

REVIEW

Management of Functional Communication, Swallowing, Cough, and Related Disorders: Consensus Recommendations for Speech and Language Therapy

Janet Baker,^{1,2} Caroline Barnett,³ Lesley Cavalli,^{4,5} Maria Dietrich,⁶ Lorna Dixon,⁷ Joseph R. Duffy,⁸ Annie Elias,⁹ Diane E Fraser,¹⁰ Jennifer L. Freeburn,¹¹ Catherine Gregory,² Kirsty McKenzie,¹² Nick Miller,¹³ Jo Patterson,¹⁴ Carole Roth,¹⁵ Nelson Roy,^{16,17} Jennifer Short,¹⁸ Rene L. Utianski,^{19,20} Miriam Van Mersbergen,²¹ Anne Vertigan,^{22,23} Alan Carson,²⁴ Jon Stone,²⁴ Laura McWhirter²⁴

For numbered affiliations see end of article.

Correspondence to

Dr Laura McWhirter, Centre for clinical brain sciences, The University of Edinburgh, Edinburgh, UK; Laura.mcwhirter@ed.ac.uk

ABSTRACT

Background Communication problems (e.g. dysphonia, dysfluency, and language and articulation disorders), swallowing disorders (dysphagia and globus), cough and upper airway symptoms, resulting from Functional Neurological Disorder (FND), are commonly encountered by speech and language professionals. However, there are few descriptions in the literature of the most effective practical management approaches. This consensus document aims to provide recommendations for assessment and intervention that are relevant to both adults and young people.

Methods An international panel of speech and language professionals with expertise in FND were approached to take part. Participants responded individually by email to a set of key questions regarding best practice for assessment and interventions. Next, a video conference was held in which participants discussed and debated the answers to these key questions, aiming to achieve consensus on each issue. Drafts of the collated consensus recommendations were circulated until consensus was achieved.

Results FND should be diagnosed on the basis of positive clinical features. Speech and language therapy for FND should address illness beliefs, self-directed attention and abnormal movement patterns through a process of education, symptomatic treatment and cognitive behavioural therapy within a supportive therapeutic environment. We provide specific examples of these strategies for different symptoms.

Conclusions Speech and language professionals have a key role in the management of people with communication and related symptoms of FND. It is intended that these expert recommendations serve as both a practical toolkit and a starting point for further research into evidence-based treatments.

INTRODUCTION

The pivotal role of the speech and language professional has been long established in the management of a range of disorders of communication, swallowing, and cough.

There is a strong evidence-base for the treatment of the aforementioned disorders occurring during

childhood development, in association with structural anomalies, and as the result of neurological disease or injury. In contrast, there have been comparatively few intervention and outcome studies for individuals with *functional* communication, swallowing, and cough disorders; while there is some evidence for the assessment and treatment of functional dysphonia and dysphagia, other symptoms have received very little systematic research attention.

In functional neurological disorder (FND), neurological symptoms are experienced which are genuine, and usually associated with distress and disability, as a result of potentially-reversible changes in function and not as a result of disease, damage, or structural abnormality.¹ FND is a common cause of neurological symptoms, present in around 1 in 6 patients presenting to neurology outpatient clinics.² Crucially, FND is diagnosed on the basis of positive clinical features of internal inconsistency, and not by exclusion of structural damage or disease.¹ FND is also described in children and young people,³ in whom successful outcomes have been reported by speech and language professionals.

Although many speech and language professionals will have assessed or treated people with functional dysphonia, they may also be asked to assist with differential diagnosis or provide treatment of a much wider range of functional communication, swallowing, and cough disorders, in isolation or in combination with other symptoms of FND. This is an area in which some and perhaps many speech and language professionals have felt unsure or underprepared when asked to provide treatment.⁴ And yet these disorders are not rare: review of referrals to one large U.S.A. speech pathology department over a 3-year period found that (excluding functional dysphonia) 3% of patients with acquired communication disorders had functional disorders.⁵

These consensus recommendations for assessment and intervention draw on published evidence where available. However, in areas where empirical evidence is sparse, the approaches recommended here represent those the authors have found useful in their own clinical practices.



© Author(s) (or their employer(s)) 2021. No commercial re-use. See rights and permissions. Published by BMJ.

To cite: Baker J, Barnett C, Cavalli L, et al. *J Neurol Neurosurg Psychiatry* Epub ahead of print: [please include Day Month Year]. doi:10.1136/jnnp-2021-326767.

General neurology

We hope that these recommendations will assist practitioners in their practical management of these disorders, and support future research towards evidence-based treatments.

METHOD

Consensus Process

A modified Delphi approach was used. Speech and language professionals from different countries with extensive experience with functional communication, swallowing or upper airway-related symptoms (including cough and/or breathing) were identified from an initial review of the literature and subsequent snowball recruitment from professional networks, and were invited to respond to a series of questions relating to their recommendations for assessment and treatment. This was followed by two video-conference discussions, after which a draft of each subsequent document was circulated three times until majority consensus was reached. The aims and methods were similar to those used to develop published recommendations for occupational therapy and physiotherapy in FND; it is intended that this document complements these publications.^{6 7}

Participants

The group included 18 speech and language professionals (speech and language therapists / speech-language pathologists; 9 based in the UK, 5 in the U.S.A., 1 in Germany [German and U.S.A trained], and 3 in Australia) with clinical experience of treating patients with FND. Participants had between 6 and 46 years of post-graduate experience. The group also included UK representatives from neuropsychiatry (n=2) and neurology (n=1), supporting a multidisciplinary approach.

Terminology

Historically, functional neurological disorders have had many names including *conversion disorder*, *psychogenic*, *psychosomatic*, *somatoform*, *medically unexplained*, or *functional*; these terms reflect differing behavioural, physical, and psychological perspectives. There is now reasonable consensus amongst neurologists and psychiatrists that the term *functional* is the most appropriate diagnostic termⁱ, primarily to emphasise a disorder of function with aetiological neutrality, when referring to specific symptoms (e.g. *functional dystonia*, *functional tremor*, *functional blindness*). *Functional Neurological Symptom Disorder (FND)* as defined by the DSM 5 (2013) is the umbrella term for these disorders which lie at the interface between neurology and psychiatry. Diagnosis of Functional Neurological Symptom Disorder in DSM 5 requires the presence of one or more symptom of altered voluntary motor or sensory function, which is incompatible with or not better explained by other recognised neurological or medical conditions, and which causes clinically significant distress or impairment. Each symptom type may be specified, i.e. ‘With swallowing symptoms’ or ‘With speech symptoms’.^{8–10} Speech and communication symptoms may occur in isolation, or alongside a range of other functional neurological symptoms.

There continues to be confusion about the most appropriate terminology for disorders of communication, swallowing, and cough in the absence of structural or neurological pathology. Difficulties in reconciling terms for these symptoms can undermine efforts to define clinical phenotypes, to collate data, and to develop evidence-based treatments.^{8–10}

ⁱWe recognize that possible confusion may occur between functional disorders and the functional goals of therapies for both structural/neurological and functional disorders.

This document aims to focus on the elements of effective treatment, rather than on these complex issues of terminology and definition. In the interests of consistency, therefore, the term *functional* will be used throughout this document to refer to these disorders of communication, swallowing, and cough. An inclusive approach has been taken in including symptoms (e.g., globus and dysphagia) which may fall between definitions of FND and functional somatic symptoms but which are commonly encountered by speech language professionals in clinical practice.

Conceptual understanding

Some reviews have examined psychosocial risk factors in functional communication and related disorders.^{5 11–18} However, symptoms do not always develop after major adverse life events, or in the context of clinically diagnosable psychological distress or psychiatric comorbidity, and the absence of adversity or distress should not be taken as evidence that the disorder is not functional.^{12 19} In common with FND in general, symptoms often develop instead in the context of injury or illness: for example, upper respiratory tract infection, voice overuse, injury to the face, mouth, oropharynx or larynx; traumatic head injury.

This group’s consensus on the conceptual understanding of the diagnosis of communication and related FND symptoms (**Box 1**) is informed by current and widely-accepted explanatory models for FND.^{1 20–24}

THE ROLE OF THE SPEECH AND LANGUAGE PROFESSIONAL

Surveys have highlighted that some and perhaps many speech and language professionals can feel uncertain about managing functional communication and related disorders.^{9 10 25–27} Some have expressed concerns about addressing possible psychological predisposing or exacerbating factors.⁴ These scope-of-practice issues have been addressed by professional bodies, and it has been made clear that addressing psychological aspects in relation to the full range of communication disorders is integral to the work of speech and language professionals.^{28–35} Although some speech and language professionals can benefit from training in various models of counselling and psychotherapy, effective treatment of most functional communication, swallowing, and cough disorders is possible within the existing skillset and practice environment of many speech and language professionals. A list of additional helpful resources can be found in **Appendix 1** (see **Appendix 1**).

Speech and language professionals have a crucial role to play in assessment and differential diagnosis of FND because of their

Box 1 Functional communication, swallowing, and cough disorders – conceptual understanding

Functional communication, swallowing, and other upper airway-related (e.g. cough and breathing) disorders occur when there is a loss of voluntary control or altered sense of self-agency (the subjective experience of controlling one’s own actions (Haggard, 2017)) over the initiation, inhibition, and maintenance of the functions involved in speech, voice, language, swallowing, breathing, or cough. As a result, there often is inconsistency between voluntary functions, which become inaccessible or excessively effortful, and automatic functions, which are usually preserved.

The symptoms of functional disorders are genuinely experienced and involuntary. A range of biological, psychological, and social predisposing, precipitating, and perpetuating factors (**Table 1**) are recognised.

General neurology

Table 1 A model of predisposing, precipitating and perpetuating risk factors for functional communication, swallowing, and cough disorders^{7,13,14,45,62}

Factors:	Biological	Psychological	Social
Predisposing vulnerabilities	<ul style="list-style-type: none"> ▶ Genetic factors ▶ Previous functional symptoms and disorders ▶ Pre-existing medical illness, especially affecting communication, e.g. traumatic brain injury ▶ Biological vulnerabilities in nervous system, lower/upper respiratory system, head & neck 	<ul style="list-style-type: none"> ▶ Personality traits (neuroticism, low social potency, stress reactivity, emotional inhibition, low self-esteem, perfectionism) ▶ Interpersonal difficulties ▶ Suggestibility ▶ Coping styles ▶ Attachment profiles ▶ Mood, anxiety, and trauma-related disorders 	<ul style="list-style-type: none"> ▶ Adverse life events ▶ Stress ▶ Poor relationships ▶ Symptom modelling (e.g. of family members)
Precipitating mechanisms	<ul style="list-style-type: none"> ▶ Physical injury; strain/pain; surgery; medical illness ▶ Habituated muscle tension patterns; dysregulated movement patterns; excessive inhibition of movement ▶ Viral infection affecting upper or lower respiratory tract ▶ Inhaled toxic substances ▶ Exposure to noxious odours ▶ Historical or recent choking incident with persisting belief something still caught in the throat ▶ Drug/medication induced side effect ▶ Severe fatigue 	<ul style="list-style-type: none"> ▶ Dilemmas with forced choices leading to negative consequences ▶ Ambivalence over expression of negative emotions, conflict over speaking out, sense of entrapment ▶ Anticipation of difficult encounter, illness, or pending surgical procedure 	<ul style="list-style-type: none"> ▶ Significant adverse life events ▶ Interpersonal stress
Perpetuating factors	<ul style="list-style-type: none"> ▶ Hypersensitivity to subtle changes in air pressure, temperature, sensation in respiratory and vocal tract ▶ Physiological arousal ▶ Pain 	<ul style="list-style-type: none"> ▶ Fear – avoidance ▶ Tendency to 'all or nothing' or catastrophic thinking ▶ Perception that voice use or swallowing are dangerous, harmful, effortful ▶ Hypervigilance and excessive self-monitoring ▶ Belief that symptoms are due to damage or suspected or confirmed disease/illness; unusual illness beliefs ▶ Entrenched symptoms have become part of one's sense of self or personal identity 	<ul style="list-style-type: none"> ▶ Litigation or disability compensation issues ▶ Medical uncertainty ▶ Excessive reliance on unreliable sources of information ▶ Stigma

Note: a given factor may cut across a range of components within the biopsychosocial formulation. For example, in some individuals altered threat/emotion processing may be both a predisposing vulnerability and a perpetuating factor

expertise in examining speech, language, voice, swallowing, and upper airway function. Specifically, speech and language professionals have the skills to recognise inconsistencies in speech, voice, language, and swallowing, which are the hallmarks of FND. Routine approaches to assessment and treatment with which most speech and language professionals are familiar can be effective in identifying, diagnosing, and treating these disorders.³⁶ Some patients may be successfully treated with speech and language therapy alone. For others, particularly when symptoms beyond communication and swallowing are present, collaborative treatment as part of a multidisciplinary team, including physiotherapy, occupational therapy, neurology, psychiatry, or psychology, including the use of common terminology and shared goals, may be most appropriate. Occasional or regular guidance or consultation with an experienced FND professional may be helpful.

INITIAL ASSESSMENT (BOX 2)

Aims of the initial assessment include information-gathering and preliminary diagnostic formulation, and rapport building; attention to additional elements can be helpful in establishing illness beliefs and expectations which may be important in maintenance of symptoms, the conduct of therapy, and response to treatment

(Box 2). Anecdotal evidence suggests that many patients with FND only attend for one session, similar to findings for psychotherapy,³⁷ so it is crucial that the first session is a positive experience.^{7 28 38 39}

Psychosocial assessment often provides an understanding of the life events, relationships, and personality traits that may be relevant to the symptoms. Gentle enquiry about recent stressors or significant events is appropriate, as part of an exploration of the risk factors described in Table 1. However, while some patients are interested and may benefit from exploring the possible relationship between their experience of psychosocial trauma or distress and their symptoms, others prefer not to do so. It is important that patients are made to feel comfortable discussing such issues, but it is also important not to probe injudiciously if a history of trauma is not forthcoming; it is possible that there has been no relevant psychological trauma or adverse life events and repeated uninvited questioning about trauma can undermine the therapeutic relationship. It is also important that speech and language professionals are aware of available local resources with appropriate levels of expertise to address suspected or certain significant psychological/psychiatric/psychosocial needs that may need to be addressed prior to or concurrently with symptomatic treatment of communication or swallowing symptoms.

General neurology

Box 2 Important elements of the history to consider during initial assessment

1. How and when did the symptom(s) begin, and what does the person understand about the possible cause of the symptoms?
2. Do symptoms come and go, or are they constant? Are there any exacerbating or relieving factors? Have there been any periods when the symptoms have disappeared completely?
3. What has the patient been told about the symptoms by other health professionals? What has been the outcome of any previous treatments for the same symptoms?
4. What is the impact of the symptoms on daily life, work, and relationships? The extended psychosocial interview developed by Butcher et al., (2007) [13] may be helpful in this regard.

