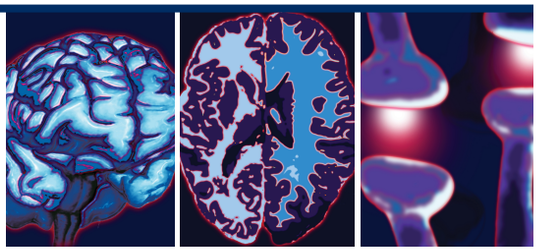
MANAGEMENT PERSPECTIVE



Reclaiming trapped limbs: current and emerging treatment strategies for motor conversion disorder

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Practice points

- Treatment of motor conversion disorder involves a variety of strategies to reverse underlying psychological factors.
- Not all patients with motor conversion have established psychological factors.
- Emerging neurobiological strategies, such as transcranial magnetic stimulation, are promising, particularly for patients without associated psychopathology.
- Viewing motor conversion as both a psychiatric and neurobiological phenomenon may best guide research and patient care in the future.

SUMMARY The DSM-IV diagnostic guidelines for motor conversion disorder stress an association between psychological factors and the onset of unexplained motor symptoms. Treatment strategies, including psychodynamic psychotherapy, cognitive–behavioral therapy, suggestion-based therapy and pharmacotherapy have, therefore, focused on the identification and management of psychiatric comorbidities. A proportion of patients with motor conversion, however, do not have clear associated psychopathology on structured psychiatric assessment. A growing body of literature on the neurobiological correlates of motor conversion has sparked interest in treatment strategies, such as repetitive transcranial magnetic stimulation, which may find special applications in this patient population. Here, the evidence behind current and emerging treatment strategies for motor conversion disorder is reviewed, and the application for patients with and without associated psychopathology is discussed.

'Psychogenic motor dysfunction' is a common term used to describe increased, decreased or abnormal movement that is not attributable to any organic cause. Most neurologists, after excluding organic disease, refer these patients to psychiatry in the hopes that treatment of a presumed underlying psychological disturbance will resolve symptoms [1]. The corresponding psychiatric diagnosis is often motor conversion disorder [1,2]. Conversion disorders are currently classified under somatoform disorders in the DSM-IV, distinguished from other subtypes by their emphasis on motor, sensory or seizure symptoms, and distinguished from factitious disorder and malingering by lack of voluntary feigning [2]. Importantly, the diagnostic criteria

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for conversion disorder in the DSM-IV includes an association between psychological stressors and the onset of motor symptoms [2]. However, the DSM-5 has recently changed this criterion to a specifier [3], which strongly supports the diagnosis. There was also a push to reclassify conversion disorders as dissociative disorders because many patients present with symptoms congruent with both categories [4,5]. The DSM-5 continues to list conversion disorder under somatoform disorders (now termed 'somatic symptom and related disorders'); however, the link between somatoform and dissociative disorders is acknowledged in the reorganization of the DSM-5 [3].

Whether conversion disorder is seen as somatoform or dissociative in nature, and whether a DSM-IV or DSM-5 definition is used, does not change the implication that a psychological factor may be an underlying cause of patients' dysfunction. This has directed management towards identification and treatment of precipitating or comorbid psychiatric disturbances using a wide variety of modalities, including psychotherapy, cognitive–behavioral therapy (CBT), biofeedback, hypnosis and pharmacotherapy [6]. However, there is a significant number of patients that do not have any identifiable psychological disturbances on structured psychiatric assessment [7,8]. One possibility is that motor conversion in these patients has a separate etiology. Physical injury, for instance, is an associated factor in 37% of motor conversion patients [9]. However, conversion from often minor injury to major disability clearly also involves psychological processes [9]. Alternatively, there may be occult psychopathology that a patient is unaware of, or is unwilling to acknowledge. In either case, these patients are some of the most frustrated and difficult to treat [1,8,10]. Nevertheless, there has been a trend towards elucidating the neural correlates of motor conversion and developing neurobiological therapies, which may be particularly promising for patients without clear psychopathology [11]. Evidence behind both psychiatric and neurobiological treatment modalities will be presented and their application for patients with and without associated psychological factors will be discussed.

'Psychiatric' modalities

Although the etiology of motor conversion disorder remains unclear, many studies have established that unexplained motor symptoms are associated with psychological factors defined as either comorbid psychiatric diagnoses or significant psychosocial stressors. In a follow-up study of 73 patients, 75% had comorbid psychiatric disorders, the majority of which coincided with the onset of motor symptoms [12]. Furthermore, a controlled prospective study comparing patients with unexplained motor symptoms to patients with similar organic symptoms found a 33% increase in overall psychiatric comorbidity, with a high Hamilton depression score and personality disorder significantly associated with the nonorganic group [7]. A larger prospective study later highlighted anxiety disorders as the most common comorbidity [8]. Case studies have also associated motor conversion with psychosocial stressors from marital or academic problems, to post-traumatic stress disorder or childhood trauma [13–15].

