Physical Therapy Management for Conversion Disorder: Case Series

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Purpose: Patients with conversion disorder present with symptoms of sensory and motor dysfunction that are not explained by known physical disorders or pathophysiological mechanisms. Correct diagnosis and prompt, effective management of patients with this disorder is essential. Healthcare providers may be unaware of the important role of physical therapy in the management of patients with conversion disorder. While numerous reports have suggested the need for physical therapy management of this disorder, there is a lack of reports outlining specific physical therapy management principles or daily treatment progression. The purpose of this series of case reports is to provide an overview of conversion disorder and describe successful physical therapy management strategies used to treat three patients with movement impairment due to this disorder.
Case Description: The patients were 18-, 20-, and 34-year-old women treated in a hospital inpatient rehabilitation setting. Behavioral modification and shaping techniques formed the basis for the physical therapy treatment approach. Abnormal movement patterns were ignored, and correct movement patterns were reinforced using feedback and praise. The patients advanced through a progressively more difficult therapy program based on treatment approaches used with analogous neurological conditions.
Outcomes: All three patients showed complete resolution of their symptoms and returned to independent mobility, independent living, and to work or school.

Key words: *conversion disorder, physical therapy, rehabilitation, behavioral modification*

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INTRODUCTION

Conversion disorder is a subset of the somatoform disorders. It has one or more symptoms that affect voluntary motor or sensory function suggesting a neurological or other medical condition, but they are inconsistent with known neurological or musculoskeletal pathologies.[1] Individuals with conversion disorder do not intentionally produce or feign their symptoms. Instead, the symptoms are due to an unconscious expression of a psychological conflict or need. The symptoms are often reinforced by social support from family and friends or by avoiding underlying emotional stress. The symptoms of patients with conversion disorder can be debilitating and include paralysis of one or more limbs, ataxia, tremors, tics, and dystonia.[2–4] Other terms used to describe this disorder are functional gait disorder, hysterical paralysis, psychosomatic disorder, conversion reaction, and chronic neurosis.[5]

Historically, mental health professionals have been the primary providers treating individuals with conversion disorder. However, recent work suggests psychological treatment alone is not effective in treating conversion disorder.[2,4,6] Instead, there must be a combination of psychological and medical treatments. Rehabilitation specialists are an integral component of a successful treatment program.[7,8] Physical therapists are familiar with analogous neurological conditions and can provide the individual with a culturally accepted intervention or cure to their illness. Physical therapists also have the skill and knowledge base in which to integrate classic behavioral modification techniques with individualized functional mobility programs. One of the main goals of rehabilitation of the patient with conversion disorder is to assist the individual to move away from a "sick role" and to return to healthy roles in their social, physical, and work life. There are numerous reports describing the need for physical therapy in the successful treatment of conversion disorder.[2,4,6,9–17] However, there is a lack of reports that describe specific physical therapy intervention techniques or program progression.

The purpose of this series of case reports is to increase awareness of conversion disorder and to provide interventions by proposing patient management guidelines. Rehabilitation staff treating patients with conversion disorder often experience frustration and stress due to confusion about the diagnosis and the absence of therapeutic guidelines and discomfort treating individuals with psychiatric disorders.[8] This series describes the successful physical therapy management of three women hospitalized with conversion disorder paralysis and gait abnormalities. The therapy management program used a behavioral modification approach to support classic physical therapy techniques of strengthening, gait training, neuromuscular reeducation, and balance training.

HISTORY AND EPIDEMIOLOGY

The concept of conversion disorder has been around since ancient Egyptian times in which strange maladies were attributed to a wandering uterus, hence the name hysterus or hysterical paralysis.[18] Sigmund Freud was the first to use the

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actual term conversion. This was in reference to the substitution of a somatic symptom for a repressed idea. He believed hysterical symptoms were converted into physical symptoms, thus the term conversion.[7]

The incidence of individuals with conversion disorder has been reported to be between 11 and 48 per 100,000 people in the general population.[19,20] Conversion disorder can occur in individuals of any age, race, ethnic, or social background. Some studies report a higher frequency in women than in men[21–24]; other studies have found no difference between the sexes.[19,25] There tends to be a higher incidence of first-degree relatives with psychiatric or medical disorders in individuals with conversion disorder.[21,26] An association also has been found with conversion disorder and a history of sexual or physical abuse.[27,28]

DIAGNOSIS AND PROGNOSIS

The American Psychiatric Association lists several criteria for the diagnosis of conversion disorder.[1] (Table 1) The symptoms of conversion disorder mimic symptoms of other neurological diseases. However, there are findings that differentiate conversion disorder from known neurological disorders. The classic symptoms of conversion disorder include inconsistencies in repeated testing of sensation and muscle strength, manual muscle strength testing that does not correspond with the patient's functional abilities, and sensory impairments that do not follow anatomical patterns.[7,9] Other signs may include jerky, exaggerated movements; unexplained tremors; bizarre gait patterns; and simultaneous contraction of agonist and antagonist muscles.[29,30] A common motor complaint is astasia-abasia, which is an unsteadiness of gait presenting with unusual incoordination especially in walking or standing still. Patients demonstrate large truncal and extremity movements but are able to control their balance. They often will grab onto walls, chairs, or "fall" into bed, but will avoid a complete fall or injury.[31]

Accurate diagnosis of patients with conversion disorder is imperative as erroneous diagnostic labeling can expose patients to unnecessary medical testing and psychological distress. Neurological diseases that are often misdiagnosed as conversion disorder include multiple sclerosis, systemic lupus erythematosus, Guillain-Barré, postencephalitis syndrome, and brain or spinal tumors.[7] The advent of magnetic resonance imaging has decreased the incidence of misdiagnosis. However, there are no laboratory tests that confirm the diagnosis of conversion disorder. A positive diagnosis is made by ruling out all possible organic causes. It is important to distinguish conversion disorder from malingering in which the symptoms are consciously produced in order to obtain secondary gain such as financial compensation, release from jail, and avoidance of military service.[6]

Once a diagnosis has been determined, it is important to inform the patient that all diagnostic tests are negative and that a full recovery is anticipated. The diagnosis should be presented in a nonconfrontational manner. Emphasis should be placed on the treatment of the symptoms not the cause.

