiological measurements and long-term follow-up data may be limited. Further randomized controlled studies with larger sample sizes are required to establish definitive evidence regarding the efficacy of yoga in cervical dystonia management.

Materials and Methods

This study was designed as a single-case clinical intervention study conducted over a period of 12 weeks to evaluate the effect of a structured therapeutic yoga program in a patient diagnosed with cervical dystonia. The intervention aimed to assess changes in pain, functional disability, cervical mobility, and quality of life following regular yoga practice.

A patient clinically diagnosed with cervical dystonia by a neurologist was included in the study. The participant presented with involuntary neck muscle contractions, abnormal head posture, neck pain, stiffness, and difficulty performing daily activities. Written informed consent was obtained prior to participation.

Case Presentation

Patient Information: A 52-year-old female working as IT professional presented with:

Involuntary rightward turning of the head, severe neck pain (VAS 8/10), headache, disturbed sleep and occupational stress. She was diagnosed with right-sided torticollis by a neurologist 3 years prior. No history of diabetes, hypertension, or trauma was reported.

Clinical Findings: Right-sided torticollis, Elevated right shoulder, Tenderness of sternocleidomastoid and trapezius, Mild head tremor, Restricted cervical movements

Outcome Measures

Visual Analog Scale (VAS)

Pain intensity was assessed using the Visual Analog Scale, a validated subjective measure of pain. The participant rated neck pain on a 10 cm scale ranging from 0 (no pain) to 10 (worst imaginable pain). Reduction in VAS score indicated improvement in pain perception.

Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS)

Disease severity and functional disability were assessed using the TWSTRS, a standardized clinical tool commonly used in cervical dystonia research. The scale evaluates:

- Severity of abnormal head posture
- Duration and amplitude of muscle contractions
- Disability in daily activities
- Pain related to dystonia

Higher scores indicate greater severity of symptoms.

Cervical Range of Motion (ROM)

Cervical mobility was assessed using standard goniometric measurements. Movements evaluated included:

- Cervical flexion
- Extension
- Lateral flexion
- Rotation to both sides

Improvement in ROM reflected reduction in muscle stiffness and better neck mobility.

WHOQOL-BREF

Quality of life was measured using the World Health Organization Quality of Life-BREF questionnaire. The instrument evaluates four domains:

- Physical health
- Psychological wellbeing
- Social relationships
- Environmental health

Higher scores represented improved overall quality of life and wellbeing.

Assessments were carried out at three time points:

- Baseline (before intervention)
- At 6 weeks
- At 12 weeks after completion of intervention

Intervention

The participant underwent a supervised therapeutic yoga program for 12 weeks. Sessions were conducted 5 days per week, with each session lasting approximately 45 minutes. The yoga module was designed to improve cervical muscle

relaxation, posture awareness, autonomic balance, and stress reduction.

Duration: 12 weeks

Frequency: 5 sessions/week

Session duration: 45 minutes

Phase 1 (Weeks 1–4): Relaxation & Breath Regulation

- Diaphragmatic breathing
- Dirgha pranayama
- Gentle neck isometric activation
- Tadasana (alignment training)
- Guided Shavasana

Phase 2 (Weeks 5–8): Controlled Mobility

- Slow Marjariasana
- Supported Bhujangasana
- Gentle scapular mobilization
- Nadi Shodhana
- Bhramari

Phase 3 (Weeks 9–12): Neuromuscular Re-education

- Mindfulness meditation (10 min)
- Yoga Nidra
- Forceful neck rotations were avoided. No changes were made to her medical management.

Results

Parameter	Baseline	6 weeks	12 weeks
VAS	8	5	3
TWSTRS	48	38	31
Cervical rotation(Right)	20°	30°	40°
WHOQOL-BREF Physical	42	52	64
WHOQOL-BREF Psychological	40	55	68

Analysis of Results

The participant demonstrated progressive improvement in pain, severity of dystonia symptoms, cervical mobility, and quality of life over the 12-week therapeutic yoga intervention.

Pain Assessment (VAS): Pain intensity measured using the Visual Analog Scale (VAS) showed a marked reduction during the study period. The score decreased from 8 at baseline to 5 at 6 weeks and further to 3 at 12 weeks. This indicates substantial reduction in neck pain and discomfort following regular yoga practice. The improvement may be attributed to muscle relaxation, reduction in muscular spasm, improved circulation, and autonomic calming effects produced by asanas, pranayama, and relaxation techniques.

Severity of Cervical Dystonia (TWSTRS): The Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS) score reduced from 48 at baseline to 38 at 6 weeks and to 31 at the end of 12 weeks. The gradual decline in score suggests reduction in disease severity, abnormal muscle contractions, and functional disability. Improvement in TWSTRS indicates better postural control and reduced impact of dystonia on daily activities. The findings suggest that yoga may positively influence neuromuscular coordination and sensorimotor regulation.

Cervical Range of Motion: Cervical rotation toward the right side improved progressively from 20° at baseline to 30° at 6 weeks and 40° at 12 weeks. The increase in cervical mobility reflects reduction in muscle tightness and improved flexibility of cervical musculature. Gentle stretching practices and

postural correction techniques in yoga may have contributed to enhanced neck movement and reduced rigidity.

Quality of Life Assessment (WHOQOL-BREF): Physical Domain

The WHOQOL-BREF physical health score improved from 42 at baseline to 52 at 6 weeks and 64 at 12 weeks. This suggests improvement in physical functioning, energy levels, sleep quality, and ability to perform activities of daily living. Reduced pain and improved mobility likely contributed to enhanced physical wellbeing.