Successfully identifying psychological factors, however, does not imply that treatment is straightforward. Currently, the most common modalities are psychodynamic psychotherapy, which aims to make patients consciously aware of events, emotions or past trauma associated with conversion, and CBT, which aims to break dysfunctional thinking patterns. A case series of ten patients receiving psychoanalytic therapy and medication for comorbid psychopathology found improvements in depression, anxiety and global functioning scores coincident with motor improvement in blinded video assessment [16]. Although the efficacy of CBT is well established for other somatoform disorders [17], there are no randomized controlled trials of CBT for motor conversion specifically. A CBT-based guided self-help intervention, which included some patients with motor symptoms, showed improvements in patient self-rating on a clinical, global improvement scale at 3-month follow-up [18].

Pharmacotherapy is most often used adjunctively rather than as primary treatment [15]. The only trial of medication alone was an open-label study on selective serotonin reuptake inhibitors in 15 patients, seven of whom achieved full recovery [19]. Given the risk of extrapyramidal side effects, neuroleptics are generally not prescribed for motor conversion [1]. However, a recent case report of motor conversion resistant to escitalopram–lorazepam combination showed dramatic response to adjunctive low-dose amisulpride, a D2/D3 receptor antagonist [20]. Another adjunctive treatment is electroconvulsive therapy, which has shown benefits for conversion

symptoms in several case reports in which the patient had severe comorbid depression [21–24].

The use of hypnosis and other suggestion-based therapies in motor conversion disorder is more controversial. 'Suggestion' is communication to a patient in an altered state of consciousness, that he or she will experience a specific, nonvolitional response. Interest in hypnosis stems from two observations: first, that hypnotized patients and patients in dissociative states show similar characteristics [25]; and second, that patients with conversion disorder are highly hypnotizable and suggestible [26]. Two randomized controlled trials have studied hypnosis. Hypnosis was both 'symptom based', wherein patients visualized symptom reversal, and 'insight based', wherein patients were challenged to express dissociated emotions. In the first study, inpatients received either hypnosis plus a comprehensive treatment program or the program alone [27]. No additional effect of hypnosis was observed. In the second study, outpatients were randomized to hypnosis or a waiting list control [28]. The hypnosis group experienced improvement on blinded motor assessment, which persisted for 6 months. A Cochrane review has critiqued the methodology of these two hypnotherapy studies [29]. An alternative to hypnosis is a drug interview, in which a sedative is used to induce a hypersuggestible state. A meta-analysis of this technique found that the use of suggestion or the occurrence of emotional catharsis during the interview was associated with recovery [30]. High suggestibility may also underlie case reports of improvement following acupuncture [31] or placebo therapy [32].

Intuitively, patients with associated psychopathology would benefit most from psychiatric treatment modalities. Although most patients in the studies cited above had associated psychopathology, a few patients without clear psychological factors were included. In the case series of ten patients receiving psychoanalytic therapy, two patients without psychopathology at baseline experienced recovery from motor deficits [16]. In one hypnosis trial, the authors claimed efficacy for motor deficits even without improvement in associated psychopathology [28]. Interpretation is limited by lack of head-to-head comparisons. Nevertheless, there seems to be a prognostic disadvantage to having no associated psychopathology [1,8,12,33]. This may be related to some patients' unwillingness to accept the diagnosis, seek early treatment or divulge information about psychosocial factors that could lead away from the diagnosis of organic disease [10]. In a large case-controlled study, patients with functional weakness were less likely than controls to admit that stress could have caused their symptoms [34]. However, the recent push to understand motor conversion in a neurobiological framework may produce more effective treatment strategies for these patients.

'Neurobiological' modalities

Functional neuroimaging is a method of correlating motor symptoms with dynamic brain function that may guide development of novel treatment strategies. Two major theories on the pathophysiology of motor conversion have arisen from functional MRI (fMRI) data. The first hypothesizes that frontal and subcortical motor circuits are suppressed by overactivity in limbic areas such as the amygdala, involved in integrating emotional stimuli, and prefrontal areas involved in motor planning [35]. Interestingly, hypnosis-induced paralysis produces a similar pattern [36]. In one case series, increased prefrontal activity and reduced subcortical motor activity returned to normal levels after recovery from symptoms [37]. In another study, patients also had greater functional connectivity between the amygdala and the supplementary motor area, and reduced habituation of amygdala activation compared with age-matched controls [38]. The second theory proposes that patients have impaired 'motor imagination' [35]. Some fMRI studies have found normal activation in motor areas when patients try to move a nonorganically paralyzed limb, but abnormal activation in prefrontal areas when patients view limb movements [39,40]. This theory emphasizes a functional dissociation between formulation of an internal movement plan and motor output, rather than active inhibition of motor output areas. Both theories are limited by small fMRI samples and the difficulty in interpreting activation associated with trying to 'move' a nonorganically paralyzed limb [39].