Factors associated with a favorable prognosis for patients with conversion disorder include an onset precipitated by a stressful life event, good premorbid health, the absence of other organic disease or psychiatric disorders, and an acute onset of the symptoms.[9,24]

TABLE 1. DSM-IV Diagnostic Criteria for Conversion Disorder (300.11)

A. One or more symptoms or deficits affecting voluntary motor or sensory function suggesting neurological or other general medical condition.

B. Psychological factors are judged to be associated to the symptom or deficit because conflicts or other stressors precede initiation or exacerbation of the symptom or deficit.

C. The patient is not feigning or intentionally producing his or her symptoms or deficits.

D. The symptom or deficit cannot, after appropriate investigation, be fully explained by a general medical condition, by the direct effects of a substance, or as a culturally sanctioned behavior or experience.

E. The symptom is not limited to pain or to a disturbance in sexual functioning and is not better explained by another mental disorder.

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PLAN OF CARE

The successful management of the three cases described in this report involved a combination of behavioral modification and physical therapy interventions incorporating strengthening, balance training, conditioning, gait, and transfer training.

Learning theory and behavioral shaping formed the basis for the behavioral modification treatment approach.[9,10,24] The rationale behind this treatment approach is that the conversion disorder symptoms are learned maladaptive behaviors.[10] The patients believe that they have a particular neurological condition. They often assume a "sick role" with its privileged social status and rewards of attention. A vicious cycle develops in which the patients believe that they are sick and then receive reinforcement of this sickness through the rewards and attention of others.[10,32] The treatment goal of behavioral modification is to reduce unwanted behaviors and strengthen desired behaviors.[6] The basic Skinnerian learning theory proposes that consequences govern human behavior. If a unit of behavior produces a favorable reaction (reinforcement), there is an increased probability that the behavior will occur again. If the behavior does not provide reinforcement, it will be discontinued.[10] In the treatment of the three cases described in this case series, the unwanted behaviors (abnormal gait, ataxia, and paralysis) were not punished but were ignored, and the desired behaviors (normal gait, smooth movements, and normal strength) were rewarded.[11,33–35] The therapist asked the patient to stop and sit down and rest if an abnormal gait pattern or behavior occurred. Verbal cues included "take a break" and "regain control of your body." The therapist did not comment about the abnormal gait pattern. Instead, when the patient demonstrated the correct gait or movement pattern, the therapist provided positive reinforcement. Often, the patient with conversion disorder was seeking attention and affirmation. By maintaining a positive and optimistic attitude, the therapist

gave the patient positive reinforcement of the correct behavior. The patient also received positive reinforcement through independence on the rehabilitation floor and passes to go out with his or her family. The therapist did not give the patients permission to ambulate outside of physical therapy sessions until they demonstrated correct gait mechanics. It was essential that patients' families be involved in the process to reinforce and carry over the behavior modification outside of the therapy session. If the family reinforced the sick role and the abnormal movements when the patient was not in therapy, the progress made during therapy was lost.

The physical therapy management program involved a sequence of steps in which the patient was progressively more challenged. The importance of designing interventions with progressive levels of challenge has been advocated for patients with neuromuscular disorders.[36,37] The step progression incorporated the principles of motor learning to include providing less physical support, less verbal cueing, and more intrinsic feedback as the patient mastered skills.[36] The patients did not progress to the next level of the treatment sequence until they demonstrated mastery of the previous level. The general progression of the treatment included developing patient rapport, working on flexibility and initial weight-bearing activities, gait training in the parallel bars, which provided the patient with success and confidence, and then to gait in open spaces and in the community. The progression of the treatment sequence was based on treatment progressions for analogous neurological conditions, and the patient was treated as if the condition was organic in nature.[4,9,10,38] The therapy progression was individualized for each patient but included general strengthening, weight shifting, bed mobility skills, gait, and transfer training. A general progression and outline of interventions used with the three cases is listed in Table 2.

The diagnosis of conversion disorder is not specifically listed in the *Guide to Physical Therapist Practice*.[39] However, the symptoms of weakness, balance difficulties, and incoordination fit under the practice pattern 5A: Primary Prevention/Risk Reduction for Loss of Balance and Falling. The recommended interventions for this practice pattern are endurance training, balance training, postural stabilization, flexibility, gait and locomotion training, relaxation training, and strengthening. This corresponds with the interventions used with the three described cases.

TABLE 2. Treatment Progression

Develop rapport	Initial evaluation and mutual goal setting with staff, patient, and family
	Tour of therapy facilities and explanation of therapy program
	Patient involvement in selection of rewards/privileges
	Consistent therapy, physician, and nursing staff
	Gaining trust of the patient
Pregait activities	Stretching, general strengthening, bed mobility skills
	Sitting and standing balance activities
	Coordination activities
	Transfer training
	Weight-shifting activities
Supported gait activities	Standing and beginning gait training in parallel bars or walker
	Gait broken down into stepping and weight shifting
	Progression to step to and then step over step gait pattern
	Sidestepping, backward walking
General mobility	Progression to gait outside of parallel bars or walker
	Maneuvering around obstacles
	Increasing endurance, add bike, treadmill
	Privilege of walking in room and to therapy sessions
	Multitasking activities such as walking and talking, basketball dribbling, etc.
Community reintegration	Walking outside of therapy and hospital setting
	Architectural barriers
	Incorporate job/school/homemaking tasks
	Activities in the community
	Discharge planning with family

