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Cough suppression therapy: Does it work?

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ABSTRACT

Cough suppression therapy (CST), also known as cough suppression physiotherapy and speech pathology management is a promising non-pharmacological therapeutic option for patients with refractory chronic cough. CST may consist of education, improving laryngeal hygiene and hydration, cough suppression techniques, breathing exercises and counselling. It is an out-patient therapy delivered in 2–4 sessions. There is evidence to support the efficacy of CST: a randomised controlled trial reported a significant reduction in cough symptoms and other studies have reported improved cough related quality of life, reduced cough reflex hypersensitivity and cough frequency. The mechanism of action of CST is not clear, but it has been shown to reduce cough reflex sensitivity, paradoxical vocal fold movement (PVFM) and extrathoracic hyperresponsiveness. Further research is needed to determine the optimal components of CST, the characteristics of patients in whom it is most effective and to increase the understanding of its mechanisms of action. The effectiveness of CST in other respiratory conditions such as asthma, pulmonary fibrosis, chronic obstructive pulmonary disease and sarcoidosis should also be investigated.

1. Introduction

Chronic cough is a common condition with an estimated prevalence of 12% [1]. It causes significant psychological and physical morbidity: chest pain, vomiting, headaches, lethargy, social embarrassment, low mood and sleep disturbance are frequent adverse consequences of persistent cough [2–4]. Few effective pharmacological antittussive therapies are available to patients [5,6]. Voluntary suppression of cough may be used as part of a self-help management programme for patients with chronic cough to minimise the impact of excessive or intense coughing. Cough suppression treatments are referred to by a number of terms; behavioural modification therapy, cough suppression physiotherapy and speech pathology management [7–9]. For the purpose of this article, the term Cough Suppression Therapy (CST) will be used. CST is a promising approach for patients with a persistent cough despite medical therapy. It is generally delivered by respiratory physiotherapists or speech and language therapists linked to respiratory, Ear–Nose–Throat, voice and allergy services [7,8]. This article will review CST; its components, evidence for efficacy and areas of uncertainty.

2. Background

Physiotherapists and speech and language therapists have long been advising selected patients to suppress cough voluntarily using a wide range of techniques [10]. Until recently, there was no evidence for the effectiveness of these techniques, it was limited to a few specialist centres, and had little structure to its approach. In contrast, self management for other respiratory symptoms such as breathlessness is available widely through pulmonary rehabilitation programmes and out-patient treatment of other respiratory disorders including COPD and hyperventilation syndrome [11]. A similar approach may be beneficial for patients with cough. This requires more research, training, collaborative working and increased awareness.

3. Cough suppression therapy components

3.1. Overview

CST is an out-patient therapy delivered over multiple sessions, tailored to the individual patients' needs. It involves educating patients about the cough reflex and negative effects of repeated coughing, identification of cough triggers, techniques to reduce laryngeal irritation and increase hydration, cough suppression exercises and psycho-educational counselling (Table 1) [7–9,12]. The treatment regime may also include voice therapy techniques and/or breathing pattern retraining [7–9]. A detailed assessment and

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Table 1
Cough suppression therapy components.

Components	Techniques
Education	Educate patients on the Cough reflex and cough reflex hypersensitivity
	Explain the Negative effects of repeated coughing
	Educate patients on voluntary control of cough
Laryngeal hygiene and hydration	Increase frequency and volume of water intake
	Reduce caffeine and alcohol intake
	Avoid smoky environments
	Promote nasal breathing
Cough control	Teach patients to identify their cough triggers
	Teach patients to use cough suppression or distraction techniques at the first sign or sensation of the need or urge to cough
	Cough suppression and distraction techniques include: forced swallow, sipping water and sucking sweets
	Breathing exercises include: Relaxed throat breathing, pursed lip breathing, breathing pattern retraining
Psycho-educational counselling	Set realistic timeframes and goals
	Motivate patients, reiterate the techniques and the aims of the therapy
	Behaviour modification: try to reduce over awareness of the need to cough
	Stress and anxiety management
	Address adverse symptoms such as incontinence

analysis of the characteristics of cough is important. CST has been investigated in patients with idiopathic and refractory chronic cough that persists (>8 weeks) despite optimal medical assessment and management [7,8]. The exclusion criteria for CST are not clear but the authors suggest patients with moderate to large sputum production should be treated with caution or excluded due to the potential risk of infection. The effectiveness of CST in respiratory conditions such as chronic obstructive pulmonary disease, idiopathic pulmonary fibrosis and bronchiectasis have not been investigated. However, selected patients with minimal sputum production may be suitable if their cough is thought to be associated with a hypersensitive cough reflex (Author's opinion).