DIAGNOSIS OF FUNCTIONAL NEUROLOGICAL DISORDER

Functional neurological disorder should not be a diagnosis based on the exclusion of disease.^{1,38} In line with FND in general, a range of **positive clinical features** of functional communication, swallowing, and cough disorders are now recognised which support a positive diagnosis of FND. General features are outlined in **Table 2**; examples of specific symptom profiles are described in the relevant sections below. These features may be observed during history taking, during the standard motor speech examination, or may be observable in the person's social utterances and activities, specific speech or swallowing tasks, or conversational speech.

Although diagnosis of a functional disorder can generally be made on the basis of positive features, comorbid structural pathology should be excluded early in the diagnostic process (with appropriate investigations, when necessary), even when a functional diagnosis seems likely. Importantly, the presence of 'structural' pathology does not exclude an FND diagnosis, which can be comorbid with structural or neurological disease, possibly representing 'functional overlay', and can be identified on the basis of positive clinical features. In such cases the speech and language professional plays an important role in the process of differential diagnosis and communicating to the patient and other clinicians in the multidisciplinary team which elements of the presentation are the result of structural damage or disease and which have a functional basis.

TREATMENT

In general, the broad principles of treatment of functional disorders of communication, swallowing, and cough are the same as for other functional neurological disorders.^{40–42} The first and most important part of treatment involves making a positive diagnosis (i.e. based on symptoms consistent with FND and not solely based on ruling out other explanations) and clearly

explaining the diagnosis and the reasons for it to the patient.³⁹ ⁴³ This explanation may have therapeutic value in its own right. Subsequent therapy may include symptomatic, behavioural and/or psychological interventions along with ongoing education about the diagnosis.

Explaining the diagnosis

In explaining the diagnosis, it is important to 1) take the problem seriously and acknowledge that the symptoms are real, 2) explain that this is a positive diagnosis (as defined above), and that the diagnosis is not unknown or mysterious, 3) explain the reasons for the diagnosis by demonstrating or explaining its positive clinical signs (**Box 3**), 4) provide written material and links to other resources (see **Appendix 1**). Suggestions to help with effective explanations are listed in **Table 3**.

When the person referred for treatment has already had the diagnosis explained by the referring professional, it is still important for the speech and language professional to reinforce, consolidate, and, if necessary, expand the person's understanding about the functional disorder diagnosis. When there is comorbid structural pathology, the therapist may need to discuss the extent to which it may or may not be an obstacle to improvement.^{44–49}

Patients sometimes ask during this explanatory stage if significant life events, emotional stress or psychological factors may be linked to the onset of their functional symptoms. Others inquire about the significance of recent illness, surgery or injury. It is important for the therapist to acknowledge the role of a range of risk factors but at a pace and direction guided by the patient.

Duration of treatment

Most patients referred with functional disorders of communication, swallowing, and cough can benefit from speech and language therapy, often substantially/dramatically and sometimes rapidly. Many achieve some improvement or even elimination of

Table 2 Positive clinical features of functional communication and swallowing disorders

Positive clinical signs of FND	General examples in functional communication and swallowing disorders
Symptoms are inconsistent with clinical examination and laboratory/imaging findings	<ul style="list-style-type: none"> ▶ Severity of speech deficit is disproportionate to severity of injury or locus of lesion (e.g. single lacunar stroke; mild traumatic brain injury) ▶ Total or partial loss of voice despite normal structure and function of vocal folds during laryngoscopy
Symptoms are internally inconsistent	<ul style="list-style-type: none"> ▶ Resolution or reduced severity during small talk or other spontaneous discussion, when attention is diverted, or during natural automatic functions, preverbal and/or automatic utterances, playful, emotionally expressive activities, during laryngeal manipulation (voice disorders).⁴² ▶ Suggestibility – e.g. the symptom becomes much more prominent when it is being discussed
Symptoms are associated with inefficient and non-ergonomic patterns of movement	<ul style="list-style-type: none"> ▶ When weakness is major complaint, speech, voice, swallowing fatigues in the direction of muscle hyperfunction ▶ Struggle behaviours - over-mouthing, eye blinking, facial contortions, excessive effort in breathing, neck, shoulders, strap muscles, shifts in body posture – including during non-speech oromotor tasks.

* Note that many structural/neurological communication disorders can show symptom fluctuations. The core difference is that in structural neurological cases one can discern plausible predictability in how/when/where symptoms vary – e.g., in relation to fatigue, time in medication cycle, cognitive load, and language variables such as word frequency, syllable complexity, stress placement in word/sentence. These underlying regularities tend not to be present in functional communication and swallowing disorders.

General neurology

Box 3 Demonstrating clinical signs

Some practitioners feel uncertain about demonstrating clinical signs of functional disorders to patients in the clinic; however, in our experience this is almost always a positive experience for patients (Stone and Edwards 2012).

For example (not real cases):

- ▶ A middle-aged man presented with sudden onset of functional falsetto characterised by an unusual high-pitched falsetto voice. The therapist asked him to produce a strong /ooh /sound while palpating, tilting and manually repositioning his larynx, demonstrating that normal lower-pitched voice was possible.
- ▶ A woman presented with a severe functional aphonia. During video-laryngoscopy examination, the otolaryngologist made a humorous aside about his poor golf swing and the patient laughed politely. The therapist pointed out that during that spontaneous laughter, it was possible to see the sudden relaxation of the tightly constricted false vocal folds that was inhibiting the function of the true vocal folds, thus revealing the potential for normal function.
- ▶ A recently-retired man presented with sudden onset of moderate-severe dysfluency characterised by whole word and initial phoneme repetition with speech blocks. The therapist asked him to speak on a topic while focusing on sequentially tapping each of his fingers with his thumb, beginning on the left hand then continuing with the right. Moments of stuttering reduced from 25 in a one minute monologue to just two, demonstrating the effect that distraction had and the ability to easily produce smooth, stutter free speech.

Table 3 Explaining the diagnosis

Important elements of the explanation of a functional communication, swallowing, and other upper airway-related (e.g. cough and breathing) disorder

Although we have used the term 'functional disorder' for consistency, we understand that a range of terms may be used to describe these conditions. For example, cough might be more clearly explained in terms of hypersensitivity or hyperresponsiveness. We also recommend that the explanation be tailored appropriately to the patient's level of understanding. Examples of explanatory phrases used by the authors are listed below:

Take the problem seriously

- ▶ "These symptoms are real and not 'in your head'"
- ▶ "This is a genuine problem, and I believe you"
- ▶ "I imagine this must be making things at work/home really difficult"

Name the diagnosis

- ▶ "You have a functional speech disorder affecting your articulation"
- ▶ "You have a functional stuttering problem affecting your fluency"
- ▶ "This sensation of a lump in your throat is called functional globus"
- ▶ "This is a type of functional neurological disorder"

Explain the diagnosis in terms of what it is rather than saying what it is not

- ▶ "The symptoms are caused by abnormal brain functioning rather than structural damage or disease."
- ▶ "A software problem, not a hardware problem."
- ▶ "Software not broken, but has a glitch."
- ▶ "The machinery is still present and whole, but someone switched the outlets so now when it gets plugged in, it doesn't work smoothly anymore. We need to switch the outlets back."
- ▶ "The server is busy."
- ▶ "Your muscles have the potential to work properly but the messages are having problems getting through."
- ▶ "The train is off the tracks. The train and the tracks are both working correctly but only run smoothly when properly aligned."
- ▶ "Your brain has forgotten the path to produce voice for speech; we need to find the path to the voice again and memorize that feeling."
- ▶ "For a time you couldn't use the most efficient route (The Motorway) and instead needed to use a "B road" to make the movement. Now we know the Motorway is open, which will be more efficient, we can help you to use the Motorway consistently again."
- ▶ In explaining aetiology, using the analogy "sometimes people throw their back out but don't know what happened" and explain that the body can respond to experiences that we are not acutely aware of."
- ▶ Describe other non-structural causes of physical symptoms: stomach ache before an important exam; headache from a stressful day at work; shoulder/neck/arm tension from being tense over some issue."
- ▶ Explain that throat muscles are particularly vulnerable to stress/anxiety (analogy of lump in throat when cross/upset/holding back tears) and when they get into a habit of tightening it can alter how our voice sounds, contribute to breathing difficulties and cough. They need to be shown how to relax/release.
- ▶ "You have very efficiently learned how to use your voice (clear or protect your airway) when you needed this protection. This learning was so helpful that you kept using it when it was no longer necessary. Now you no longer need this technique and may benefit from reacquainting yourself with how you previously spoke (breathed, swallowed, etc)."
- ▶ Explain conditioned learning (e.g. "Pavlov's dogs"), especially when symptoms are intermittent, paving the way to "unlearning" with treatment.
- ▶ Explain "your brain is clever, and it knows that you need to stop and look after yourself".
- ▶ Explain the diagnosis using a sketch of a straight line balanced on the tip of a triangle, and discuss the importance of a balance between capacities and demands (bringing into the explanation the Demands and Capacities Model; when demands (internal and external) exceed capacity (compromised by pain, headache, sleep deprivation, etc), the neurologic demands on the brain's finite resources are compromised. Use the analogy of demands as noise in the brain, impacting the finite synapses we depend on for rapid transmission and storage of information (capacities).

Explain and demonstrate the rationale for the diagnosis. Explain that the presence of variability suggests that improvement should be possible with treatment.

- ▶ Demonstrate and explain positive clinical features, e.g.: "When you imitated my voice in this way, I was able to hear your voice, even though momentarily. This suggests that the vocal cords are able to move normally when automatic control takes over, and tells us that we should be able to get your voice working normally again and back under your voluntary control."

Provide written information and direct to other resources (see Appendix 1)

- ▶ Printed symptom information sheets
- ▶ Online information such as www.neurosymptoms.org
- ▶ It is good practice to write clinical letters to patients when possible, and to enable access to clinical reports when respective specialists give permission.

General neurology

one or more, and sometimes all of their symptoms during the initial consultation. While this does not necessarily mean that the functional disorder has fully resolved, such early symptomatic improvement is very encouraging. Others require several therapy sessions of symptomatic/behavioural work, integrated with counselling. Clinical experience suggests that intensive therapy, with sessions several times per week, may be most successful in helping patients to regain normal function and inhibit abnormal movements or struggle behaviours, and to maintain gains in the wider social context. We recognise, however, that limited resources may limit the frequency of therapy.

For some, several weeks or months of treatment may be required for a sustained improvement that generalises beyond the clinical setting. This has sometimes been attributed to the patient 'being resistant' or 'failing to comply' with recommendations, but generally speaking, patients do want to improve – that is why they are there – and are cooperative with treatment. Habituated patterns of movement and behaviour can take time and practice to overcome, and there may also be perpetuating influences (see **Table 1**). Some therapists find it useful to develop a time-limited treatment contract which includes indications for ending therapy, a plan for self-management, and strategies for coping with possible relapse of symptoms.

Suitability for treatment

The following factors suggest that the person with FND is likely to engage with and benefit from treatment:

- ▶ A reasonable degree of understanding and acceptance of the diagnosis.
- ▶ Agrees to treatment.
- ▶ Displays motivation to improve for personal, social, or occupational reasons.

In assessing suitability, it can be helpful to ask patients to rate (for example, on a 1-10 scale) their degree of confidence in the diagnosis, their commitment to treatment, and their expectation of recovery.

It is common for patients to have some doubts about their FND diagnosis. This should be addressed in the early stages of treatment. Nonetheless, improvement is possible even when the patient has some doubts, and such improvement can reduce doubt about the diagnosis.

There are, however, some circumstances in which beginning or continuing symptomatic therapy is less likely to be successful or may be inadvisable. It can be helpful to be aware of signs that continuing symptomatic and behavioural intervention may be inadvisable. The following factors suggest a guarded or poor prognosis in some cases; although a trial of treatment might still be pursued:

- ▶ When symptoms are very transient, unpredictable, or highly variable across settings, making it difficult to observe or pinpoint targeted behaviours accurately.
- ▶ Resolution or improvement of symptoms will lead to a return to what may be an unsafe or 'futile' work environment or domestic situation.
- ▶ Unresolved litigation related to symptoms.
- ▶ Severe psychiatric comorbidity.
- ▶ When other severe FND symptoms are present, such as seizures, dissociative states, severe pain, or fatigue, treatment may be more difficult. However, early treatment of communication symptoms may enable the person to engage better with treatment of the other symptoms.
- ▶ When the patient doubts the diagnosis of FND. However, we also note that some patients who doubt the diagnosis

initially may accept/embrace it during successful symptomatic treatment. A trial of treatment should, therefore, usually be offered if the patient agrees that it may be helpful.

- ▶ The patient lacks confidence in therapist's ability to help them resolve symptoms.

A trial of therapy is generally appropriate despite a degree of resistance or ambivalence. However, some positive response to treatment should be expected during the first 1-2 sessions; failure to respond at all during these initial sessions suggests it would be better to pause and revisit symptomatic treatment at a later date, or with another therapist.

When a patient refuses or fails to engage with speech and language therapy, there may be other ways in which they can be supported by the wider multidisciplinary team.

The therapist's approach to treatment

The demeanour and attitude of the speech language professional is crucial. It is important for the therapist to be warm, reassuring and empathic, showing respect for the patient and the distress that their symptoms have been causing. Physical touch during therapy can be of value, including, for example, palpation of particular muscle groups in order to guide or monitor levels of tension, targeted massage to reduce musculoskeletal tension, repositioning of the larynx (where within professional scope and competence)⁴⁵, and gentle touch as ways of encouraging or comforting the patient.^{45 50-52}

General principles of symptomatic treatment

The principles of symptomatic management of functional communication, swallowing, and cough disorders can be helpfully informed by both perceptual-motor learning models as they have been applied to voice training and therapy^{53 54} and recommendations from physiotherapy and occupational therapy professionals with experience treating FND.^{6 7} Treatment involves learning or retraining of motor patterns, while highlighting the ways in which attention, expectations, illness beliefs, and the vulnerability of our sense of agency (the experience of controlling one's own movements) may inhibit normal movements and promote abnormal movements (**Box 4**).

1. Identify symptomatic behaviours and explain the mechanism of the symptom

It is important to explain how the patient's symptoms differ from those associated with normal speech, voice, swallowing, or cough and then to draw attention to the inadvertent and unnecessary efforts being used in particular muscle groups, such as in the head and neck, face, upper torso and shoulders; for example, patients are often surprised to learn that even producing a hoarse whisper can reflect excessive effort. Acknowledging how tiring and distressing it can be to exert such effort may prompt a reaction of relief or gratitude when the patient senses someone understands what they have been experiencing.