GENERAL GUIDELINES FOR PHYSICAL THERAPY MANAGEMENT

- The completion of a thorough diagnostic workup before the therapy treatment program begins rules out an organic cause of the symptoms. Once the diagnosis has been made, additional diagnostic testing and consultation referrals should be avoided. Otherwise, it implies that the healthcare team is not confident in their diagnosis.[5,10]
- Referral to the rehabilitation team needs to happen as soon as possible after ruling out organic causes.
- A consistent healthcare team trained in the behavioral treatment approach to conversion disorder is essential. Keeping staffing changes to a minimum helps to develop trust and rapport and demonstrates a unified team approach.[9]
- Regular communication between all team members regarding the patient's progress toward goals assists with maintaining treatment consistency.[30]
- Patients need the ability to relinquish their symptoms without loss of self-esteem.
- Psychological counseling is helpful to assist the patient in dealing with his or her underlying emotional conflicts and with finding new ways to deal with emotional stress.[2,13]
- Involving the patient's family members in treatment planning, goal setting, and education helps to facilitate positive reinforcement of normal movement behaviors outside the therapy sessions.[9]

PROPOSED PHYSICAL THERAPY MANAGEMENT GUIDELINES

- Treatment programs for analogous neurological conditions (hemiparesis, paraplegia, quadriplegia, and ataxia) form the basis for the therapy treatment program. The patient progresses through the treatment program as if he or she had an organic neurological syndrome.[9,10]
- Treatment progresses through stages of recovery with each stage building on the previous stage. The progression to the next stage does not occur until complete mastery of the previous stage.[9,10,40] For example, the patient does not walk without support until demonstrating a normal gait sequence in the parallel bars. External feedback is withdrawn as the patient demonstrates independence in a skill.
- The patient receives praise on completion of a step in the training sequence. The patient may receive rewards of day passes or floor privileges with success in the sequence.[10,41,42] The decision to grant privileges and rewards is determined after input from all healthcare team members.
- Emphasis is placed on the quality of movement instead of the quantity of movement. The patient receives verbal cueing to gain control of his or her extremities and focuses on the quality of the movement instead of the speed or distance.[9]
- Developing rapport and trust with the patient is essential. Treatment should occur in a positive, nonthreatening environment.[16]
- The patient is involved in goal setting. A contract toward goals can be helpful.
- Abnormal movements are ignored. All attention to illness symptoms is withdrawn.[10,33]
- Assistive devices are removed as soon as possible.[9]

CASES

Information on the three patients presented in this case series was obtained from a retrospective chart review. Approval for this retrospective chart review was obtained from the Mayo Clinic Institutional Review Board. The individuals described here were patients in the St. Mary's Hospital inpatient rehabilitation unit. The rehabilitation program for these patients consisted of between three and five hours per day, six to seven days per week of physical, occupational, and speech therapies. These therapies were augmented with recreational therapy, psychology, and nursing care. The rehabilitation team met on a weekly basis at a patient care conference to discuss patient progress and goals. Informal communication about the patients' care happened on an as-needed basis outside of the scheduled care conference times.

The patients' strength, sensation, and reflexes were tested using standard methods as described by O'Sullivan and Schmitz.[43] Functional abilities were measured using the Functional Independence Measurement tool (FIM^{TM}).[44] The FIM^{TM} tool is used to measure function in both the cognitive and physical domains and record progress from complete dependence to complete independence. The tool is a measure of functional status that consists of 23 items in seven areas of function: self-care, sphincter control, mobility, locomotion, communication, social adjustment, cognition, and problem solving.[44]

Ottenbacher et al.[45] reported a mean interobserver reliability value of 0.95 and a test-retest reliability of 0.95 on the FIM^{TM} tool. The authors also reported that the motor portion of the FIM^{TM} demonstrated strong concurrent validity with the Barthel Index with a Spearman's correlation coefficient ranging from 0.74 (admission) to 0.92 (discharge).

Case 1

Examination

History

The patient was a 20-year-old woman admitted to the acute rehabilitation unit for a 10-day history of quadriparesis and a low-grade fever. Her medical history included Leber's hereditary amaurosis since birth causing legal blindness. The patient required the use of a white blind cane for assistance with navigation around obstacles.

Admission medications

On admission, the patient was taking Florinef and mitodrine.

Social history

The patient recently graduated from high school and planned to attend college on a music scholarship. The patient was estranged from her biological father who was an alcoholic. The patient also had a history of sexual abuse by a family member. She lived in an apartment in the home of her mother and stepfather. She had to navigate 12 steps with a railing to enter her apartment.

Test and measures

Electromyography, magnetic resonance, and lumbar puncture study results were all negative. Reflex testing was symmetrical and normal at the knee, ankle, and elbow. Light touch and proprioceptive sensation was absent on testing of all four extremities. However, the patient became agitated when the sheets of the bed touched her legs. The patient had full passive range of motion of all extremities, but was unable to move her extremities on command. During manual muscle testing, she demonstrated contraction of both her knee extensors and flexors and tremors of all four extremities. She provided inconsistent effort on manual muscle testing. The patient demonstrated spontaneous movement of her limbs during sleep and when repositioning herself in bed. The patient was alert and oriented and did not demonstrate language or cognitive deficits.

Functional abilities

The patient was dependent on help for bed, chair, and toilet transfers. She was unable to control her head or trunk in midline when sitting and would fall backward or sideways onto the bed. The patient was unable to propel a manual wheelchair. She was unable to attempt stairs or gait due to her weakness and instability. She also was dependent on help for all self-care including toileting, dressing, and bathing.