3.2. Education

CST provides an opportunity to evaluate the patients' cough in detail, outside the busy out-patient respiratory clinic. The education component focuses on the cough reflex, cough reflex hypersensitivity and the benefits of CST [9,12]. The negative effects of repeated coughing such as laryngeal irritation and trauma are discussed and patients are reassured that suppressing their cough is not harmful [7,9,12].

3.3. Laryngeal hygiene and hydration

Most patients with chronic cough refer to the larynx (throat) as the location of the trigger of cough, irritation and soreness. Laryngeal trauma may result from laryngeal dehydration, inhaling irritants and coughing itself. This may be minimised by recommending reduction of alcohol and caffeine consumption, avoiding smoky atmospheres, increasing frequency and volume of water intake and can include steam inhalation [7,8]. Nasal breathing is promoted to reduce the drying effect on the larynx of mouth breathing [7,12].

3.4. Cough control

The mechanisms of conscious control of cough have been studied recently. Young et al. reported that patients with chronic cough can effectively suppress capsaicin induced reflex cough [13]. Hegland et al. reported that subjects asked to suppress cough substitute it with other behaviours. The most common cough substitution behaviours were throat clearing, breath-hold, huff and swallow (Fig. 1) [14]. A study by Hutchings et al. found a significant difference between scores for the psychology parameter of obsessional symptoms ($p = 0.009$) and mood in people who were effective and ineffective at voluntarily suppressing their cough (Fig. 2) [15]. Therefore treatments which address mood may have the potential to improve cough suppression. The areas of the brain responsible for conscious control of cough have been described by Mazzone et al.; these include the anterior insula, anterior midcingulate cortex and inferior frontal gyrus [16]. This functional magnetic resonance imaging study suggested that cough is not simply a brain stem reflex but often involves active facilitation by cortical regions regulated by distinct higher order inhibitory processes.

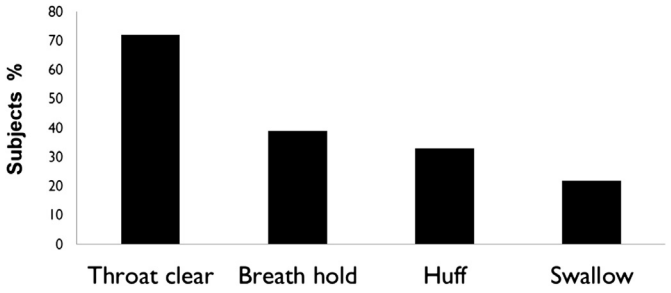

Fig. 1. Cough is substituted with alternative behaviour during voluntary cough suppression. Adapted from data published in Hegland K et al. [13].

Patients are taught to identify the urge to cough at the first sign of irritation and then to try to voluntarily suppress or replace the cough. Cough suppression techniques can include substituting the cough with a forced swallow or distraction techniques such as taking sips of water or sucking a sweet [7,8]. The latter also hydrates the larynx.

Paradoxical vocal fold movement (PVFM), the adduction of vocal cords during inspiration and sometimes expiration [17], is frequently present in patients with cough [18,19] CST has been used to address PVFM and dysfunctional breathing patterns [7,18]. Breathing pattern dysfunction is a term generally used to describe abnormal variation in respiratory rate and/or increased upper chest movement during respiration [20,21]. Common presenting symptoms are breathlessness, dizziness, light-headedness, paraesthesia, chest pain and tightness [20,21].

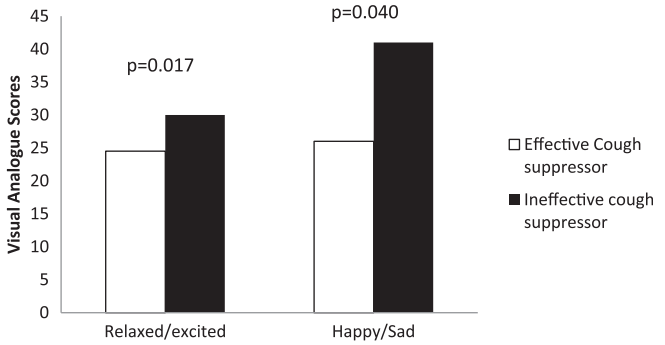

Fig. 2. Mood scores for subjects voluntarily suppressing cough. Fig. 2 shows mood bipolar VAS scores where left hand mood state represents a score of 0 on the VAS scale and the right hand mood state represents a score of 100. Adapted from data published in Hutchings H et al. [14].