2. Introduce strategies to facilitate natural automatic patterns of movement

A common key feature of symptomatic treatment involves finding ways to access natural automatic movement patterns.

⁴⁵There are international differences in practice here; for example in the USA laryngeal palpation and circumlaryngeal massage may be a fairly common practice and within speech and language professional competency / scope of practice, whereas in some other countries additional (i.e., specialty) training is required.

General neurology

Box 4 General principles of symptomatic treatment

1. Identify symptoms behaviours and describe them in a straightforward manner.
2. Introduce strategies to facilitate natural automatic patterns of movement.
3. Guide acquisition of voluntary control over speech, phonation, swallowing etc., or elicit normal function through use of natural, instinctual automatic sounds, words, phrases etc.
4. Extend automatic activities into graded, functionally relevant and meaningful activities.
5. Positive and negative practice between old and new voice, (or speech pattern, swallow etc.) in order to consolidate a sense of mastery and control over communication.
6. Consolidate and generalise normalised behaviours into wider social context.
7. Help the patient identify and modify unhelpful behaviours, ideas and expectations.
8. Address psychosocial issues which may be meaningful as predisposing, precipitating or perpetuating influences.
9. Develop strategies for dealing with possible setbacks (e.g., relapse, periodic recurrence of symptoms).

3. Regain voluntary control over conscious initiation of speech, phonation, swallowing etc

In addition to facilitating natural automatic movement patterns, in some cases the aim will be to trigger highly volitional utterances that will be simply *different* from the abnormal speech pattern. It may not necessarily be normal, but it will be different, and it can then be shaped towards normal. The therapist may then invite the person to extend these different or natural automatic patterns of movement into familiar and well-learned sequences that require little conscious thought or planning. The schemas for these automatic sequences tend to be locked into our *procedural memory which are revealed when we ask a person to engage in well-learned and practised tasks which they are able to do largely without detailed awareness of what has been learned*.^{53 55}

4. Extend automatic activities into graded, functionally relevant and meaningful activities

When the therapist asks the patient to do these automatic and well-learned sequential tasks, many will be able to complete them successfully (even if only tentatively at first). However, if the patient is clearly reticent, the therapist may introduce a number of additional activities in order to *distract the patient's attention* from their own performance. For instance, during verbal tasks the therapist may introduce ways to momentarily mask the patient's auditory feedback of their own voice and speech which will then help to trigger a reflexive vocal response. Distraction of attention can serve to block the patient's heightened sensitivity to auditory feedback which may have prompted a self-conscious inhibition of their voice or speech.^{56 57}

For many patients, it can be an exciting moment to hear their speech, voice and fluency returning to normal once again, or to realise they have swallowed some fluid without choking. For some, their relief may trigger laughter or tears. For others it can be an uncomfortable experience and may even stimulate an escalation in the severity of their involuntary symptomatic behaviours. Here it is important for the therapist to confidently persist with the interventions, reassuring the patient that it is not unusual for their speech or swallowing patterns to go through different stages as it returns to normal, and that they intend to persevere with them through this transition phase if the patient wishes to continue.

5. Positive and negative practice between old and new

Distraction or diverted attention is not always necessary, and some find it helpful to guide the patient to allocate all attentional resources to **positive** (auditory, kinaesthetic, vibrotactile) changes that take place during the course of therapy. This

is an essential component of positive/negative (new way/old way) practice; paying attention to how the new pattern feels compared to the old disordered pattern aids a sense of voluntary control and mastery.

6. Consolidate and generalise normalised behaviours into wider social context

The next step is to extend these improved utterances or behaviours into graded and meaningful, *task-oriented activities* that will eventually culminate in conversation, swallowing comfortably during social mealtime eating and drinking, or managing symptoms of cough in different settings. In keeping with another key principle of perceptual-motor learning, findings suggest that *conscious self-focused attention* on the minutiae of the mechanics of motor tasks affects both performance and learning negatively. In contrast, focused attention on the *target of the activity* and the *desired outcomes of the task* are generally more beneficial.

7. Help the patient to notice and challenge unhelpful thoughts

Incorporating principles from Cognitive Behavioural Therapy (CBT) can aid treatment of FND, and there have been promising results from trials of specific CBT for functional movement disorders and dissociative seizures,^{42 58 59} parallel-arm, multi-centre randomised controlled trial, we initially recruited participants at 27 neurology or epilepsy services in England, Scotland, and Wales. Adults (≥ 18 years functional communication, swallowing, cough disorders, and specifically in relation to voice.⁶⁰⁻⁶³ CBT principles can inform therapy even without formal CBT training. For example, by helping the patient to notice and challenge unhelpful automatic thoughts, such as catastrophising (e.g. "If I stutter at work I'll lose my job"; "once I start coughing I won't be able to stop"); or 'all or nothing' thoughts like "If my voice isn't perfect all the time then I'm a failure" or "swallowing is sometimes hard so it is better if I never eat in public". Behavioural strategies might include helping the patient to plan 'behavioural experiments' – such as a telephone call, or coffee with a friend – to address fear and avoidance of specific activities. In patients with other FND symptoms, such as a movement disorder or seizures, behavioural experiments might be planned in collaboration with other members of the multidisciplinary team.

8. Address psychosocial predisposing and perpetuating factors

Many patients with FND will have rapid and successful resolution of symptoms without the need to explore psychological or social risk factors, which may not be relevant. However, some patients will wish to explore the relevance of psychological or

General neurology

social factors as therapy progresses. From a purely practical point of view, it is easier to address those influences once functional symptoms are no longer interfering with communication. We emphasise that the therapist can helpfully and appropriately engage in supportive discussion about the role of anxiety, or about the impact that symptoms have had on relationships and everyday life, without special training in counselling or psychotherapy. These discussions might, for example, help the patient to plan for situations where symptoms may recur, and allow them to explore how best to manage future relapses.

In the more unusual situation in which a patient becomes extremely distressed or psychiatrically unwell during treatment, a plan for additional or alternative management should be made, incorporating the patient's general practitioner/family doctor, other members of the multidisciplinary team (such as psychiatry or psychology where available), or referral to a mental health professional or crisis services as available locally.⁶⁴

A final stage of treatment often involves encouraging the ongoing involvement of family, friends and caregivers, and re-establishing the links to and support from the patient's workplace and work colleagues.

9. Preparing strategies for dealing with setbacks or relapse

Patients should be prepared for the possibility of relapse, with the emphasis on enabling them to self-manage any relapse using the techniques used during therapy. Clear criteria should be provided to the patient and referrer, or other members of the multidisciplinary team, about how and when future therapy should be sought; this advice should be provided on a case-by-case basis and obviously may depend on service constraints. However, in general we recommend that further treatment or support be made available in case of relapse. As emphasised in a discussion paper addressing ways to end therapy 'the therapeutic relationship once established need never be broken'.⁶⁵

ASSESSMENT, DIAGNOSIS, AND TREATMENT OF SPECIFIC SYMPTOMS

The following sections address specific symptoms. However, it should be noted that these specific symptoms are not mutually exclusive but often co-occur. An individual may experience a range of different symptoms at different times, including during treatment and recovery. The treatment strategies suggested here are based on available evidence and the combined clinical experience of the consensus group. They largely represent recommendations rather than high-level-evidence-based guidelines.

Specific symptoms – Functional voice disorders

Functional voice symptoms include dysphonia, aphonia, odynophonia (pain using the voice), vocal fatigue, and mutational falsetto or puberphonia (high pitched voice after puberty). Globus is common, and excessive physical effort is a hallmark feature of these disorders. There is a (usually) sudden or intermittent loss of volitional control over the initiation and maintenance of phonation despite normal structure and function as observed during laryngoscopy and clinical examination. Since the voice is often closely associated with the expression of emotion, sudden total or partial loss of voice is often presumed to be linked to psychological factors and negative emotions associated with stress. Furthermore, patterns of vocal hyperfunction related to dysregulated or imbalanced laryngeal muscle activity are often observed, both of which are consistent with current FND models that emphasise the interplay between 'top down' and 'bottom up' influences on peripheral sensorimotor processing.^{52 66 67} As a

consequence, in the past these disorders have often been referred to as 'psychogenic', or 'conversion dysphonia', with others more recently preferring the more aetiologically neutral term of 'functional' or 'primary muscle tension dysphonia' (pMTD).^{8 68}

Onset may follow acute stress or longer-term difficulties, sometimes characterised by conflict over speaking out, expressing negative emotions, a sense of powerlessness; sometimes related to personality vulnerabilities.^{18 69 70} Importantly, many patients do not recall any emotionally stressful incidents, but will associate their loss of voice with a recent upper respiratory tract infection, a medical procedure involving the head and neck, or some form of blunt injury which cannot account for the nature and severity of the vocal symptoms. Therapists often comment that while some patients do not report or recall significant stresses prior to onset, once they have their voice back, they might reopen conversations about possible psychosocial triggers. Helpful assessment methods and diagnostic features are listed in **Table 4**.

Treatment includes strategies to bypass problematic movement patterns by facilitating short, instinctual responses and overlearned or reflexive utterances (**Table 5**). It is advisable to inform patients that you are going to ask them to do some things differently which may entail making unusual sounds or carrying out gestures or bodily movements not associated with their usual way of talking. These activities can elicit normal phonation easily, without conscious preparation, since they are neither generally associated with use of the voice, nor are they experienced as being directly related to a conscious intent to communicate. If they were, they may trigger patterns of inhibitory muscular tension and exaggeration of the symptoms.

Specific treatment strategies may be necessary to reduce excessive musculoskeletal tension when present. They may include focal palpation of the laryngeal region, circumlaryngeal massage, and manual repositioning with gentle but firm lowering or compression of the larynx (when within professional scope and competence³²).^{50 51} The speech and language professional should reassure the patient that their pattern of excessive tension does not represent an irreversible muscular abnormality, but rather reflects a well-intentioned, but misdirected effort to achieve normal voice. Just prior to touching the neck, throat and larynx, it is important to explain what the clinician will do and why, and to ask permission to palpate, massage or reposition the larynx.

Use of traditional evidence-based techniques for dysphonia such as Vocal Function Exercises, Semi-Occluded Vocal Tract Exercises, and Resonant Voice Exercises may be useful for modifying voice, consolidation and generalisation.

Once normal phonation has been achieved, generalisation beyond the clinical setting is relatively straightforward, but it can be particularly challenging for some individuals in specific psychosocial contexts (i.e. a schoolteacher returning to the classroom after developing functional aphonia following significant difficulties in managing rebellious student behaviours and lack of support from school leaders). Under these circumstances, sustained improvement may be difficult to achieve, especially if there is evidence of long-standing anxiety, co-morbid depression, or ongoing medicolegal or workers' compensation issues.⁵⁷ Outcomes are more likely to be positive if the patient understands the relationship between the voice problem and any ongoing psychosocial issues and has strategies in place to deal with them. Basic supportive counselling (and use of additional psychological approaches within individual scope) by the speech and language professional is often sufficient, but referral for additional support from a mental health professional is sometimes essential.^{62 63 71–73}

General neurology

Table 4 Diagnostic features of functional voice disorders

Diagnostic elements	Positive clinical features
Symptoms are inconsistent with clinical examination and laboratory/imaging findings	<ul style="list-style-type: none"> ▶ Inappropriate pitch and vocal quality in relation to age and gender. ▶ Mismatch between total loss of voice (aphonia) or quality of dysphonic voice despite healthy larynx and potential for normal vocal fold adduction viewed during laryngoscopy (comprehensive laryngoscopic examination is essential to rule out primary or comorbid structural or neurological cause, and also a helpful part of explanation and treatment). ▶ Even if laryngeal/neurological pathology is present, vocal symptoms are incongruent with expectations associated with site or type of lesion, or out of proportion given the structural changes identified.
Symptoms are internally inconsistent	<ul style="list-style-type: none"> ▶ Examine speech in a range of spontaneous & standardised formats: isolated sounds, automatic utterances, well-learned phrases, complex conversation. Severity may vary depending on vocal tasks, but more significantly on emotional content of the topic. ▶ Specific strategies to demonstrate symptom reversibility may prompt 'leakage' of normal phonation and may also form the basis of treatment. Note that reversibility during assessment does not mean that the <i>a/dysphonia</i> has resolved.
Symptoms are associated with inefficient and nonergonomic movements	<ul style="list-style-type: none"> ▶ Exaggerated struggle behaviours in mouth, face, neck may accompany efforts to phonate and disappear as soon as the voice has returned. ▶ In some cases there is extreme muscle dysregulation, with a tightly held larynx in elevated position; rigidity in laryngeal framework on palpation; narrow thyrohyoid space and hyper or hypo adduction of the vocal folds.
Other characteristics	<ul style="list-style-type: none"> ▶ A sensation of 'globus' (lump in the throat) is often described which disappears with resolution of vocal symptoms and associated psychosocial issues (Elias 2019)

Systematic reviews of randomised controlled trials exploring the efficacy of symptomatic voice therapy for 'functional dysphonia' report moderate-to-good evidence for the direct symptomatic and behavioural voice therapies, either alone, or in combination with indirect therapies that may involve education and vocal hygiene.^{74 75} More recently an extensive evaluation of the evidence for the efficacy of therapy for functional, and structural neurological voice disorders has shown similar findings.⁷⁶ These studies did not appear to distinguish between patients within their broadly defined functional dysphonia groups (i.e. no structural abnormality) and those traditionally termed 'psychogenic/conversion aphonia dysphonia' as being discussed in this paper.

Another subtype of functional communication disorders is *functional mutism*, in which the patient does not produce sound, even with a whisper, or may mouth words with accurate but inaudible articulatory movements. This is in contrast to selective mutism which reflects voluntary refusal to speak, sometimes only in specific circumstances (often in the context of anxiety). In functional mutism the inability to speak is experienced as involuntary. Selective mutism and functional mutism sometimes overlap. In some cases the history reveals a breakdown in communication with significant others, and/or there is a conflict over speaking out or expressing negative emotions. The person may ask for access to an electronic device to assist with communication, which raises interesting issues about offering aids that may serve to perpetuate the ongoing pattern of mutism. When possible, communication without aids should be encouraged.

Specific symptoms - Functional stuttering

Functional stuttering is distinguished from developmental or neurogenic stuttering by new onset in adulthood (without prior developmental speech output difficulties), extremes of variability or consistency on sound, syllable, word or phrase repetitions, unusual patterns of rate and pausing, increased dysfluency with more simple speech tasks, and lack of improvement with activities that usually promote fluency. Of note, functional dysfluency may be internally inconsistent but may also be unusually consistent in presentation compared to developmental stuttering, such as stuttering on every syllable or word, or on the first word of every sentence.^{26 45 77 78} Helpful assessment methods and positive diagnostic features are shown in **Table 6**.