Evaluation

- Pathology: conversion disorder manifested as quadriplegia
- Impairments: Weakness of upper and lower extremities, balance difficulties, tremors, loss of vision
- Functional limitations: difficulty with eating, bathing, dressing, transfers, and mobility
- Disabilities: inability to attend college, difficulty with participation in church activities
- Patient goals: attend guide dog training program, go to college, live alone

Intervention

Develop rapport: day 1

Develop rapport between patient and therapist/team members.

Physical therapy interventions. An initial evaluation of strength, sensation, joint motion, and functional abilities was performed. Short- and long-term goals were developed in collaboration with the patient. The patient and therapist developed compensation and adaptation techniques to deal with the patient's blindness and her ability to get around her hospital room. The patient received a tour of the rehabilitation facilities to familiarize her with the building layout.

Behavioral modification techniques. The expectations of the therapy program and progression were outlined. The information was presented in nonconfrontational manner. All healthcare team members attended a patient care conference to develop a consistent approach. The patient met with a rehabilitation psychologist.

Pregait activities: days 1 and 2

Physical therapy interventions. The patient worked on bed mobility skills of rolling and scooting and supine to sit transfers. Strengthening exercise included supine bridging and active range of motion exercises. Seated activities included reaching, upper extremity weight-bearing, and head/trunk control activities. The patient required maximal assistance to transfer supine to sit and to maintain her sitting balance. She demonstrated large movement of her trunk and her head rested on her chest. She transferred to standing with maximal assistance of two people with blocking at her knees and support at her head and trunk.

Behavioral modification techniques. The patient was provided constant reassurance of her progress in therapy. Progression of movement happened slowly with maximal support from therapist to assure the patient that she was safe. Praise was provided for correct movement patterns and transitions.

Supported gait activities: days 3 and 4

Physical therapy interventions. The sessions began with stretching and range of motion exercises. The patient continued with strengthening of her extremities, adding two to four pound weights. She progressed to standing in the parallel bars. She practiced forward, back, and side-to-side standing weight shifting with her feet parallel and staggered. The patient quickly progressed to walking with moderate assistance for balance and control of swing phase of her lower extremities. Gait began in a step-to-gait pattern and progressed to a step-through-gait pattern. By the end of the fourth day, the patient was able to walk 30 ft in the parallel bars with minimal assistance for balance.

Behavioral modification techniques. The patient was verbally praise for normal heel-to-toe progression of her gait. She was instructed to sit down and rest when she demonstrated knee recurvatum on stance phase or large lower extremity swing phase movements. Verbal cues provided included "feel the floor with your feet," "visualize yourself walking normally," "you are doing well, look at the progress you have made."

General mobility: days 5 and 6

Physical therapy interventions. Sessions began with stretching and strengthening exercises for the extremities. The patient worked on sit to stand transitions and seated forward weight shifting activities. She was able to progress to ambulation outside of the parallel bars with support at her trunk. On day 5, she was able to ambulate 100 ft, and by day 6, she progressed to 500 ft with verbal cueing for correct gait mechanics and contact guard assist for balance. She also began ambulating up and down six steps with a railing and step-over-step gait pattern with only contact guard assistance from the therapist.

Behavioral modification techniques. Verbal feedback included "relax the muscles in your shoulders and trunk," "feel the control of your extremities." The patient received praise, encouragement, and reinforcement of normal gait mechanics. A mirror was used to provide visual feedback to assist the patient in analyzing her own body and gait mechanics.

Community reintegration: days 7–9

Physical therapy interventions. The focus of therapy shifted to life skills tasks and personal goals. She practiced carrying a laundry basket while walking on level surfaces and up and down stairs. She also practiced vacuuming, getting objects out of the refrigerator, and making a bed. The therapy sessions included walking across a busy street intersection, walking on grass, and navigating around a public restroom. On day 8, the patient rode a city bus and went to a movie with therapeutic recreation staff. She needed to use the skills of navigating in the theater with her white blind cane. She also worked on general conditioning on an exercise bicycle for 15 minutes.

Behavioral modification techniques. When the patient demonstrated safety and independence in her gait, she was given the privilege of walking to the hospital chapel with her mother. The granting of this privilege occurred after communication with all rehabilitation team members.

Outcome

The patient was discharged home with her parents. At discharge, she was independent and safe in all transfers, self-care skills, and gait. She continued to require the white blind cane to assist with navigation due to her blindness. She spent the summer attending a camp for working with a guide dog. The patient began attending college in the fall. She chose not to pursue psychological counseling on discharge. At a three-month phone interview follow-up, the patient was doing well with no reoccurrence of her symptoms. She was on the dean's list in college and living independently in a dorm room.

Case 2

Examination

History

The patient was an 18-year-old woman admitted to the hospital when she fell out of bed and was unable to get up or walk. Her symptoms progressed to include low back pain, episodes of jerking and tingling of her upper extremities, and ataxia of her trunk and extremities. The patient had a medical history of a ruptured ovarian cyst and an abortion.

Social history

The patient was a senior in high school and planned to attend college in the next six months. She had had been living away from her parents since the age of 15 and was currently living with her boyfriend. The patient's parents were divorced. She had a history of psychological trauma as her biological father kidnapped her at knifepoint at the age of eight. The patient was active in sports and other school activities. She lived in a ground level apartment with no steps.

Admission medications

On admission, the patient was taking Tylenol.

Tests and measures

Magnetic resonance imaging (MRI) and computed tomography of the patient's head and spine were negative on admission. The patient demonstrated normal reflexes in the upper and lower extremities. Her light touch and proprioception sensation was intact in all extremities. She had full active range of motion of all joints, but she performed the range of motion with large, jerky movements. The patient had normal muscle strength in her lower and upper extremities on manual muscle testing. Visible contractions of the knee and hip flexor and extensor muscle groups were noted at rest. These contractions resolved with distraction. She also had normal finger to nose and heel to knee coordination bilaterally. However, she demonstrated high-amplitude tremors and jerking of her lower extremities on attempts to stand. The patient's efforts during the physical examination were inconsistent. The patient had normal speech and cognition. Her bowel and bladder function was normal.