Psychological Domain: The psychological domain score increased from 40 at baseline to 55 at 6 weeks and 68 at 12 weeks. The marked improvement indicates better emotional wellbeing, reduced stress, and improved coping ability. Mindfulness practices, breathing exercises, and relaxation techniques may have helped reduce anxiety and emotional distress commonly associated with chronic neurological disorders.

Overall Interpretation: The findings demonstrate that the 12-week therapeutic yoga intervention was associated with clinically meaningful improvements across all assessed parameters. Maximum improvement was observed progressively over time, indicating cumulative therapeutic benefits with continued practice. The combined effects of yogasanas, pranayama, relaxation, and meditation may have contributed to pain reduction, improved cervical mobility, better psychological wellbeing, and enhanced overall quality of life in the participant with cervical dystonia.

Percentage Improvement

Parameter	Baseline	12 Weeks	Percentage Improvement
VAS	8	3	62.5% reduction
TWSTRS	48	31	35.4% reduction
Cervical Rotation (Right)	20°	40°	100% improvement
WHOQOL Physical	42	64	52.4% improvement
WHOQOL Psychological	40	68	70% improvement

The greatest improvement was observed in cervical range of motion and psychological wellbeing, highlighting the potential role of yoga in improving both physical and mental aspects of cervical dystonia management.

Subjective Improvements

- Reduced frequency and severity of spasms
- Improved sleep quality
- Reduced headache episodes
- Enhanced stress tolerance
- Improved posture awareness

No adverse events were observed.

Discussion

This case demonstrated clinically meaningful improvement in pain, functional ability, and overall quality of life following a structured 12-week therapeutic yoga intervention. The observed benefits may be attributed to the multidimensional effects of yoga on the neuromuscular, autonomic, and psychological systems. Therapeutic yoga combines physical postures (asanas), breathing techniques (pranayama), relaxation, and mindfulness practices, thereby addressing both physical symptoms and psychosocial stressors associated with chronic neurological disorders. One of the most plausible

mechanisms underlying symptom improvement is the modulation of autonomic nervous system activity. Patients with chronic movement disorders often exhibit heightened sympathetic activity and stress responsiveness, which may exacerbate muscle tension, pain, fatigue, and abnormal movement patterns. Yoga has been shown to improve autonomic balance by enhancing parasympathetic (vagal) activity and reducing sympathetic overactivity [9]. Studies evaluating heart rate variability and baroreflex sensitivity in yoga practitioners have demonstrated increased vagal tone and improved autonomic regulation following regular yoga practice [10]. Stress is a well-recognized aggravating factor in dystonia and related movement disorders. Emotional stress and anxiety may worsen involuntary muscle contractions through abnormal sensorimotor integration and altered cortical excitability. Mindfulness-based practices and pranayama may reduce hypothalamic–pituitary–adrenal axis activation and decrease stress-related sympathetic discharge. Slow breathing techniques have also been associated with improved parasympathetic dominance and reduced cardiovascular variability, suggesting a calming effect on the central autonomic network [11]. Such autonomic stabilization may indirectly influence cortical and subcortical motor circuits involved in dystonic movements. Another possible explanation for improvement is enhanced proprioceptive feedback and body awareness. Dystonia is frequently associated with impaired sensory processing and altered motor control. Yoga postures require controlled movement, balance, coordinated breathing, and sustained attention to body position, which may facilitate sensorimotor retraining. Repetitive mindful movement may improve neuromuscular coordination and reduce maladaptive movement patterns through neuroplastic mechanisms [12]. Increased body awareness may also contribute to improved posture, flexibility, and movement confidence. The relaxation component of yoga may further contribute to pain reduction and improved sleep quality. Chronic pain conditions are often associated with central sensitization and increased muscle guarding. Gentle stretching and relaxation practices may reduce muscle stiffness and improve circulation, thereby decreasing pain perception and enhancing functional mobility. Furthermore, meditation and mindfulness practices may improve emotional resilience, coping ability, and overall psychological well-being [13]. The improvement in quality of life observed in this case highlights the holistic nature of yoga therapy. Beyond symptom reduction, yoga may positively influence mood, self-efficacy, sleep, fatigue, and social participation. These psychosocial benefits are particularly important in chronic neurological conditions where long-term disability and emotional distress commonly coexist. Although this case demonstrates encouraging outcomes, certain limitations should be acknowledged. As a single-case observation, the findings cannot be generalized to all patients with dystonia or related disorders. Placebo effects, natural symptom fluctuation, concurrent therapies, and patient motivation may also have contributed to the observed improvement. Objective neurophysiological assessments and larger controlled studies are needed to further clarify the mechanisms and efficacy of yoga-based interventions in movement disorders. Nevertheless, this case supports the potential role of therapeutic yoga as a safe, feasible, and cost-effective complementary intervention for improving functional outcomes and quality of life in patients with chronic neurological movement disorders.

Limitations include single-case design.

Conclusion

Therapeutic yoga appears to be a safe and feasible adjunct therapy in cervical dystonia. It may reduce pain, improve mobility, and enhance quality of life. Larger randomized controlled trials are needed to establish efficacy.

Patient Perspective

The patient reported feeling “more relaxed and able to control neck posture better” with noticeable improvement in daily activities.

Informed Consent

Written informed consent was obtained from the patient for publication of this case report.

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