Case reports suggest functional dysfluency may follow stressful life events associated with conflict and difficulties with communication of negative emotions in close relationships or with an

important person; dealing with high burden of responsibility or criticism in the work place where it is difficult to speak out and defend oneself; recent accident or illness sometimes in association with mild head injury leading to transient concussion; in situations where personal injury lawsuit or workers compensation may be an issue; or in association with posttraumatic stress disorder following combat. Clinicians emphasise that close attention needs to be given to these psychosocial issues, while also recognizing that the absence of a clear psychological trigger should not discount a functional diagnosis. Functional dysfluency can co-occur with other functional neurological symptoms, and in patients with comorbid neurologic disease including stroke, epilepsy, or traumatic brain injury.^{49 77 79 80}

Although positive outcomes have been reported in case studies of treatment of functional stuttering in adults, it remains unclear what elements of these treatments explain their effectiveness.^{49 77} Some potential approaches to symptomatic treatment are summarised in **Table 7**.

When functional dysfluency does not resolve quickly with treatment, psychological impacts can be severe. Generalised anxiety and social anxiety in anticipation of speaking activity have significant implications for self-identity, close relationships, social participation and quality of life. While diagnosis of a psychological disorder is outside the scope of practice for speech language professionals, recognition of psychosocial factors in functional stuttering (as in developmental stuttering) allows therapists to appreciate the lived experience of stuttering and to guide appropriate therapy. Alongside symptomatic treatment, the therapist might helpfully include psychological approaches targeting features of avoidance, rumination and self-doubt.^{81 82} As with developmental and neurogenic presentations of stuttering, collaboration with mental health professionals may be helpful in the management of secondary anxiety disorders and psychological distress.⁸³

Specific symptoms – Functional articulation symptoms

Functional articulation disorders are characterised by substitutions or distortions of specific sounds, some of which may be associated with developmental errors (e.g. 'wead'/'read', 'wittle'/'little', 'thome thoap'/'some soap'). Some sounds are produced with marked variability and unusual and exaggerated tongue, lip or jaw movements. These distortions may be accompanied by other unusual prosodic features, such as inappropriate patterns of loudness, with telegraphic speech and hesitations or exaggerated facial movements. Errors may

General neurology

Table 5 Treatment of functional voice disorders

Domains of intervention	Examples of possible strategies
Education & explanatory	<ul style="list-style-type: none"> ▶ A key part of treatment is clear explanation of the nature of the disorder (see table 3 for helpful phrases) and the rationale for the diagnosis. ▶ Review the laryngoscopy examination and/or images together with the patient. It is particularly important to explain that 'abnormal movements' and similar remarks in written reports reflect reversible habitual movements and not irreversible structural abnormality, as patients may misunderstand the implications of such phrases. ▶ Explain that voice disorders can result from excessive muscle tension which may prevent normal speech but does not represent an irreversible or uncontrollable abnormality and that it can be brought under their control.
Symptomatic	<ul style="list-style-type: none"> ▶ Natural, reflexive, or instinctive behaviours usually accompanied by sound: ▶ Cough and clear the throat (allowing voice to be present if possible). ▶ Yawn followed by a sigh (as if with genuine relief). ▶ Whimper sounds (as if a small distressed animal such as a kitten) or invite extremely high-pitched voice. ▶ Grunt or groan (as if in pain, shifting posture, lifting a heavy item). ▶ Comfort moaning sounds (associated with pleasure, eating something delicious). ▶ Gargling with a firm sound (firstly with water then simulated without water) ▶ Pretend to be snoring. ▶ Use slow easy onset with prolonged speech sounds such as /mmyyy-mmuumm. ▶ Phonation on inhalation while maintaining a very relaxed body. ▶ ▶ Playful pre-linguistic vocal sounds that we might enjoy with a young child: ▶ Blow raspberries while voicing. ▶ Phonate with a rising and falling scale blowing the lips like a horse. ▶ Move finger rapidly in between the lips shaped for 'ooh' with a falling inflection from high to low (you are so cute). ▶ Pat the lips with hand while phonating (gentle affectionate tone as if to infant). ▶ Gently pat the patient's back while they sigh out 'ah' (as if with comfort). ▶ Patient pats own chest firmly while sighing 'ah' (with a sense of comfort or relief). ▶ Siren quietly down the scale using nasal sounds such as /m/ /n/ or /ng/. ▶ Produce a low-pitched glottal fry at the very bottom of the vocal range. ▶ Giggle or laugh (as if in absolute delight). ▶ Hold a tube of paper to the lips, phonate 'ooh' and notice sensation of lips vibrating. ▶ Sing rising and falling scale on tongue trill with firmly voiced consonant, e.g., 'drr'. ▶ Automatic phrases and utterances with minimal communicative responsibility ▶ Respond with short "Mm mm" "Okay" "Uh huh" (as in response to question). ▶ Count and recite days of the week, sing "Happy Birthday" or favourite song. ▶ Physical and/or postural manoeuvres: ▶ Reposturing/repositioning/lowering of the larynx including circumlaryngeal massage with concurrent vocalisation. It is important to clearly explain and check with the patient before touching their neck. ▶ During these manoeuvres, patient may be asked to phonate gently on an open vowel such as /ah/, nasal sounds such as /mm/, or to glide down the scale from high to low on a /whooh/, which will often facilitate a tentative squeak, an uncertain pitch break from falsetto phonation into modal voice, or a brief sound resembling their normal voice. For some it may even prompt more irregular phonation, so the therapist needs to reassure the patient that different stages of dysphonia may be heard as it returns to its normal pitch, quality and function. ▶ Postural manipulations such as phonating while bending over or while leaning back and looking at the ceiling. ▶ Redirection of attentional focus: ▶ Bubble blowing into water with vocalisation. ▶ Large body movements such as jumping, shaking out body whilst make 'shivering noises' facilitates redirection and release. ▶ Invite patient to communicate and interact while walking along, inside or outside the clinical setting, against the noise of traffic. ▶ Use of amplification or headphones to alter or enhance auditory feedback. ▶ Use of electroglottography (EGG) and electromyography (EMG) as forms of laryngeal biofeedback which may also serve to redirect attention.
Psychological	<ul style="list-style-type: none"> ▶ Communication counselling attending to predisposing, precipitating and perpetuating issues related to onset and maintenance of voice symptoms. ▶ Identify and gently address patterns of avoidance of speaking or excessive dependence on aids to communication. ▶ Identify any social or other phobic anxiety – i.e. of speaking in particular situations. Support to increase exposure (and so reduce anxiety) to feared situations. In some cases collaborative work with, or onward referral to, mental health professionals for structured psychotherapy (e.g. CBT) may be helpful.

be consistent and limited to particular sounds, or unusual and associated with unusual tongue posturing (e.g. speaking with consistent tongue retraction). The patient may complain of weakness while exhibiting paradoxical strained voice quality. Functional articulation symptoms sometimes develop after dental, surgical or traumatic injury to the mouth, tongue or facial structures, or in combination with other functional symptoms affecting voice or fluency.^{5 84 85} Examination features are detailed in **Table 8**.

In addition to the general treatment approaches outlined above, traditional treatment approaches used for developmental and neurological articulatory disorders may be effective. Some treatment strategies are suggested in **Table 9**.

Specific symptoms – Other functional communication disorder symptoms (e.g., language, prosody, and accent)

Language impairments impacting on understanding, word finding, syntax, reading, and writing may occur in functional neurological disorders, often along with other functional cognitive symptoms.⁸⁶ Diagnosis is generally made on the basis of significant internal inconsistency in performance compared to well-described lesion-based patterns of aphasia, dysgraphia and alexia. An example of such inconsistency would be disproportionate difficulty with reading during formal assessment in comparison to day-to-day reading. In some cases, however, these problems may be abnormally consistent in comparison with lesion-based aphasia, dysgraphia, etc.

General neurology

Table 6 Assessment and diagnosis of functional dysfluency/stuttering

Diagnostic elements	Positive clinical features
Symptoms are inconsistent with clinical examination and laboratory/imaging findings	<ul style="list-style-type: none"> ▶ Acquired neurological stuttering in adulthood is rare in the absence of aphasia, apraxia of speech, or dysarthria and supports FND diagnosis.
Symptoms are internally inconsistent	<ul style="list-style-type: none"> ▶ Functional stuttering may persist during a range of verbal activities that normally lead to reduction in stuttering behaviours or promote adaptation effects: <ul style="list-style-type: none"> – e.g. choral reading (reading aloud in unison); singing or chanting; repeated reading aloud of same passage; speaking under conditions of white noise; or delayed auditory feedback. – e.g. functional stuttering may continue when patient is asked to mime speech or when miming reading aloud. ▶ Markedly inconsistent pattern to dysfluencies with tense pauses, whole phrase repetitions, interjections, telegraphic speech, or excessively fast or slow rate. ▶ May rapidly resolve during assessment in response to a brief trial of symptomatic therapy. May resolve in response to psychological counselling.
Symptoms are associated with inefficient and nonergonomic movements	<ul style="list-style-type: none"> ▶ Dysfluencies are accompanied by struggle behaviours such as facial grimacing, head jerking, hand slapping, eye squinting, neck extension, inhalation breaks, rapid panting, tremulous speech. ▶ No reported or obvious avoidance of certain sounds/words to inhibit stuttering which is typically seen in those with a developmental stuttering.
Symptoms are usually inconsistent with typical patterns of developmental or neurological stuttering	<ul style="list-style-type: none"> ▶ Stuttering on nearly all words, with no islands of fluency on well-learned sequences such as counting, days of the week or automatic social greetings - unusual for developmental or neurological stuttering. ▶ Stuttering may occur on all phonemes with no particular pattern which differs from developmental stuttering where fricatives and plosives are more commonly affected.

Subjective word finding or memory and concentration difficulties are not uncommon in patients with FND, and often appear to reflect inefficient allocation of attentional resources. Once other speech or communication symptoms, or other functional

symptoms, are effectively treated, such cognitive symptoms may resolve. If the symptoms persist, some patients may benefit from being taught simple compensatory strategies for word retrieval deficits and similar difficulties.

Table 7 Treatment of functional dysfluency/stuttering

Domains of intervention	Examples of possible strategies
Education & explanatory	<ul style="list-style-type: none"> ▶ Reassurance regarding nature of symptoms and good prognosis for resolution. ▶ Explanation for rationale behind diagnosis of functional stuttering. ▶ Explanation that dysfluencies can reflect effects of excessive muscle tension which may prevent normal speech but does not represent an irreversible or uncontrollable abnormality and that it can be brought under their control. ▶ Highlight the importance of forward airflow during speech to achieve smoothness.
Symptomatic	<p>Reduction of excessive musculoskeletal tension in both speech and non-speech muscles often associated with stuttering:</p> <ul style="list-style-type: none"> ▶ Reduce muscle tension, drawing on techniques used for functional voice disorders. ▶ Select high frequency abnormal behaviours associated with dysfluencies. ▶ Palpate or manipulate facial muscles or lower the larynx to reduce muscle tension. ▶ Reduce muscular tension in head, neck, shoulders and postural alignment. <p>Eliminate secondary or accessory movements which may involve asking them to do something differently or adding a distraction which is faded out as speech normalises</p> <ul style="list-style-type: none"> ▶ Speak while lying on their back. ▶ Invite person to squeeze a ball while speaking. ▶ Invite person to sort blocks into different patterns while speaking. ▶ Suggest finger tapping thumb and finger while speaking. ▶ Speak while listening to music through headphones. <p>Modification of stuttering behaviours</p> <p>Once excessive tension has been reduced, and the patient can produce some sounds, words or phrases with less struggle, normal speech may return in some cases. If not, it may be appropriate to introduce techniques currently used successfully for the treatment of developmental stuttering such as: Speech restructuring and fluency shaping techniques, e.g. the Prolonged Speech Treatment Model, the Camperdown Program for adults who stutter, or the La Trobe Smooth Speech Clinic Program.</p> <p>These intensive treatment programs offered individually or in groups may include:</p> <ul style="list-style-type: none"> ▶ Slowing rate of speech. ▶ Easy, gentle onset. ▶ Elongating vowels and producing prolonged speech. ▶ Linking words together with controlled phrasing. ▶ Emphasising speech naturalness. ▶ Determining hierarchy of speaking situations with desensitization tasks.
Psychological	<ul style="list-style-type: none"> ▶ Communication counselling attending to predisposing, precipitating perpetuating issues related to onset, presentation, and maintenance of stuttering behaviours. ▶ Address abnormal illness beliefs, excessive attention and vigilance towards bodily sensations, and the sense of loss of control over speech fluency. ▶ Teach person to respond to moments of stuttering and feelings of loss of control in more adaptive ways, using less struggle and tension which can be beneficial, both psychologically and physically. ▶ Refer to mental health professionals for psychotherapy; Acceptance and Commitment Therapy; or CBT for treatment of anxiety in relation to stuttering.

General neurology

Table 8 Examination and diagnostic features of functional articulation disorders

Diagnostic elements	Positive clinical features
Symptoms are inconsistent with clinical examination and laboratory/imaging findings	<ul style="list-style-type: none"> ▶ Unusual non-speech orofacial movements that are inconsistent with the abnormal speech pattern: <ul style="list-style-type: none"> ▶ Give-way weakness of tongue or jaw. ▶ There may be the appearance of unilateral facial weakness caused by excessive contraction of unilateral facial and/or neck muscles. ▶ Dyskinetic-like orofacial movements on non-speech steady posture tasks but not during speech or at rest. ▶ Alternatively, dyskinetic-like movements during speech but absence of this at rest, or during non-speech movements (e.g. chewing or smiling). ▶ Extraneous labial retraction to one side that affects articulation during speech tasks (but resolves with behavioural treatment). ▶ Altered balance of hyper/hypo nasality inconsistent with soft palate/nasal airway status: possible development of idiosyncratic nasal emission or sniffing. ▶ On examination of alternating motion rates (AMRs) (diadochokinetic rates (DDK)) during tasks to judge speed and regularity of jaw, lip, and tongue movements, there may be a mismatch between AMRs for speech tasks in comparison to non-speech movements, or articulatory movements demonstrated in conversational speech and reading aloud (see Duffy 2020 pp74-75).
Symptoms are internally inconsistent	<ul style="list-style-type: none"> ▶ Amplification of symptom severity when examiner is clearly focused on patient performance, and/or reduction in symptom severity with examiner diverts attention with comment or activity. ▶ Speech variability across tasks and in different contexts: with close family members, children, pets, with friends, colleagues, teachers, strangers, during spontaneous and scheduled phone calls. ▶ Occurrence of sounds or 'sound derailments' that do not occur in neurological speech disorders for a given language: e.g. in English, presence of pharyngeal plosives.
Symptoms are associated with inefficient and nonergonomic patterns of movement	<ul style="list-style-type: none"> ▶ Struggle behaviours during attempted speech with exaggerated facial movements such as grimacing, lip pursing, eye blinking or excessive contraction of lower facial muscles, recognising that such movements may be difficult to distinguish from abnormal movements (e.g., chorea, dystonia) associated with other neurological conditions (e.g., Huntington's Disease, tardive dyskinesia).