Functional abilities

The patient was independent in rolling and scooting in bed. She was able to transfer to the edge of the bed independently and was able to sit unsupported on the edge of the bed. The patient required maximal assistance to transfer to standing. She demonstrated high-amplitude movements of her arms and alternating buckling and hyperextension of her knees on standing. The patient did not appear alarmed by these movements and did not lose her balance, even when the movements moved her center of mass out of her base of support. The patient was unable to ambulate without maximal support of two people. She took large, uncontrolled steps and forcibly extended her torso to swing her legs forward. The patient was only able to ambulate five feet on admission. She was unable to attempt stairs. She was dependent on her mother and her boyfriend for all self-care including feeding.

Evaluation

- Pathology: conversion disorder, manifested as ataxia
- Impairments: uncoordinated movements, poor balance in sitting and standing
- Functional limitations: difficulty with toileting, bathing, gait, and transfers
- Disabilities: unable to participate on high school basketball team, unable to attend high school, unable to participate in social activities with friends
- Patient goals: return to living with boyfriend, return to playing basketball, attend the prom, graduate from high school with peers

Intervention

Develop rapport: day 1

Develop rapport between patient and therapist/team members.

Physical therapy interventions. An initial evaluation was performed assessing strength, sensation, joint range of motion, and the patient's functional abilities. The therapy treatment program was outlined and the short- and long-term goals were determined. The patient, her boyfriend, and her mother met with the therapist to discuss the patient's home setup and social and leisure activities.

Pregait activities: days 1 and 2. Physical therapy interventions. The patient worked on bed mobility skills of rolling, scooting, and transferring to sitting on the edge of the bed. By day 2, the patient was able to sit independently and in midline on the edge of the bed. The patient worked on seated weight-shifting activities while reaching for objects placed at her front and sides. The patient transferred from the bed to a wheelchair with a standing pivot, requiring maximal assistance from the therapist. The patient was able to weight shift onto her lower extremities but demonstrated large "windmill-like" movements of her upper extremities and locked her knees into hyperextension.

Behavioral modification techniques. When the patient's limbs began jerking during an activity, the therapist stopped the activity. The therapist instructed the patient to rest, regain control of her extremities, and then to resume the activity.

Supported gait activities: day 3

Physical therapy interventions. The sessions began with general stretching and sit-to-stand transitions. The patient then progressed to standing in the parallel bars and was able to progress very quickly to walking in the parallel bars with bilateral upper extremity support. The patient demonstrated exaggerated trunk and leg movements. The patient also worked on mini-squats and toe raises in the parallel bars.

Behavioral modification techniques. The patient was provided with verbal cues to slow down her movements and to take smaller steps. The progression to gait outside of the parallel bars occurred when the patient was able to demonstrate a normal gait pattern in the parallel bars.

General mobility: days 4 and 5

Physical therapy interventions. The patient progressed to walking outside of the parallel bars with hand-hold support of the therapist. She required verbal cueing to control knee recurvatum during stance phase of gait bilaterally. The patient was able to ambulate 100 ft on day 4 and 1000 ft by day 5. She was able to ride a recumbent bike for five minutes on day 4 and 20 minutes on day 5. The patient was able to perform high-level balance activities of tandem walking and braiding by day 5.

Behavioral modification techniques. The patient's gait was videotaped and reviewed on both days of therapy. During the review of the videotape with the patient, the good qualities of her gait were emphasized and the abnormal movements were ignored.

Community reintegration: day 6

Physical therapy interventions. The patient ambulated independently to and from therapy sessions from her room (500 ft). She worked on balance activities of shooting a basketball at a standard basketball hoop, dribbling a basketball while walking, and jogging down the hallway. She practiced carrying a 10-lb backpack, simulating her bag at school. She also practiced walking up and down two flights of stairs, which she needed to attend classes at her school.

Behavioral modification techniques. The patient was granted visits from high school friends. The patient was discharged home after a care conference with school representatives, family, and healthcare team members.

Outcome

At discharge, the patient was independent in all transfers, gait, and self-care activities. She returned to high school and actively participated in basketball and other extracurricular activities. She pursued ongoing psychological counseling at home. At a three-month phone follow-up, the patient was attending college and doing well.

Case 3

Examination

History

The patient was a 34-year-old woman who presented with complaints of chest pain that radiated to her left shoulder. Her symptoms had been present for two months. On the second day of her hospital admission for the medical assessment of her chest pain, she developed acute weakness and tremors of her bilateral arms and legs. The patient had a medical history of an anxiety disorder and posttraumatic stress disorder due to sexual abuse. She also had a history of asthma.

Admission medications

On admission, the patient was taking aspirin and terbutaline.

Social history

The patient was a divorced mother of three children ages 11, 13, and 15. Her children lived with their father, and the patient had visitation rights on the weekends. The patient was living with her fiancé. She worked four 10-hour shifts as a personal care attendant in a hospital orthopedic center. She lived in a mobile home with a three-step entrance with railings. Her bedroom and bathroom were on one level.

Tests and measures

Coronary angiography and echocardiograms were normal. An extensive workup, including MRI of the pelvis, abdomen, and spine, lumbar puncture and electroencephalography and electromyography scans, were also normal. The patient had normal and symmetrical reflexes of the upper and lower extremities. She also demonstrated normal strength, light touch, and proprioception sensation of her bilateral extremities, and trunk. The patient had a visible tremor in all four extremities when asked to move. However, she was able to crochet with no noticeable tremor. The patient demonstrated normal speech and cognition. Her bowel and bladder function was also normal.