While neuroimaging does not reveal etiology, it has inspired an emerging treatment modality called repetitive transcranial magnetic stimulation (rTMS). rTMS noninvasively creates a brief, powerful magnetic field to induce electric currents within a targeted brain region. Depending on the frequency and intensity of these magnetic pulses, rTMS can trigger increases or decreases in cortical excitability [41]. rTMS has also been

applied to various neurologic and psychiatric conditions, including major depression, anxiety disorders, post-traumatic stress disorder and schizophrenia [42].

Preliminary studies in motor conversion disorder have shown promise. A 2006 case series involving four patients with psychogenic paralysis reported one patient with full recovery and two patients with marked improvements following 'excitatory' rTMS stimulation of the motor cortex [43]. These patients had stable improvement at 1-year follow-up. A 2010 single-center, retrospective review of 70 patients with psychogenic paralysis also showed improvement (defined as full or dramatic recovery) in 89% of patients after rTMS, particularly in those with short symptom duration [44]. This study involved a relatively larger sample; however, interpretation remains limited by the retrospective design and a strongly skewed patient population towards short symptom durations. 'Inhibitory' rTMS protocols have also had preliminary success for cases of psychogenic tremor [45] and psychogenic aphonia [46]. As neuroimaging advances our ability to correlate conversion symptoms with altered activity or dysfunctional connectivity between brain regions, rTMS may provide a flexible method to up- or down-regulate excitability in implicated regions [35]. However, any apparent efficacy must be separated from placebo effects, particularly for highly suggestible patients [35]. To date, no trials of rTMS for motor conversion have directly compared rTMS to a sham control. A recent systematic review of rTMS studies for motor conversion highlights the need for more clinically relevant trials, with an adequate control group, standardized stimulation protocols, and consistent outcome measures across trials, before this modality may be considered as an effective treatment strategy [47]. Time has largely exonerated transcranial magnetic stimulation (TMS) from significant safety concerns; however, safety must also be addressed before widespread use [42].

All rTMS studies cited above included patients with and without associated psychological factors, and demonstrated efficacy in both groups. In the 2006 case series, two of the three patients who recovered had no psychiatric comorbidities, and in the 2010 retrospective study, only 28 of the 70 patients had psychiatric comorbidities [43,44]. Although direct comparisons between each population are lacking [10], rTMS may find special application for patients without associated psychological factors. Forming a therapeutic alliance with these patients is challenging because many refuse to accept a diagnosis implying that the problem is 'all in their mind' [1,10]. rTMS lends itself to explanation through a neurobiological model that might be more readily acceptable to these patients. Furthermore, clinical signs elicited using TMS could demonstrate to the resistant patient that although there is no organic cause, their symptoms are correlated with organic changes. One preliminary TMS study demonstrated abnormal suppression of corticospinal excitability during movement imagination, which is not present in the unaffected limb or in healthy controls [48]. Another interesting case report showed reversal of abnormal TMS responses following successful psychodynamic therapy [49]. This finding highlights the importance of addressing motor conversion from both psychiatric and neurobiological perspectives.

Conclusion & future perspective

There are currently no evidence-based guidelines for the treatment of motor conversion disorder because the majority of studies are case based. However, one expert panel has recommended a thorough exploration of potentially related psychopathology, followed by multimodal treatment including psychodynamic therapy, CBT, stress management, relaxation techniques and medications [50]. There is also some evidence that physiotherapy may offer benefits [6,51,52]. Although some experts are also showing cautious optimism for rTMS, enthusiasm for its potential clinical application will require more clinically relevant evidence [1,11,35]. At this point, evidence for conventional psychotherapeutic techniques, although limited, still outweighs evidence for neurobiological techniques. Future studies comparing and combining methods may suggest an optimum treatment strategy for this difficult condition. At the same time, the wide variety of treatment options that have already arisen speaks to the heterogeneity of patients presenting with psychogenic motor symptoms. Any 'optimum' strategy should not replace treatment of patients within an integrative bio–psycho–social framework.

Despite lack of strong evidence for any one treatment modality, recovery is associated with several positive prognostic factors, including short symptom duration, comorbid psychiatric diagnosis, and early diagnosis and treatment [2,10,12]. Particularly important is the patient's acceptance of the diagnosis and the quality of the

therapeutic alliance [8,10,33]. Indeed, a common theme across all therapeutic strategies is to break down psychological barriers in order to facilitate insight, acceptance and recovery. A focus on motor conversion disorder as a psychiatric and a neurobiological condition, as well as the development of treatments within each of these frameworks, may be the best strategy going forward to find successful treatments for the wide variety of patients with this condition.

Financial & competing interests disclosure

The author has no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

No writing assistance was utilized in the production of this manuscript.

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