Foreign accent syndrome (FAS) is a disorder of speech in which listeners perceive the affected individual as speaking with a foreign or regional accent. Onset of FAS may occur in neurological disease or damage, for example after stroke or brain injury. Recent review of cases of self-reported FAS suggest that in some cases symptoms are the result of a functional neurological disorder. Functional FAS can be identified by the presence of internally inconsistent changes in the person's articulation and prosody, alterations to vowel and consonant production, stress, rhythm and intonation (Table 10).^{48 87-90}

Similarly, while immature features (e.g., developmental articulation errors) may persist in the speech of some adults, the

sudden emergence of such features, and incongruity with the person's former manner of speaking, age, level of maturity, and occupation, suggests a functional neurological disorder.⁵⁰ Such immature speech is often characterised by a combination of prosodic, voice and articulatory alterations such as elevated pitch, exaggerated inflectional patterns, and common developmental errors (e.g. th/s, w/r); immature speech may be accompanied by infantile gestures and expressions. Functional immature speech may co-occur with functional voice disorders or stuttering and may disappear when the voice or fluency symptoms have resolved with intervention. Treatment by the speech and language professional may be directed towards

Table 9 Treatment of functional articulation disorders

Domains of intervention	Examples of possible strategies
Education & explanatory	<ul style="list-style-type: none"> ▶ Reassurance regarding nature of symptoms and good prognosis for resolution. ▶ General principles already discussed as for functional voice and fluency including their understanding of diagnosis, the rationale for current diagnosis. ▶ Education about how we actually speak versus how we think we speak e.g. we do not necessarily pronounce words according to spelling.
Symptomatic	<ul style="list-style-type: none"> ▶ Reduction of excessive musculoskeletal tension in speech and non-speech muscles often associated with articulation: in head, neck, shoulders, face and mouth. ▶ Where there is functional facial weakness, spasm, or trismus, collaborative treatment with physiotherapy or occupational therapy may be helpful. ▶ Eliminate secondary or accessory movements which may involve the patient doing something differently, which acts as a distraction, later to be faded out as speech normalises. ▶ Focusing on normal movements and sounds, distracting from abnormal sounds etc. ▶ Dual tasking while speaking as form of distraction. ▶ Invite non-speech articulation such as singing. ▶ Introduce skills in 'mindfulness' during oromotor tasks as a way of maintaining focus on easy, smooth movements where possible. ▶ Slow speech down or elongate a sound rather than building tension around it, which can be explained as 'resetting the system'. ▶ Use nonsense words or syllable repetitions as way to demonstrate potential for 'normal' function. ▶ Advance communication with higher cognitive linguistic content in hierarchical fashion (similar to the strategies for functional voice and stuttering). ▶ Redirect patient focus on speech to other topics, monitoring if speech improves and in which contexts. ▶ If functional voice or fluency problems are also present the treatment of a single communication problem may result in resolution of all communication symptoms.
Psychological	<ul style="list-style-type: none"> ▶ Attention to psychosocial issues as for other symptom groups. ▶ Address cognitive features related to locus of control, executive function, abnormal illness beliefs, hypervigilance to bodily functions, etc. ▶ Help person gain insight into the positive changes in articulation, and how they are achieving more normal control over speech movements.

General neurology

Table 10 Diagnosis of functional foreign accent syndrome and other functional language and prosody disorders

Diagnostic elements	Examination methods and positive clinical features
Symptoms are inconsistent with clinical examination and laboratory/imaging findings	<ul style="list-style-type: none"> ▶ Mismatch between speech features and physical assessment (e.g. problems with tongue tip sounds but no evidence of tongue tip weakness, incoordination or apraxia of speech). ▶ Speech changes not linked to typical variables of syllable complexity e.g. more difficulty with production of 'l' in 'lane' vs 'malign', or 'lane' vs 'explain'. ▶ Speech changes not linked to phonotactic probability (likelihood of one sound following another; 'asked' vs 'axed'). ▶ Production of /r/ - more deviant realisations such as uvular /r/ not accounted for by changes in speech motor control and physiological factors. ▶ Linguistic features - morphology, syntax, semantics: ▶ Pseudo-agrammatism (e.g. "me sleepy" instead of "I'm sleepy"). ▶ Changes in syntax, telegraphic or broken English sentence structure. ▶ Idiosyncratic expressions, inconsistent omission of verb endings, e.g. 'ing' or inappropriate addition of /s/ to words e.g. 'fall overs'
Symptoms are internally inconsistent	<ul style="list-style-type: none"> ▶ Marked variability over time or between contexts, not accounted for by phonetic/linguistic differences and not explained by variability patterns associated with neurological motor speech disorders (dysarthria or apraxia of speech). ▶ Periods of complete remission. ▶ Ability to copy/produce another accent with relative ease on request.
Alterations to prosody	<ul style="list-style-type: none"> ▶ Characteristics may fit with stereotype of the accent, including characteristic alterations to stress patterns in words and sentences, rhythm, pitch, rate, fluency, inappropriate rising and falling in intonation.
Additional features	<ul style="list-style-type: none"> ▶ Intrusion of foreign vocabulary and stereotypical gestures.

modification of these obvious speech, voice and infantile pragmatic behaviours. However, in view of the possible symbolic implications of these regressive symptoms, in cases where there is clear evidence of relational difficulties or emotional problems, referral for family therapy psychodynamic psychotherapy may be appropriate.

Functional FAS may resolve spontaneously or during treatment; but there is relatively little information about the best treatment approaches to use when symptoms persist. Of note, FAS may or may not impact on communicative effectiveness. Others have suggested attention to detailed phonetic analysis with traditional speech therapy while recognising co-morbid psychological factors,⁹¹ or strategies routinely used for accent

reduction in non-native speakers of English.⁹² In a case described by Lee et al., (2016), functional FAS resolved with speech and language therapy approaches combined with CBT. Some treatment suggestions for functional FAS and other disorders of language, prosody and accent are offered in **Table 11**.

Specific symptoms – Globus pharyngeus

Globus pharyngeus is a functional disorder which presents as a recurrent, non-painful but uncomfortable sensation of a lump in the throat, in the absence of dysphagia, odynophagia, gastro-oesophageal reflux (GORD/GERD) or a histopathology-based oesophageal motility disorder. Globus commonly co-occurs with functional voice disorders.

Table 11 Treatment of functional foreign accent syndrome and other functional disorders of language, prosody, and accent

Domains of intervention	Examples of possible strategies
Education	<ul style="list-style-type: none"> ▶ General principles as already discussed for functional voice and fluency. ▶ In some cases, working on voice, fluency, or other speech symptoms facilitate spontaneous resolution of foreign accent syndrome or immature/infantile speech pattern.
Symptomatic	<ul style="list-style-type: none"> ▶ Reduction of excessive musculoskeletal tension, if present, in both speech and non-speech muscles often associated with articulation: <ul style="list-style-type: none"> – Reduce muscular tension in head, neck, shoulders, face and mouth. – Eliminate secondary or accessory movements which may involve asking them to do something differently and which acts as a distraction, later to be faded out as speech normalises. ▶ Practise rhythm and intonation using features of the desired (the patient's 'normal') accent; for example, for a Scottish accent using Scots poems, reading a play where characters have the desired accent, or songs with a strong discernible accent. ▶ Encourage use of dialect/vocabulary of the patient's normal accent. ▶ Sometimes imitating a different foreign/regional accent may be easier than the patient's own accent and can ease transition back to normal. ▶ Distraction – for example, record speech with/without auditory feedback (loud music) to allow the patient to hear any resulting change in accent. ▶ For immature prosody, suggest 'play acting' in an older voice. Ask the person to write out statements and phrases of a senior and authoritative nature and to practise reading these with appropriate prosody. In the initial stages a patient may imagine they are acting as an 'alter ego' with a more age-appropriate voice. ▶ Resonant Voice Therapy or Vocal Function Therapy exercises, and finger thumb pressure on the thyroid cartilage, can all be used to reduce pitch and correct vowel sounds in immature/infantile speech pattern. ▶ Limited anecdotal reports suggest hypnosis may be effective, using imagery of self-speaking as they did before, and post hypnotic suggestion. ▶ It is not always helpful to address functional linguistic symptoms such as agrammatism (e.g. by teaching grammar), which may resolve with treatment of the other symptoms. However, some patients with functional telegraphic/agrammatic speech respond well to reminders to correct grammatical errors.
Psychological	<ul style="list-style-type: none"> ▶ Help person to gain insight into the changes in the sounds and sound patterns in their speech. ▶ Attention to psychosocial issues as for other symptom groups and as for voice and fluency. ▶ Exploration of what new accent means to them in terms of status and/or stigma, and exploration of the wider impact/disability. What would a return to own accent mean to them?

General neurology

Symptoms may be persistent or intermittent and are experienced as a sensation of a foreign body in the throat (e.g., hair, crumb); a tightening or choking feeling; a lump in the throat; or sensations of throat strain or itch. Globus is more obvious between meals and improves with eating, but there is often a sense of food and/or liquid sticking or passing with difficulty through the oesophagus. Globus is often associated with throat clearing, a sense of mucus build up or dry throat, repeated swallowing, chronic cough or hoarseness and, over time, dysphonia with pharyngolaryngeal tension.^{44 93}

Studies have shown links between globus and psychological stress,^{94 95} with many patients reporting exacerbation of their symptoms during periods of high emotional intensity. Although common, psychological and psychiatric disorders may be an outcome rather than a predisposing factor.

Globus must be distinguished from dysphagia, but while the two symptoms do not necessarily co-occur, empirical data suggests that 20% of patients with functional dysphagia experience globus sensation with swallowing.⁹⁶ Within gastroenterology, globus is defined often using the Rome IV criteria as a diagnosis of exclusion.^{44 46} This is in contrast to the inclusive methods preferred here for diagnosis of functional voice and speech disorders.

There are few adequately controlled treatment trials for globus. Although spontaneous remission may occur with reduction in psychological stress, 75% are still symptomatic after 3 years. One study suggested that globus symptoms resolved after reassuring diagnostic investigation by an ENT physician.^{93 97 98} others have cautioned against over investigation.^{93 98}

While therapeutic trials of proton-pump inhibitors are sometimes recommended in order to exclude GERD as a cause of globus, it should be noted that in a randomised controlled trial, globus resolved as frequently in patients administered esomeprazole as in those given placebo.⁹⁹ Antidepressants may be helpful, even in the absence of mood symptoms, in reducing oesophageal pain and discomfort.¹⁰⁰ In one small trial, the SSRI antidepressant paroxetine was found both effective and superior to low dose amitriptyline (a tricyclic antidepressant), which was superior to the proton-pump inhibitor lansoprazole in treatment of refractory globus.¹⁰¹

There is good preliminary evidence for the effectiveness of speech and language therapy in treating globus.^{47 98 102 103} These approaches to management are summarised in Table 12.

Specific symptoms – Functional dysphagia

Functional dysphagia is more often *oropharyngeal* rather than *oesophageal* since oropharyngeal musculature is under voluntary rather than autonomic control. For both types of dysphagia exclusion of disease is vital, but for oropharyngeal dysphagia identifying positive features is an important part of the diagnosis and explanation when due to a functional disorder. Positive signs include inability to swallow in the absence of drooling or excessive oral secretions, or inability to control anything in the mouth but ability to spit saliva into a cup.

Symptoms of 'globus', a feeling of it being 'hard' to swallow, pain on swallowing, choking sensations, and coughing¹⁰⁴ are often described by patients with functional dysphagia. Patients often adopt avoidance behaviours as an attempt to reduce the perceived risk of choking. Examples include subtly reducing food intake and textures, changing head postures, eating slowly and with raised bodily tension, and social avoidance. Fear of choking is common and functional dysphagia may ultimately lead to unintended weight loss, social withdrawal, anxiety, panic and depression.^{96 105 106} The impacts on quality of life are not

dissimilar to those experienced by patients suffering dysphagia in association with head and neck cancer.^{107 108}

Functional *oesophageal* dysphagia can be diagnosed using Rome IV criteria, which unlike other disorders in this paper, are based on exclusion of disease rather than positive clinical features of functional disorder, with diagnostic criteria requiring that the following symptoms are present for at least 3 months, with onset 6 months before diagnosis: 1) a sense of solid or liquid food sticking, lodging, or passing abnormally through the oesophagus; 2) an absence of mechanical obstruction, GERD, or oesophageal motility disorder causing these symptoms.¹⁰⁹ Such patients require varying levels of investigation, the details of which are outside the scope of this article.

In some cases functional dysphagia is an isolated symptom, with muscle tension or laryngeal hyper-sensitivity;¹¹⁰ in other cases dysphagia may be present as one of a range of functional motor symptoms, e.g. in stroke-like presentations; or may be associated with significant phagophobia or psychiatric symptoms. Functional symptoms elsewhere in the gastrointestinal tract, such as cyclical vomiting, may impact on food intake goals.