Functional abilities

The patient was able to independently roll and scoot in bed. She required moderate assistance to move to sitting on the edge of the bed due to tremors and coactivation of her lower extremity muscles. She also required moderate assistance to transfer to a shower, toilet, bed, and wheelchair. The patient ambulated 25 ft with moderate assistance of two people for balance. She ambulated with a stiff legged gait pattern and her elbows into locked into extension, pushing down into the therapist's hands. The patient was very slow and deliberate in her gait. She was able to ambulate up and down four stairs with two railings with assistance from the therapist for balance and bending of her knees to progress to the next step. The patient required setup for eating and minimal assistance for grooming and bathing.

Evaluation

- Pathologies: conversion disorder manifested as chest pain, ataxia, anxiety disorder
- Impairments: lower extremity tremor, impaired balance
- Functional limitations: difficulty with feeding, bathing, dressing, transfers, and gait
- Disabilities: unable to work as a personal care attendant, unable to care for her children
- Patient goals: walk alone, jog, and return to work

Intervention

Develop rapport: day 1

Develop rapport between patient and therapist/team members.

Physical therapy interventions. An initial evaluation with mutual goal setting with patient and family was performed.

Behavioral modification techniques. The patient and her family received a tour of the rehabilitation unit. Goals were developed and expectations for rehabilitation were outlined. Healthcare team members attended a team meeting to discuss goals, care plans and anticipated length of stay. The patient was instructed to use her wheelchair outside of her therapy sessions in order to eliminate reinforcement of abnormal movement patterns. Assistive gait devices were removed from the patient's room, and nursing staff was instructed to assist the patient with all transfers from a wheelchair base.

Pregait activities: days 1 and 2

Physical therapy interventions. Interventions included stretching, active assisted range of motion of extremities, rolling, scooting, deep breathing and relaxation, and supine hip and abdominal stabilization exercises. Activities also included transitions from supine to sitting and sitting to standing and balance activities in sitting. The patient was able to stand in the parallel bars with minimal support from the therapist.

Behavioral modification techniques. The patient worked on isolating joint movements during range of motion exercises with emphasis on decreasing coactivation of agonist and antagonist muscles during movement. The therapist provided cueing for relaxation and normal movement patterns. The therapist stopped an activity if the patient's tremors appeared. The activity was restarted when the patient "had control of her body." Other verbal cueing included "I want you to activate only one joint at a time," "isolate the elbow, shoulder, knee," etc.

Supported gait activities: days 2 and 3

Physical therapy interventions. The patient practiced standing weight shifts in parallel bars including stepping forward and back over her right and then left lower extremities. She then progressed to walking forward and backward and sidestepping the length of the parallel bars (15 ft).

Behavioral modification techniques. The therapist's verbal cues emphasized controlled, smooth movements and normal length steps. Again, if the patient demonstrated abnormal movement patterns, the therapist instructed her to sit down, relax, and regain control of her limbs. The patient was progressed to walking outside of the parallel bars when she demonstrated normal gait mechanics within the parallel bars.

General mobility: days 4–6

Physical therapy interventions. The patient began gait training outside of the parallel bars with progression from 100 ft on day 4 to 400 ft on day 6. Higher level balance activities including stepping over obstacles on the floor, performing crossover steps, and tandem walking were practiced. On day 6, the patient was able to ambulate up and down 12 steps independently with a step-over-step gait pattern. She increased her endurance on an exercise bike from five minutes on day 4 to 15 minutes on day 6.

Behavioral modification techniques. The patient was provided verbal cues to relax her trunk and extremities during gait and transfers. She also received verbal cueing to decrease her step length because she took large, uncontrolled steps. On day 6, the patient was given the privilege to walk to and from therapies independently from her room. The patient required reassurance and positive reinforcement of her progress and needed encouragement to push herself and try new challenges.

Community reintegration: days 7–9

Physical therapy interventions. The patient was able to ambulate independently to and from therapies (400 ft). She practiced household tasks including carrying laundry baskets, vacuuming, and making a bed. Her endurance improved on the treadmill from 10 minutes on day 7 to 20 minutes on day 9. Job-specific tasks including transferring a person to a chair, getting up from a kneeling to a standing position, and lifting 40-lb objects from the floor were practiced. On day 9, she was able to ambulate up and down 30 steps without a railing. Her gait was progressed to include ambulation outside in the snow on a slippery sidewalk.

Behavioral modification techniques. The patient's fiancé and children attended her therapy sessions on the last two days. A patient care conference with the patient, her family, and all team members was held on the day of discharge to discuss return to work and follow-up psychological and medical care.

Outcome

The patient was discharged home with her fiancé. She was independent in all transfers, self-cares, and gait. She did not show any symptoms of tremors or balance difficulties. The patient returned to work two weeks after her hospital discharge. She did follow-up with psychological counseling and began an exercise program at her employer's fitness center. At three-month follow-up, the patient had no symptom reoccurrence and was gainfully employed and doing well.

TABLE 3. Functional Independence Measurement

	Case 1*			Case 2			Case 3		
	Adm	Dis	F/U	Adm	Dis	F/U	Adm	Dis	F/U
Eating	3	7	7	7	7	7	5	7	7
Grooming	1	7	7	7	7	7	4	7	7
Bathing	1	6	6	2	7	7	4	7	7
Dressing upper extremity	1	7	7	3	7	7	4	7	7
Dressing lower extremity	1	7	7	2	7	7	4	7	7
Toileting	1	7	7	2	7	7	4	7	7
Bladder	6	7	7	7	7	7	7	7	7
Bowel	6	7	7	7	7	7	7	7	7
Bed/chair/wheelchair transfer	1	6	6	2	7	7	3	7	7
Toilet transfer	1	6	6	2	7	7	3	7	7
Tub/shower transfer	1	6	6	2	7	7	3	7	7
Walk/wheelchair	1	6	6	1	7	7	3	7	7
Stairs	1	6	6	1	7	7	3	7	7
Comprehension	7	7	7	7	7	7	7	7	7
Expression	7	7	7	7	7	7	7	7	7
Social interaction	6	7	7	7	7	7	7	7	7
Problem solving	6	7	7	7	7	7	6	7	7
Memory	7	7	7	7	7	7	7	7	7
Total score	58	120	120	80	126	126	89	126	126

* Case 1 used a white blind cane for mobility before and after discharge.
Adm = admission; Dis = discharge; F/U = three-month follow-up.
0 = activity does not occur; 7 = complete independence in activity.