There have been no randomised controlled trials for treatments specifically targeted at functional dysphagia as opposed to globus. Antidepressants are sometimes used on the basis of evidence of benefit in overlapping disorders causing oesophageal discomfort.¹⁰⁰

An overview of educational, behavioural and psychological strategies that may be used by speech and language professional in the management of functional dysphagia are summarised in Table 12. Of note, a recent trial of Cognitive Behaviour – Enhanced Swallowing Therapy (CB-EST) in patients recovering from head and neck cancer had promising outcomes; a similar approach may be beneficial in treatment of functional dysphagia.¹⁰⁸

Specific symptoms – Cough and vocal cord dysfunction (laryngeal hypersensitivity syndrome)

The group suggests that conceptualising laryngeal hypersensitivity syndrome as a functional disorder is appropriate. Chronic cough and vocal cord dysfunction (also known as paradoxical vocal fold motion and inducible laryngeal obstruction) can be considered manifestations of laryngeal hypersensitivity syndrome. Symptoms can occur in the absence of a known cause or persists despite thorough medical management. Cough and vocal cord dysfunction persist as a result of reversible changes in function or aberrant involuntary learned behaviours, rather than primarily due to ongoing disease or damage, but not necessarily in the presence or as a result of significant psychological distress. Importantly, it is possible to have laryngeal hypersensitivity syndrome without meeting criteria for DSM-5 somatic symptom disorder (in which disproportionate time, energy, thoughts, anxious feelings and behaviours persist in relation to the seriousness of the symptoms), which is the way the American College of Chest Physicians have framed conditions previously described as psychogenic cough.^{111 112}

It seems likely that the term *psychogenic cough* has been used inappropriately for a range of types of refractory cough. Idiopathic cough,¹¹³ medically unexplained cough,^{10 114} chronic refractory cough,¹¹⁵ neurogenic cough or laryngeal/cough hypersensitivity syndrome,¹¹⁶ all refer to cough of unknown aetiology that persists despite medical treatment. Psychiatric co-morbidity is far from universal and often secondary rather than causal.^{113 117}

Referral should follow respiratory assessment by a physician, which should usually include investigations including

General neurology

Table 12 Treatment of functional globus and dysphagia

Domains of intervention	Examples of possible strategies
Education & explanatory	<p>Globus</p> <ul style="list-style-type: none"> ▶ Provide reassurance that although unpleasant, the globus sensation is not dangerous. <p>Dysphagia</p> <ul style="list-style-type: none"> ▶ Explain the mechanism of normal swallow, emphasising the automatic nature of pharyngeal stage, the many layers of inbuilt swallowing protection, and the cough as the protective reflex for the swallow. ▶ Show the patient their own videofluoroscopy or fiberoptic endoscopic evaluation of swallowing (FEES), or use a dysphagia app (see Appendix 1) to demonstrate swallow function visually. ▶ Explain that we all aspirate/penetrate to a degree, and that the body copes unless there is poor oral hygiene and immunosuppression. As we age, we have an increasing number of misdirected swallows. ▶ Explain that obstruction to the airway is generally only caused by solid unchewed pieces (or very fast, high volume intake in an abnormal posture). ▶ If the patient is very worried, one might explain choking first aid, but this need not be routine.
Behavioural	<p>Globus</p> <ul style="list-style-type: none"> ▶ Provide advice about adequate hydration, and avoidance of smoking, and excessive coffee and tea. <p>Try exercises to relieve vocal tract tension and dysphonia associated with globus:</p> <ul style="list-style-type: none"> ▶ De-constriction of intrinsic and extrinsic laryngeal muscles. ▶ Laryngeal massage (if within professional scope and competence) ▶ Silent breaths in and out while holding hands over ears. ▶ Swallow, yawn, jaw release. ▶ Yawn with a giggle posture which helps retract false vocal folds. ▶ Stifled yawn, keeping lips together with light contact, drop the jaw, the tongue goes back leading to stretch/openness in the throat. ▶ Reduce throat clearing. <p>Attempt modification of swallow patterns if aberrant manoeuvres have developed:</p> <ul style="list-style-type: none"> ▶ Check the overly effortful swallow which patients often perform habitually which tends to aggravate globus symptoms. ▶ A wet swallow as opposed to a dry swallow. <p>Dysphagia</p> <p>Encourage normal dining etiquette. For example:</p> <ul style="list-style-type: none"> ▶ Sit up tall, at a table. ▶ Avoid talking while eating. ▶ Chew food well and don't overfill mouth. <p>Address anxiety using desensitisation and graded exposure principles. Graded exposure should be organised according to the patient's hierarchy of difficulty and not usual SLT food hierarchies. Steps might include:</p> <ul style="list-style-type: none"> ▶ In a patient who is not eating at all due to anxiety or perceived inability to swallow, start with licking an ice lolly, or a spoon coated in dessert. ▶ Try holding food in the mouth without swallowing. ▶ Try sucking a chocolate button, or melt in mouth / dissolvable solid foods, e.g., 'Quaver' / 'Skip', 'flying saucer', sherbet. ▶ Graded exposure to extend the range, texture and quantities of food and drink. ▶ Graded reduction in the number of chews and swallows. ▶ Systematic desensitisation to different eating situations. <p>Address any muscular tension in the head, neck, and jaw:</p> <ul style="list-style-type: none"> ▶ Neck and shoulder release with postural alignment. ▶ Other generalised bodily relaxation exercises. ▶ Attention to relaxed breathing. ▶ Downward repositioning of the larynx if it is held in a high position (if this is within professional scope and competence^{*2})
Psychological	<ul style="list-style-type: none"> ▶ Supportive discussion in relation to psychological and life stresses contributing to symptoms. ▶ Education about the physiology of anxiety, the anxiety arousal curve, and the importance of avoiding avoidance. ▶ Treatment of any comorbid or secondary psychiatric disorder e.g. anxiety, depression, phagophobia. ▶ Cognitive Behavioural Therapy strategies may be useful. Identify and challenge: <ul style="list-style-type: none"> – Beliefs and cognitions, e.g. 'food will stick in my throat' 'I will choke and die'. – Self-reported sensations, e.g. 'My throat feels tight and narrow' 'Food is sticking there and won't move'. – Maladaptive behaviours, e.g. Avoidance of solids, withdrawing from others, eating in isolation. ▶ Self-directed attention, e.g. Preoccupations with throat sensations 'Chewing is hard, swallowing is difficult'. ▶ Recommend positive self-statements during the swallow such as 'my throat feels easy', 'this swallow is easy'.
Medical	<ul style="list-style-type: none"> ▶ Provide information and advice to reduce acid reflux. Signpost for appropriate medical management of acid reflux and/or post nasal drip if present. ▶ SSRI antidepressants or low-dose amitriptyline may be helpful for globus.

spirometry. This group recognises two patterns of dysfunctional cough: 1) persistent habitual cough, and 2) cough which occurs intermittently in a 'hypersensitive' pattern but without objective evidence of airway hypersensitivity, in response to salient stimuli as part of a conditioned response, and with or without perceived panic or autonomic arousal. Respiratory exposure chamber testing may be indicated in some persistent cases. In most cases the diagnosis should be clearly established prior to referral for speech therapy. However, in those cases where patients may

self-refer, they should be encouraged to seek formal assessment by a respiratory physician.

The assessment process can help the patient to understand the nature of their disorder, to recognise the key triggers that stimulate their urge to cough and then, how they respond behaviourally to those triggers. Strategies and behavioural guidelines for treatment, as recommended by a speech and language professionals, physiotherapists and respiratory physicians specialising in this area are summarised in **Table 13**.^{118–120}

General neurology

Table 13 Treatment of laryngeal hypersensitivity syndrome

Domains of intervention	Examples of possible strategies
Explain the mechanism of the symptom	<ul style="list-style-type: none"> ▶ Educate patients about the nature and anatomy of the cough reflex, and that cough is both voluntary and involuntary ▶ Explain the self-perpetuating nature of the cough or dyspnoea: the role of repeated irritation of the vocal folds through repeated coughing and resulting cough reflex hypersensitivity ▶ Emphasise negative side effects of repeated coughing on vocal tract, vocal folds, voice ▶ Reassure the patient that the cough is not necessary, is of no benefit, but there are advantages to cough suppression ▶ Encourage acceptance of the notion that the person can develop voluntary control over their cough
Introduce strategies to suppress the cough, reduce sensitivity to cough reflex, and regain voluntary control	<p>Teach the patient to notice early triggers, or signs of urge to cough, throat tightness or breathlessness, and then to prevent/stop/interrupt the cough despite the sensation or urge to cough</p> <p>Learn to substitute the cough or breathing difficulty with an alternative competing response, eg:</p> <ul style="list-style-type: none"> ▶ Modified cough suppression swallow, dry swallow, sip water, chew gum, suck medicated sweets for short time ▶ Cough control breathing techniques. Release or relaxed breathing techniques as for inducible laryngeal obstruction (ILO) and Paradoxical Vocal Fold Movement (PVFM) disorders: <ul style="list-style-type: none"> – Relaxed abdominal breathing, breathing through the nose, breath out quickly through the mouth – Pursed lip breathing which filters out irritants, alters air temperature, reduces speed of airflow in larynx – Laryngeal control techniques with de-constriction – Resonant hum as a cough distraction (since sensory interpretation occurring at the level of the vocal folds is necessarily different) – Silent or whispered cough ▶ Accent method breathing ▶ Establish a hierarchy of challenge with the patient and apply to these control techniques. Use graded exposure to desensitize the patient to particular triggers. ▶ Train the patient to regularly and systematically cough on command to reinforce the volitional aspect of a cough and bring cough and breathing back under voluntary control (similar to switching from old voice to new voice once functional a/dysphonia has resolved).
Vocal Hygiene Education	<ul style="list-style-type: none"> ▶ Improve vocal tract hydration by increasing frequency and volume of water and non-caffeinated drinks ▶ Decrease exposure to irritating stimuli on laryngeal mucosa and cough receptors e.g. smoking, alcohol, caffeine ▶ Reduce stimulation to the cough receptors ▶ Promote nasal breathing and reduce mouth breathing if this is a pattern ▶ Easy voicing, adequate hydration and breath support to reduce risk of phono-trauma ▶ Information on diet, behavioural management of GERD if relevant ▶ Therapeutic laryngeal massage to assist with excessive muscle tension patterns in head, neck, larynx, jaw etc.
Psychological	<ul style="list-style-type: none"> ▶ Highlight differences between behavioural and medical treatment. Assess the person's motivation to persevere; sustained application of techniques is needed. Set realistic goals in collaboration with the patient. Help patient to believe in their own self-efficacy and facilitate internalising locus of control over the cough and breathing symptoms by explaining how they are behaviours occurring in response to irritating stimuli rather than a phenomenon that is outside their control. ▶ Stress and anxiety management, drawing attention to the role of hypervigilance. ▶ Hypnotherapy may be useful in some cases. ▶ Psychology or psychiatry input where psychological distress is marked or impacts on engagement with treatment.
Medical	<ul style="list-style-type: none"> ▶ In some cases, medical interventions can support (but not replace) behavioural treatment: e.g. neuromodulators (such as amitriptyline or gabapentin), Botox A, or nebulised lidocaine in normal saline.

CONCLUSION

Functional communication, swallowing, and cough symptoms are common, and may be effectively treated with a range of techniques that already form part of the considerable expertise of speech and language professionals. However, an unhelpful variation in terminology and understanding of different symptom areas has contributed to a limited evidence base for treatments, and as a result many speech and language professionals have felt poorly prepared to treat them.

Due to variation in the extent and quality of available evidence for speech and language therapy interventions for functional disorders, the recommendations provided in this paper are based on the expert opinion of an international panel of speech and language professionals with particular experience and interest in treating functional disorders. Where possible, we have drawn on evidence from clinical trials and observational studies. We note as a limitation the dominance of a small number of countries in the authorship, and potential for bias related to the interests of included authors. Future work might helpfully take a more widely international approach to identify key research priorities.

It is intended that these recommendations help speech and language professionals who work in a variety of settings to feel better able to approach the assessment and treatment of functional disorders with confidence and good outcomes, including as part of a multidisciplinary team treating patients with a range of functional

neurological symptoms. The recommendations in this document are restricted to those presentations most likely encountered by speech language professionals, although we note that these professionals can have wider roles in the management of FND in general.

We also hope that, by fostering interest into FND as a key part of the work of speech and language professionals, our recommendations might stimulate research towards developing more evidence-based treatments for these disorders.

Author Affiliations

¹Speech Pathology, Flinders University, Adelaide, South Australia, Australia

²University of Technology Sydney, Sydney, New South Wales, Australia

³South Warwickshire NHS Foundation Trust, Warwick, UK

⁴Department of Speech & Language Therapy, Great Ormond Street Hospital for Children NHS Foundation Trust, London, UK

⁵Division of Psychology and Language Sciences, University College London, London, UK

⁶Department of Psychiatry and Psychotherapy, University Hospital Bonn, Bonn, Nordrhein-Westfalen, Germany

⁷National Hospital for Neurology and Neurosurgery, London, UK

⁸Department of Neurology, Mayo Clinic, Rochester, Minnesota, USA

⁹Speech and Language Therapy, Kent Community Health NHS Foundation Trust, Ashford, UK

¹⁰Department of Clinical Neurosciences, Royal Infirmary of Edinburgh, Edinburgh, UK

¹¹Massachusetts General Hospital, Boston, Massachusetts, USA

¹²Lewisham and Greenwich NHS Trust, London, UK

¹³Speech Language Sciences, Newcastle University, Newcastle upon Tyne, UK

¹⁴University of Liverpool, Liverpool, UK

¹⁵Speech Pathology Division, Naval Medical Center San Diego, San Diego, California, USA

General neurology

¹⁶Department of Communication Sciences and Disorders, The University of Utah, Salt Lake City, Utah, USA

¹⁷Division of Otolaryngology - Head and Neck Surgery (Adjunct), The University of Utah, Salt Lake City, Utah, USA

¹⁸North Bristol NHS Trust, Westbury on Trym, UK

¹⁹Neurology, Mayo Clinic, Rochester, Minnesota, USA

²⁰Speech Pathology and Neurology, Mayo Clinic College of Medicine and Science, Rochester, Minnesota, USA

²¹School of Communication Sciences and Disorders, Institute for Intelligent Systems, The University of Memphis, Memphis, Tennessee, USA

²²Speech Pathology, John Hunter Hospital, Newcastle, New South Wales, Australia

²³Centre for Healthy Lungs, Hunter Medical Research Institute; School of Medicine and Public Health, The University of Newcastle, Newcastle, New South Wales, Australia

²⁴Centre for Clinical Brain Sciences, The University of Edinburgh, Edinburgh, UK

Acknowledgements Nil

Contributors LM, JS, and AC developed the concept of the paper and together with JB defined the scope and assembled a group of expert co-authors. All authors contributed materially and substantially to a detailed online survey establishing the content of the manuscript, attended a zoom meeting for discussion of issues arising, and contributed to multiple subsequent rounds of comments and revision as per the methods described in the paper. LM coordinated this process. JB wrote the initial draft, which was sequentially revised by LM and JB as per this process. JS revised the long version (see Supplementary file 1) to produce an abbreviated version to submit for print publication.

Funding LM is funded by a University of Edinburgh Clinical Research Fellowship funded philanthropically by Baillie Gifford. LM provides independent medical testimony in court cases regarding patients with functional disorders. AC is a director of a limited personal services company that provides independent medical testimony in Court Cases on a range of neuropsychiatric topics on a 50% pursuer 50% defender basis, is an associate editor of the Journal of Neurology Neurosurgery and Psychiatry, and is the treasurer of the International Functional Neurological Disorder Society. JS reports personal fees from UptoDate, outside the submitted work, runs a self help website for patients with functional neurological symptoms (www.neurosymbols.org) which is free and has no advertising, provides independent medical testimony in personal injury and negligence cases regarding patients with functional disorders, and is secretary of the International Functional Neurological Disorder Society. Professor Jon Stone is a Chief Scientists Office NHS Research Scotland Career Researcher. The other authors declare no conflicts of interest.

Competing Interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed

REFERENCES

- 1 Espay AJ, Aybek S, Carson A, et al. Current concepts in diagnosis and treatment of functional neurological disorders. *JAMA Neurol* 2018;**75**:1132–41. doi:10.1001/jamaneurol.2018.1264
- 2 Stone J, Carson A, Duncan R, et al. Who is referred to neurology clinics?—the diagnoses made in 3781 new patients. *Clin Neurol Neurosurg* 2010;**112**:747–51.
- 3 Heyman I. Mind the gap: Integrating physical and mental healthcare for children with functional symptoms. *Arch. Dis. Child.* 2019;**104**:1127–8. doi:10.1136/archdischild-2019-317854
- 4 Barnett C, Mitchell C, Tyson S. The management of patients with functional stroke: speech and language therapists' views and experiences. *Disabil Rehabil* Published Online First: 2021. doi:10.1080/09638288.2020.1867910
- 5 Duffy JR. Functional speech disorders: clinical manifestations, diagnosis, and management. In: Hallett M, Stone J, Carson A, eds. *Functional Neurologic Disorders, Volume 139 of the Handbook of Clinical Neurology series*. 2016. 379–88. doi:10.1016/B978-0-12-801772-2.00033-3
- 6 Nicholson C, Edwards MJ, Carson AJ, et al. Occupational therapy consensus recommendations for functional neurological disorder. *J Neurol Neurosurg Psychiatry* 2020;**91**:1037–45. doi:10.1136/jnnp-2019-322281
- 7 Nielsen G, Stone J, Matthews A, et al. Physiotherapy for functional motor disorders: a consensus recommendation. *J Neurol Neurosurg Psychiatry* 2015;**86**:1113–9. doi:10.1136/jnnp-2014-309255
- 8 Baker J, Ben-Tovim D, Butcher A, et al. Development of a modified diagnostic classification system for voice disorders with inter-rater reliability study. *Logop Phoniatr Vocology* 2007;**32**:99–112. doi:10.1080/14015430701431192
- 9 Barnett C, Armes J, Smith C. Speech, language and swallowing impairments in functional neurological disorder: a scoping review. *Int. J. Lang. Commun. Disord.* 2019;**54**:309–20. doi:10.1111/1460-6984.12448
- 10 Short J, Harding S. A systematic exploration of the terminology used in the diagnosis and treatment of oropharyngeal dysphagia (swallowing difficulty) in the absence of a clear medical explanation. In: *RCSLT Conference*. Nottingham: 2019. doi:10.1007/s00455-018-9912-9
- 11 Baker J. The role of psychogenic and psychosocial factors in the development of functional voice disorders. *Int J Speech Lang Pathol* 2008;**10**:210–30. doi:10.1080/17549500701879661
- 12 Baker J, Ben-Tovim D, Butcher A, et al. Psychosocial risk factors which may differentiate between women with Functional Voice Disorder, Organic Voice Disorder and a Control group. *Int J Speech Lang Pathol* 2013;**15**:547–63. doi:10.3109/17549507.2012.721397
- 13 Butcher P, Elias A, Cavalli L. *Understanding and treating psychogenic voice disorder: A CBT framework*. New York: Chichester and Wiley 2007.
- 14 Deary V, Miller T. Reconsidering the role of psychosocial factors in functional dysphonia. *Curr. Opin. Otolaryngol. Head Neck Surg.* 2011;**19**:150–4. doi:10.1097/MO0.0b013e328346494d
- 15 O'Hara J, Miller T, Carding P, et al. Relationship between fatigue, perfectionism, and functional dysphonia. *Otolaryngol - Head Neck Surg* 2011;**144**:921–6. doi:10.1177/0194599811401236
- 16 Roy N, Bless DM. Personality traits and psychological factors in voice pathology: a foundation for future research. *J Speech, Lang Hear Res* 2000;**43**:737–48. doi:10.1044/jslhr.4303.737
- 17 Roy N, Bless DM. Toward a theory of the dispositional bases of functional dysphonia and vocal nodules: Exploring the role of personality and emotional adjustment. In: *The handbook of voice quality measurement*. 2000. 461–80. https://www.researchgate.net/profile/Nelson_Roy/publication/313695030_Toward_a_Theory_of_the_Dispositional_Bases_of_Functional_Dysphonia_and_Vocal_Nodules_Exploring_the_Role_of_Personality_and_Emotional_Adjustment/links/58a31cb992851cb987733eb/Toward-a-T (accessed 19 Jan 2021).
- 18 Van Mersbergen M, Patrick C, Glaze L. Functional dysphonia during mental imagery: Testing the trait theory of voice disorders. *J Speech, Lang Hear Res* 2008;**51**:1405–23. doi:10.1044/1092-4388(2008/06-0216)
- 19 Ludwig L, Pasman JA, Nicholson T, et al. Stressful life events and maltreatment in conversion (functional neurological) disorder: systematic review and meta-analysis of case-control studies. *The Lancet Psychiatry* 2018;**5**:307–20. doi:10.1016/S2215-0366(18)30051-8
- 20 Edwards MJ. Neurobiologic theories of functional neurologic disorders. In: Hallett M, Stone J, Carson A, eds. *Functional Neurologic Disorders, Volume 139 of the Handbook of Clinical Neurology series*. 2016. 131–7. doi:10.1016/B978-0-12-801772-2.00012-6
- 21 Edwards MJ, Adams RA, Brown H, et al. A Bayesian account of 'hysteria'. *Brain* 2012;**135**:3495–512. doi:10.1093/brain/awt129
- 22 Pareés I, Kojovic M, Pires C, et al. Physical precipitating factors in functional movement disorders. *J Neurol Sci* 2014;**338**:174–7. doi:10.1016/j.jns.2013.12.046
- 23 Hallett M, Stone J, Carson A. *Functional Neurologic Disorders, Volume 139 of the Handbook of Clinical Neurology series*. Amsterdam: Elsevier 2016.
- 24 Haggard P. Sense of agency in the human brain. *Nat Publ Gr* Published Online First: 2017. doi:10.1038/nrn.2017.14
- 25 Elias A, Raven R, Butcher P, et al. Speech therapy for psychogenic voice disorder: A survey of current practice and training. *Int J Lang Commun Disord* 1989;**24**:61–76. doi:10.3109/1368282890901946
- 26 Griffith MM. Identifying speech-language pathologists' current perceptions and practice patterns. 2015. <https://encompass.eku.edu/etd> (accessed 19 Jan 2021).
- 27 Keulen S, Verhoeven J, De Witte E, et al. Foreign accent syndrome as a psychogenic disorder: a review. *Front Hum Neurosci* 2016;**10**:168. doi:10.3389/fnhum.2016.00168
- 28 Baker J. *Psychosocial perspectives on the management of voice disorders*. Oxford: Compton Publishing 2017.
- 29 Dilollo A, Neimeyer R. *Counseling in speech-language pathology and audiology*. San Diego: Plural Publishing 2014. doi:10.1097/00003446-199410000-00012
- 30 Fourie RJ. *Therapeutic processes for communication disorders: A guide for clinicians and students*. New York: Psychology Press 2010. doi:10.4324/9780203839706
- 31 Holland AL. *Counseling in Communication Disorders*. Brisbane: Plural Publishing 2007. <https://www.bookdepository.com/Counseling-Communication-Disorders-Audrey-Holland/9781597560498> (accessed 19 Jan 2021).
- 32 Mills M, Stoneham G. The voice book for trans and non-binary people: a practical guide to creating and sustaining authentic voice and communication. 2017;222. <https://www.amazon.co.uk/Voice-Book-Trans-Non-Binary-People/dp/1785921282> (accessed 19 Jan 2021).
- 33 American Speech-Language-Hearing Association. Scope of practice in speech-language pathology. 2016. <https://www.asha.org/siteassets/uploadedfiles/sp2016-00343.pdf>
- 34 Speech Pathology Australia. Scope of Practice in Speech Pathology. 2015. https://www.speechpathologyaustralia.org.au/SPAweb/About_us/SPA_Documents/spaweb/About_Us/SPA_Documents/SPA_Documents.aspx?hkey=3c5269c1-51eb-45cf-8081-ab9c0544180a#anchor_sp
- 35 Royal College of Speech and Language Therapists. Counselling Guidance: Responsibilities. <https://www.rcslt.org/members/delivering-quality-services/counselling/counselling-guidance#section-3> (accessed 20 Jan 2021).
- 36 Freeburn J. Speech therapy: being understood clearly. In: LaFaver K, Maurer C, Nicholson T, et al, eds. *Functional Movement Disorder: An Interdisciplinary Case-Based Approach*. 2021.