DISCUSSION

All three patients demonstrated rapid improvement in function with the mean length of stay in rehabilitation of eight days. Functional independence measures (FIM™) were recorded on admission, at discharge from the hospital, and three months post-discharge (Table 3). The three-month follow-up was conducted through a phone interview as part of the routine data collection at St. Mary's Hospital inpatient rehabilitation unit.

The mean discharge FIM™ score of the three patients was 124 with the mean FIM™ gain in score from admission to discharge of 48 points. The maximal possible discharge FIM™ is 126. All three patients gained complete return of physical functioning and were symptom free at three-month follow-up.

All three cases presented with symptoms of neurological impairment. They also all had a history of abuse and a stressful life event that preceded the onset of their symptoms. The patients were all female and in the adolescent/young adult stage of life (Table 4). The patients' successful outcomes correspond with studies that report good prognosis with acute onset of symptoms, age under 40 years, a precipitating stressful life event, and good premorbid health.[24,46]

Because physical therapy is a culturally acceptable treatment for paralysis and gait abnormalities, the patient is often willing to participate in the treatment program. The patient will make progress if provided with an option for getting better. The specific strengthening and gait training techniques used with this patient population may not be as critical as the use of behavioral modification techniques to support the therapy interventions. The essential behavioral modification techniques include positive reinforcement of normal movement and a progressively more challenging therapy program. Table 5 lists a mnemonic that was developed for remembering the principles of conversion disorder management. Many of these principles can also be applied to the treatment of patients with other somatoform disorders.

Population studies suggest that conversion disorder is a rare disorder, making randomized, controlled trials impractical and difficult to perform. Future studies should include analysis of outcomes of inpatient versus outpatient rehabilitation and outcomes of psychiatric versus rehabilitation treatment approaches or combination approaches. A possible limitation of this report is that it was difficult to standardize care due to the varying patient impairments and interaction of other therapy discipline's care.

CONCLUSION

Patients with conversion disorder represent a small proportion of patients seen by the average physical therapist, but the ramifications of misdiagnosis and mistreatment can be considerable. Misdiagnosis can expose the patient to unnecessary treatment and testing, increased healthcare costs, and undue psychological stress. The role of the physical therapist in the treatment of conversion disorder is to re-establish normal patterns of movement. The physical therapist can gently lead the patient to recovery and return to their social, physical, and work life.

TABLE 4. Patient Characteristics

Case	Age (y)	Symptom presentation	Classic conversion symptoms	Life stress	History of abuse	Length of stay (d)
1	20	Quadriplegia	Inconsistent sensation and muscle testing compared to function	Leaving home to live independently, going to college	Sexual	9
2	18	Ataxia	Cocontraction on muscle testing, inconsistent effort, windmill-like arm movements	Recent abortion, moving in with boyfriend, graduating high school	Emotional	6
3	34	Ataxia, tremors	Exaggerated movements, coactivation on muscle testing, inconsistent physical examination	Pending marriage	Sexual	9

TABLE 5. A Mnemonic for Remembering Critical Components for the Successful Management of Patients with Conversion Disorder

C Confrontation is avoided
O Organic illness is ruled out
N Not allowed to progress to next step, without mastery of previous step
V Vulnerability requires "face saving" options
E Establish concrete measures of progress/set goals
R Reinforcement through positive feedback
S Stress management techniques
I Ignore abnormal behavior
O Open communication with rehab team and family
N Need for consistency in care providers