General neurology

- 37 Talmon M. *Single-session therapy: Maximizing the effect of the first (and often only) therapeutic encounter*. Jossey-Bass 1990. <https://psycnet.apa.org/record/1990-98311-000> (accessed 20 Jan 2021).
- 38 Lehn A, Gelauff J, Hoeritzauer I, et al. Functional neurological disorders: mechanisms and treatment. *J Neurol* 2016;**263**:611–20. doi:10.1007/s00415-015-7893-2
- 39 Stone J. Functional neurological disorders: The neurological assessment as treatment. *Pract. Neurol* 2016;**16**:7–17. doi:10.1136/practneurol-2015-001241
- 40 Adams C, Anderson J, Madva EN, et al. You've made the diagnosis of functional neurological disorder: Now what? *Pract Neurol* 2018;**18**:323–30.
- 41 Gilmour GS, Nielsen G, Teodoro T, et al. Management of functional neurological disorder. *J Neurol* 2020;**267**:2164–72. doi:10.1007/s00415-020-09772-w
- 42 LaFaver K. Treatment of Functional Movement Disorders. *Neurol Clin* 2020;**38**:469–80. doi:10.1016/j.ncl.2020.01.011
- 43 Stone J, Edwards M. Trick or treat? Showing patients with functional (psychogenic) motor symptoms their physical signs. *Neurology* 2012;**79**:282–4.
- 44 Baumann A, Katz PO. Functional disorders of swallowing. In: *Handbook of Clinical Neurology*. 2016. 483–8. doi:10.1016/B978-0-12-801772-2.00039-4
- 45 Duffy J. *Motor Speech Disorders*. 4th ed. St Louis: Elsevier 2020.
- 46 Galmiche J, Clouse R, Balint A, et al. Functional esophageal disorders. *Gastroenterology* 2006;**130**:1459–65. <https://www.sciencedirect.com/science/article/pii/S0016508506005075> (accessed 19 Jan 2021).
- 47 Harvey PR, Theron BT, Trudgill NJ. Managing a patient with globus pharyngeus. *Frontline Gastroenterol* 2018;**9**:208–12. doi:10.1136/flgastro-2017-100844
- 48 McWhirter L, Miller N, Campbell C, et al. Understanding foreign accent syndrome. *J Neurol Neurosurg Psychiatry* 2019;**90**. doi:10.1136/jnnp-2018-319842
- 49 Roth CR, Cornis-Pop M, Beach WA. Examination of validity in spoken language evaluations: Adult onset stuttering following mild traumatic brain injury. *NeuroRehabilitation* 2015;**36**:415–26. doi:10.3233/NRE-151230
- 50 Aronson A, Bless DM. *Clinical voice disorders*. 4th ed. New York: Thieme 2009. doi:10.1016/s0214-4603(10)70007-3
- 51 Roy N. Assessment and treatment of musculoskeletal tension in hyperfunctional voice disorders. *Int J Speech Lang Pathol* 2008;**10**:195–209. doi:10.1080/17549500701885577
- 52 Roy N, Dietrich M, Blomgren M, et al. Exploring the neural bases of primary muscle tension dysphonia: a case study using functional magnetic resonance imaging. *J Voice* 2019;**33**:183–94. doi:10.1016/j.jvoice.2017.11.009
- 53 Titze IR, Verdolini Abbott K. *Vocology The Science and Practice of Voice Habilitation*. Salt Lake City: National Center for Voice and Speech 2012.
- 54 Yiu EML, Verdolini K, Chow LPY. Electromyographic study of motor learning for a voice production task. *J Speech, Lang Hear Res* 2005;**48**:1254–68. doi:10.1044/1092-4388(2005)087a
- 55 Squire LR. *Mechanisms of memory*. Univ. of California Press 1986. <http://science.sciencemag.org/> (accessed 20 Jan 2021).
- 56 Boone D. *The voice and voice therapy*. New Jersey: Prentice-Hall 1977.
- 57 Baker J. Psychogenic dysphonia: Peeling back the layers. *J Voice* 1998;**12**:527–35. doi:10.1016/S0892-1997(98)80061-1
- 58 Goldstein LH, Robinson EJ, Mellers JDC, et al. Cognitive behavioural therapy for adults with dissociative seizures (CODES): a pragmatic, multicentre, randomised controlled trial. *The Lancet Psychiatry* 2020;**7**:491–505. doi:10.1016/S2215-0366(20)30128-0
- 59 Richardson M, Isbister G, Nicholson B. A novel treatment protocol (Nocebo Hypothesis Cognitive Behavioural Therapy; NH-CBT) for functional neurological symptom disorder/conversion disorder: A retrospective consecutive case series. *Behav Cogn Psychother* 2018;**46**:497–503. doi:10.1017/S1352465817000832
- 60 Butcher P, Elias A. Cognitive-behavioural therapy with dysphonic patients: An exploratory investigation. *Coll Speech Ther Bull* 1983;**37**:1–3. https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Butcher%2C+P.%2C+%26+Elias%2C+A.+%281983%29.+Cognitive-behavioural+therapy+with+dysphonic+patients%3A+A+An+exploratory+investigation.+The+College+of+Speech+Therapists+Bulletin%2837%29%2C+1-3.+&btnG= (accessed 19 Jan 2021).
- 61 Carding P, Deary V, Miller T. Cognitive behavioural therapy in the treatment of functional dysphonia in the United Kingdom. In: Yiu E, ed. *International Perspectives on Voice Disorders*. UK: Multilingual Matters / Channel View Publications 2013. 133–48. doi:10.21832/9781847698742-014
- 62 Deary V, McColl E, Carding P, et al. A psychosocial intervention for the management of functional dysphonia: Complex intervention development and pilot randomised trial. *Pilot Feasibility Stud* 2018;**4**. doi:10.1186/s40814-018-0240-5
- 63 Miller T, Deary V, Patterson J. Improving access to psychological therapies in voice disorders: A cognitive behavioural therapy model. *Curr Opin Otolaryngol Head Neck Surg* 2014;**22**:201–5. doi:10.1097/MOQ.0000000000000056
- 64 Gutkin M, McLean L, Brown R, et al. Systematic review of psychotherapy for adults with functional neurological disorder. *J Neurol Neurosurg Psychiatry* 2021;**92**:36–44. doi:10.1136/jnnp-2019-321926
- 65 Baker J. The therapeutic relationship once established, need never be broken. *Int. J. Speech. Lang Pathol* 2010;**12**:309–12. doi:10.3109/17549501003749842
- 66 Spengler FB, Becker B, Kendrick KM, et al. Emotional dysregulation in psychogenic voice loss. *Psychother. Psychosom*. 2017;**86**:121–3. doi:10.1159/000452306
- 67 Baker J. Functional voice disorders: clinical presentations and differential diagnosis. In: Hallett M, Stone J, Carson A, eds. *Functional Neurologic Disorders, Volume 139 of the Handbook of Clinical Neurology series*. Amsterdam: Elsevier 2016. 389–406.
- 68 Verdolini K, Rosen C, Branski R. *Classification Manual for Voice Disorders-I*. New Jersey: Laurence Erlbaum Associates 2006. doi:10.4324/9781410617293
- 69 Dietrich M, Verdolini Abbott K. Psychobiological stress reactivity and personality in persons with high and low stressor-induced extralaryngeal reactivity. *J Speech, Lang Hear Res* 2014;**57**:2076–89. doi:10.1044/2014_JSLHR-5-12-0386
- 70 Roy N, Bless DM, Heisey D. Personality and voice disorders: A multitrait-multidimension analysis. *J Voice* 2000;**14**:521–48. doi:10.1016/S0892-1997(00)80009-0
- 71 Kollbrunner J, Seifert E. Encouragement to increase the use of psychosocial skills in the diagnosis and therapy of patients with functional dysphonia. *J Voice* 2017;**31**:132.e1–132.e7. doi:10.1016/j.jvoice.2015.11.021
- 72 Kiese-Himmel C. Klinisch-psychologische Bausteine in der Diagnostik funktioneller Dysphonien - eine Übersicht. *Laryngorhinootologie* 2015;**94**:156–62. doi:10.1055/s-0034-1394454
- 73 Behrendt S. Die psychogene aphonie auf dem hintergrund psychotherapeutischer modelle und erfahrungen. *Spr Stimme Gehor* 2002;**26**:9–13. doi:10.1055/s-2002-23117
- 74 Ruotsalainen J, Sellman J, Lehto L, et al. Systematic review of the treatment of functional dysphonia and prevention of voice disorders. *Otolaryngol - Head Neck Surg* 2008;**138**:557–65. doi:10.1016/j.otohns.2008.01.014
- 75 Speyer R. Effects of voice therapy: A systematic review. *J Voice* 2008;**22**:565–80. doi:10.1016/j.jvoice.2006.10.005
- 76 Carding P, Bos-Clark M, Fu S, et al. Evaluating the efficacy of voice therapy for functional, organic and neurological voice disorders. *Clin Otolaryngol* 2017;**42**:201–17. doi:10.3109/13682829209012036
- 77 Baumgartner J, Duffy JR. Psychogenic stuttering in adults with and without neurologic disease. *J Med Speech Lang Pathol* 1997;**5**:75–95. https://www.researchgate.net/profile/Joseph_Duffy/publication/279897923_Psychogenic_stuttering_in_adults_with_and_without_neurologic_disease/links/565493ca08aeaf2aabe37d.pdf (accessed 19 Jan 2021).
- 78 Deal JL. Sudden onset of stuttering: A case report. *J Speech Hear Disord* 1982;**47**:301–4. doi:10.1044/jshd.4703.301
- 79 Binder LM, Spector J, Youngjohn JR. Psychogenic stuttering and other acquired nonorganic speech and language abnormalities. *Arch Clin Neuropsychol* 2012;**27**:557–68. doi:10.1093/arclin/acs051
- 80 Helm-Estabrooks N, Hotz G. Sudden onset of 'stuttering' in an adult: Neurogenic or psychogenic? *Semin Speech Lang* 1998;**19**:23–9. doi:10.1055/s-2008-1064032
- 81 Connery A, McCurtin A, Robinson K. The lived experience of stuttering: a synthesis of qualitative studies with implications for rehabilitation. *Disabil Rehabil* 2020;**42**:2232–42. doi:10.1080/09638288.2018.1555623
- 82 Scheurich JA, Beidel DC, Vanryckeghem M. Exposure therapy for social anxiety disorder in people who stutter: An exploratory multiple baseline design. *J Fluency Disord* 2019;**59**:21–32. doi:10.1016/j.jfludis.2018.12.001
- 83 Beilby J. Psychosocial impact of living with a stuttering disorder: Knowing is not enough. *Semin Speech Lang* 2014;**35**:132–43. doi:10.1055/s-0034-1371756
- 84 Baizabal-Carvallo JF, Jankovic J. Speech and voice disorders in patients with psychogenic movement disorders. *J Neurol* 2015;**262**:2420–4. doi:10.1007/s00415-015-7856-7
- 85 Chung DS, Wettroth C, Hallett M, et al. Functional speech and voice disorders: case series and literature review. *Mov Disord Clin Pract* 2018;**5**:312–6. doi:10.1002/mdc3.12609
- 86 Jones A, Smakowski A, O'Connell N, et al. Functional stroke symptoms: A prospective observational case series. *J Psychosom Res* 2020;**132**. doi:10.1016/j.jpsychores.2020.109972
- 87 Keulen S, Verhoeven J, De Page L, et al. Psychogenic foreign accent syndrome: a new case. *Front Hum Neurosci* 2016;**10**:143. doi:10.3389/fnhum.2016.00143
- 88 Keulen S, Verhoeven J, Bastiaanse R, et al. Perceptual accent rating and attribution in psychogenic FAS: some further evidence challenging whitaker's operational definition. *Front Hum Neurosci* 2016;**10**:1–14. doi:10.3389/fnhum.2016.00062
- 89 Lee O, Ludwig L, Davenport R, et al. Functional foreign accent syndrome. *Pract Neurol* 2016.
- 90 Romó N, Miller N, Cardoso A. Segmental diagnostics of neurogenic and functional foreign accent syndrome. *J Neurolinguistics* 2021;**58**. doi:10.1016/j.jneuroling.2020.100983
- 91 Haley KL, Roth HL, Helm-Estabrooks N, et al. Foreign accent syndrome due to conversion disorder: Phonetic analyses and clinical course. *J Neurolinguistics* 2010;**23**:28–43. doi:10.1016/j.jneuroling.2009.08.001
- 92 Sikorski LD. Foreign accents: Suggested competencies for improving communicative pronunciation. *Semin Speech Lang* 2005;**26**:126–30. doi:10.1055/s-2005-871208
- 93 Karkos PD, Wilson JA. The diagnosis and management of globus pharyngeus: Our perspective from the United Kingdom. *Curr. Opin. Otolaryngol. Head Neck Surg*. 2008;**16**:521–4. doi:10.1097/MOQ.0b013e328316933b
- 94 Deary IJ, Wilson JA, Kelly SW. Globus pharyngis, personality, and psychological distress in the general population. *Psychosomatics* 1995;**36**:570–7. doi:10.1016/S0033-3182(95)71614-0

General neurology

- 95 Harris MB, Deary IJ, Wilson JA. Life events and difficulties in relation to the onset of globus pharyngis. *J Psychosom Res* 1996;**40**:603–15. doi:10.1016/0022-3999(96)00024-4
- 96 Elias A. Our voice and neuro caseloads - making the links. NHS 2019.
- 97 Järvenpää P, Arkkila P, Aaltonen LM. Globus pharyngeus: a review of etiology, diagnostics, and treatment. *Eur Arch Oto-Rhino-Laryngology* 2018;**275**:1945–53. doi:10.1007/s00405-018-5041-1
- 98 Lee BE, Kim GH. Globus pharyngeus: A review of its etiology, diagnosis and treatment. *World J Gastroenterol* 2012;**18**:2462–71. doi:10.3748/wjg.v18.i20.2462
- 99 Noordzij JP, Khidr A, Evans BA, et al. Evaluation of omeprazole in the treatment of reflux laryngitis: A prospective, placebo-controlled, randomized, double-blind study. *Laryngoscope* 2001;**111**:2147–51. doi:10.1097/00005537-200112000-00013
- 100 Weijenborg PW, de Schepper HS, Smout AJPM, et al. Effects of antidepressants in patients with functional esophageal disorders or gastroesophageal reflux disease: A systematic review. *Clin Gastroenterol Hepatol* 2015;**13**:251-259.e1. doi:10.1016/j.cgh.2014.06.025
- 101 Chen D, Jia L, Gu X, et al. Comparison of paroxetine and amitriptyline in the treatment of refractory globus pharyngeus. *Dig Liver Dis* 2016;**48**:1012–7. doi:10.1016/j.dld.2016.05.025
- 102 Khalil HS, Reddy VM, Bos-Clark M, et al. Speech therapy in the treatment of globus pharyngeus: How we do it. *Clin Otolaryngol* 2011;**36**:388–92. doi:10.1111/j.1749-4486.2011.02326.x
- 103 Wareing M, Elias A, Mitchell D. Management of globus sensation by the speech therapist. *Logop Phoniatr Vocology* 1997;**22**:39–42. doi:10.3109/14015439709075313
- 104 Kang CH, Zhang N, Lott DG. Muscle tension dysphagia: contributing factors and treatment efficacy. *Ann Otol Rhinol Laryngol* 2020:000348942096633. doi:10.1177/0003489420966339
- 105 Verdonschot RJCG, Baijens LWJ, van de Kolk I, et al. Affective symptoms in patients with oropharyngeal dysphagia: A systematic review. *J Psychosom Res* 2017;**97**:102–10. doi:10.1016/j.jpsychores.2017.04.006
- 106 Bülow M. Psychogenic dysphagia. In: *Principles of Deglutition: A Multidisciplinary Text for Swallowing and its Disorders*. Springer New York 2013. 771–6. doi:10.1007/978-1-4614-3794-9_52
- 107 Patterson JM. Psychological interventions for the head and neck cancer population who are experiencing dysphagia. *Perspect ASHA Spec Interes Groups* 2019;**4**:1049–54. doi:10.1044/2019_pers-sig13-2019-0001
- 108 Patterson JM, Exley C, McColl E, et al. Feasibility and acceptability of combining cognitive behavioural therapy techniques with swallowing therapy in head and neck cancer dysphagia. *BMC Cancer* 2018;**18**:1–11. doi:10.1186/s12885-017-3892-2
- 109 Aziz Q, Fass R, Gyawali CP, et al. Esophageal disorders. *Gastroenterology* 2016;**150**:1368–79. doi:10.1053/j.gastro.2016.02.012
- 110 Kang CH, Hentz JG, Lott DG. Muscle tension dysphagia: symptomatology and theoretical framework. *Otolaryngol - Head Neck Surg (United States)* 2016;**155**:837–42. doi:10.1177/0194599816657013
- 111 Vertigan AE. Somatic cough syndrome or psychogenic cough-What is the difference? *J Thorac Dis* 2017;**9**:831–8. doi:10.21037/jtd.2017.03.119
- 112 Vertigan AE, Murad MH, Pringsheim T, et al. Somatic cough syndrome (previously referred to as psychogenic cough) and tic cough (previously referred to as habit cough) in adults and children: CHEST guideline and expert panel report. *Chest* 2015;**148**:24–31. doi:10.1378/chest.15-0423
- 113 McGarvey LP, Carton C, Gamble L, et al. Prevalence of psychomorbidly among patients with chronic cough. *Cough* 2006;**2**:1–6. doi:10.1186/1745-9974-2-4
- 114 Gibson P, Wang G, McGarvey L, et al. Treatment of unexplained chronic cough chest guideline and expert panel report. *Chest* 2016;**149**:27–44. doi:10.1378/chest.15-1496
- 115 Gibson PG, Vertigan AE. Management of chronic refractory cough. *BMJ* 2015;**351**. doi:10.1136/bmj.h5590
- 116 Song WJ, Morice AH. Cough hypersensitivity syndrome: A few more steps forward. *Allergy, Asthma Immunol. Res.* 2017;**9**:394–402. doi:10.4168/aaair.2017.9.5.394
- 117 Dicipinigitis P V, Tso R, Banauch G. Prevalence of depressive symptoms among patients with chronic cough. *Chest* 2006;**130**:1839–43. doi:10.1378/chest.130.6.1839
- 118 Chamberlain Mitchell SAF, Ellis J, Ludlow S, et al. Non-pharmacological interventions for chronic cough: The past, present and future. *Pulm. Pharmacol. Ther.* 2019;**56**:29–38. doi:10.1016/j.pupt.2019.02.006
- 119 Mathur A, Liu-Shiu-Cheong PSK, Currie GP. The management of chronic cough. *QJM.* 2019;**112**:651–6. doi:10.1093/qjmed/hcy259
- 120 Vertigan AE, Theodoros DG, Gibson PG, et al. Efficacy of speech pathology management for chronic cough: A randomised placebo controlled trial of treatment efficacy. *Thorax* 2006;**61**:1065–9. doi:10.1136/thx.2006.064337

Baker et al. 2021 – Appendix 1

Appendix 1 – Helpful resources

For professionals:

- The international [Functional Neurological Disorder Society](#) streams a wide programme of webinars, with [back catalogue](#) available to members.
- '[Emotion Matters](#)' is a resource for health and social care professionals working with adults with long term physical health issues, and includes the **SWIFT Check Up** – a tool to help develop a clear picture of a patient's social, occupational, and emotional background.
- Northern Speech Services [dysphagia app](#) is helpful for showing patients how swallowing works.
- USA Mental Health Resources at [National Institutes of Mental Health \(NIMH\)](#), [National Alliance on Mental Illness \(NAMI\)](#), and the [American Psychological Association](#).
- [Medline Plus on voice disorders](#)
- [The Voice Foundation](#)
- The [National Center for Voice and Speech](#) (NCVS) (USA)
- University of Wisconsin Madison [Voice and Swallowing Lecture Series](#)

For patients:

Functional neurological disorders in general:

- [Neurosymptoms](#) - Functional neurological disorders: a patient's guide. This website is also available in German, Dutch, French, Italian, Spanish, Portuguese, Swedish, and Russian.
- [FND Australia Workbook](#)
- [FND Portal](#) blog (and the associated @fndportal twitter account)
- [FND Hope International](#)
- [FND Action UK](#)

Baker et al. 2021 – Appendix 1

- [FND Forum](#) – an international multidisciplinary site that brings together health care providers who work with FND.
- [My FND](#) – a free app for people with FND

Foreign Accent Syndrome

- University of Texas at Dallas [‘Foreign Accent Syndrome’ website](#)

Voice problems

- British Voice Association has a [range of leaflets about the voice](#), and about looking after your voice, including [‘The Effects of Stress and Emotion on the Voice’](#).
- [Voice Doctor](#)

Counselling and psychological therapies

- (USA only) – [Psychology Today – Find a Therapist](#)

Trauma

- [USA Trauma Research Foundation](#)