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REFERENCES

1. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition*. Washington, DC: American Psychiatric Association; 1994.
2. Deaton AV. Treating conversion disorders: is a pediatric rehabilitation hospital the place? *Rehabil Psychol.* 1998;43:56–62.
3. Tomasson K, Kent D, Coryell W. Somatization and conversion disorder: comorbidity and demographics at presentation. *Acta Psychiatr Scand.* 1991;84:288–293.
4. Teasdell RW, Shapiro A. Rehabilitation of conversion disorders: a programmatic experience. *Phys Med Rehabil.* 2002;16:45–53.
5. Mai FM. "Hysteria" in clinical neurology. *Can J Neurol Sci* 1995;22: 101–110.
6. Heruti RJ, Levy A, Adunski A, et al. Conversion motor paralysis disorder: overview and rehabilitation model. *Spinal Cord.* 2002;40:327–334.
7. Parobek V. Distinguishing conversion disorder from neurologic impairments. *J Neurosci Nurs.* 1997;29:128–135.
8. Stewart TD. Hysterical conversion reactions: some patient characteristics and treatment team reactions. *Arch Phys Med Rehabil* 1983;64:308–310.
9. Speed J. Behavioral management of conversion disorder: a retrospective study. *Arch Phys Med Rehabil.* 1996;77:147–154.
10. Trieschmann RB, Stolov WC, Montgomery ED. An approach to the treatment of abnormal ambulation resulting from conversion reaction. *Arch Phys Med Rehabil.* 1978;63:198–206.
11. Gooch JL, Wolcott R, Speed J. Behavioral management of conversion disorder in children. *Arch Phys Med Rehabil.* 1997;78:264–268.
12. MacKinnon JL. Physical therapy treatment of a patient with conversion reaction. A case report. *Phys Ther.* 1984;64:1687–1688.
13. Calvert P, Jureidini J. Restrained rehabilitation: an approach to children and adolescents with unexplained signs and symptoms. *Arch Dis Child.* 2003;88:399–402.
14. Sullivan M, Buchanan D. The treatment of conversion disorder in a rehabilitation setting. *Can J Rehabil.* 1989;2:175–180.
15. Delargy MA, Peatfield RC, Burt AA. Successful rehabilitation in conversion paralysis. *BMJ.* 1986;292:1730–1731.
16. Brazier DK, Venning HE. Conversion disorders in adolescents: a practical approach to rehabilitation. *Br J Rheumatol.* 1997;36:594–598.
17. Watanabe TK, O'Dell MW, Togliatti TJ. Diagnosis and rehabilitation strategies of patients with hysterical hemiparesis: a report of four cases. *Arch Phys Med Rehabil.* 1998;79:709–713.
18. Jones MM. Conversion reaction: anachronism or evolutionary form? A review of the neurologic, behavioral, and psychoanalytical literature. *Psychol Bull.* 1980;87:427–441.
19. Stefansson JG, Messina JA, Meyerowitz S. Hysterical neurosis, conversion type: clinical and epidemiological considerations. *Acta Psychiatr Scand.* 1976;53:119–138.
20. Singh SP, Lee AS. Conversion disorders in Nottingham: alive, but not kicking. *J Psychosom Res.* 1997;43:425–430.
21. Guz H, Doganay Z, Ozkhan A, et al. Conversion and somatization disorders. Dissociative symptoms and other characteristics. *J Psychosom Res.* 2004;56:287–291.
22. Liu G, Clark MR, Eaton WW. Structural factor analysis for medically unexplained somatic symptoms of somatization disorder in the Epidemiologic Catchment Area Study. *Psychol Med.* 1997;27:617–626.
23. Ford CV, Folks DG. Conversion disorders: an overview. *Psychosomatics.* 1985;26:371–374, 380–383.
24. Lazare A. Current concepts in psychiatry: conversion symptoms. *N Engl J Med.* 1981;305:745–748.
25. Chardoff P. The diagnosis of hysteria: an overview. *Am J Psychiatry.* 1974;131:1073–1078.
26. Binzer M, Anderson PM, Kullgren G. Clinical characteristics of patients with motor disability due to conversion disorder: a prospective control group study. *J Neurol Neurosurg Psychiatry.* 1997;63:83–88.
27. Spitzer C, Spelsberg B, Grabe HJ, et al. Dissociative experiences and psychopathology in conversion disorders. *J Psychosom Res.* 1999;46:291–294.
28. Sar V, Akyuz G, Kundakc T, et al. Childhood trauma, dissociation, and psychiatric comorbidity in patients with conversion disorder. *Am J Psychiatry.* 2004;161:2271–2276.
29. Keane JR. Hysterical gait disorder: 60 cases. *Neurology.* 1989;39:586–589.
30. Heruti RJ, Reznik J, Adunski A, et al. Conversion motor paralysis disorder: analysis of 34 consecutive referrals. *Spinal Cord.* 2002;40: 335–340.
31. Teasdell RW, Shapiro AP. Misdiagnosis of conversion disorders. *Am J Phys Med Rehabil.* 2002;81:236–240.
32. Schwartz AC, Calhoun AW, Eschbach CL, et al. Treatment of conversion disorder in an African American Christian woman: cultural and social considerations. *Am J Psychiatry.* 2001;158:1385–1391.
33. Silver FW. Management of conversion disorder. *Am J Phys Med Rehabil.* 1996;75:134–140.
34. Solyom C, Solyom L. A treatment program for functional paraplegia/ Munchausen's syndrome. *J Behav Ther Exp Psychiatry.* 1990;21:225–230.
35. Teasdell RW, Shapiro AP. Strategic-behavioral interventions in the treatment of chronic non-organic motor disorders. *Am J Phys Med Rehabil.* 1994;73:44–50.
36. Fell DW. Progressing therapeutic intervention in patients with neuromuscular disorders: a framework to assist clinical decision making. *J Neurol Phys Ther.* 2004;28:35–46.
37. Callahan J, Parlman K, Beninato M, et al. Perspective: impact of the III Step conference on clinical practice. *J Neurol Phys Ther.* 2006;30:157–166.
38. Withrington RH, WynnParry CB. Rehabilitation of conversion paralysis. *J Bone Joint Surg [Br].* 1985;67:635–637.
39. American Physical Therapy Association. Guide to Physical Therapist Practice, Second Edition. *Phys Ther.* 2001;81:9–746.
40. Jureidini CP. Restrained rehabilitation: an approach to children and adolescents with unexplained signs and symptoms. *Arch Dis Child.* 2003;88:399–402.
41. Delamater AM, Rosenbloom N, Conners CK, et al. The behavioral treatment of hysterical paralysis in a 10 year old boy. A case study. *J Am Acad Child Psychiatry.* 1983;22:73–79.
42. Blanchard EB, Hersen M. Behavioral treatment of hysterical neurosis: symptom substitution and symptom return. *Psychiatry.* 1976;39:118–129.
43. O'Sullivan S, Schmitz T. *Physical Rehabilitation: Assessment and Treatment.* Philadelphia, Pa: FA Davis; 2001.
44. Uniform Data System for Medical Rehabilitation. *The Guide for the Uniform Data Set for Medical Rehabilitation. Version 5.1.* Buffalo, NY: UDSMR; 1997.
45. Ottenbacher KJ, Hsu Y, Granger CV, et al. The reliability of the Functional Independence Measure: a quantitative review. *Arch Phys Med Rehabil.* 1996;77:1226–1232.
46. Crimlisk HL, Bhatia K, Cope H, et al. Slater revisited: 6 year follow up study of patients with medically unexplained symptoms. *BMJ.* 1998; 316:582–586.

