# Habit cough in children

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## Abstract

Cough is one of the most common presenting complaints in childhood. Chronic cough has many possible causes, and this symptom often results in extensive investigations, treatments and anxiety. Habit (habit-tic) and somatic cough disorder (also known as psychogenic cough) is one of the more common underlying diagnoses eventually reached. Habit cough often follows an upper respiratory infection. It is a dry, repetitive, honking, disruptive cough. Characteristically, habit cough usually reduces with distraction, and disappears in sleep. A good detailed history and physical examination, coupled with (normal) basic investigations will usually suffice in diagnosing habit cough – it is important to avoid extensive investigations and unnecessary treatments. However, it is also imperative to note that some children may have both pathological and habit or psychogenic cough. The mainstay of management of habit cough is education and addressing any underlying psychosocial stressors. Various forms of psychotherapies and physiotherapies (cough suppression techniques) have been shown to be effective. With intervention, most children with habit cough will achieve complete resolution, or at least improvement in symptoms. This short article is aimed at healthcare professionals working with children and gives practical advice about investigation and management of suspected habit cough in children and young people.

**Keywords** children; chronic; cough; habit; paediatrics; psychogenic

## Introduction

Although chronic cough does not have a universally agreed definition, cough is common in children.[1] Daily cough for more than 4 weeks in the absence of obvious intercurrent viral illness has a reported prevalence of up to 30% of children. It results in a lot of parental anxiety and school absences. Most children and families seen in a paediatric respiratory clinic for chronic cough have already sought medical advice on multiples occasions. Before embarking upon investigations, it is important to understand what is normal or expected.

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Children commonly experience viral illness. Pre-school children in higher income countries contract 8–10 respiratory tract infections a year. So cough is a ubiquitous symptom of early childhood. However, even healthy children cough. Those free from viral illness may still have 11–30 coughs per day. Some parents can become sensitized to the symptom, particularly following a significant respiratory illness leading to a hospital admission. In clinical practice it is important to differentiate what is normal and expected from a likely pathological entity before embarking on investigations.

The differential diagnoses for chronic cough is wide – including viral infections, asthma, allergic rhinitis, cystic fibrosis, primary ciliary dyskinesia, aspirated foreign body, gastro-oesophageal reflux, protracted bacterial bronchitis, tuberculosis, pertussis, passive smoking, immunodeficiencies, cardiac and congenital abnormalities (e.g. vascular ring, airway malacia, tracheo-oesophageal fistula). A wider discussion about investigation and management of chronic cough in children is beyond the scope of this article but further advice can be found elsewhere in this journal.[1]

When managing chronic cough in children, it is important to take into account their age – cough sensitivity and cough reflex change with age, airway calibre and maturation; and other settings such as the children's countries of origin and regions they are residing in. The use of paediatric-specific cough management guidelines and protocols are recommended.[2]

## Habit or psychogenic cough

In the absence of an identifiable organic cause for a persistent involuntary cough, habit (or habit-tic) cough, also known as "psychogenic" (or more recently known as "somatic cough disorder") or "functional" cough, should be considered. Although these terms are often used interchangeably they are likely to have different underlying causes. A habit (or habit-tic) cough (+/- throat clearing) often is underpinned by a combination of motor and phonic tics; whereas a somatic cough disorder ("psychogenic cough") occurs when psychological distress is translated into a physical disorder (somatisation).[3]

### Characteristics of habit cough

The mean age at diagnosis of habit cough is reported to be 10.5 years, with no apparent gender bias. At diagnosis children typically have had the cough for more than 6 months and even with treatment, will cough for a further 6 months before achieving complete resolution. With no intervention, habit cough will persist and has been reported to last for an average of 6 years in untreated children.[3]

Habit cough commonly follows a mild upper respiratory infection[4]; it may also become more apparent during times of stress, although in some cases, no apparent trigger is identified.[3] Habit cough typically comprises of a short inspiration followed by an explosive honking expiration.

There are generally two types of habit tic-like cough: i) dry, repetitive (can be up to every few seconds) and purposeless; or ii) honking, non-irritative but disruptive.[5] Children and young people with habit cough usually exhibit ''la belle indifference'' to the disruptive coughing, much to the frustration of families, teachers and classmates.

Habit cough is predominantly a day time phenomenon; it may increase with attention, and may be associated with secondary gain such as school absence. It often reduces with involvement and concentration in activity, drinking water, or sleep, despite often exhibiting its maximal severity during the evening.[3]

It is the absence of the loud repetitive honking cough during sleep that helps distinguish (though not diagnostic) habit cough from other causes. However complete absence of cough during the night is relatively rare. Occasional nocturnal cough is normal, and co-existent in common complaints such as asthma or gastro-oesophageal reflux can lead to a persistence of some coughing at night, particularly during arousals from sleep.

Habit or psychogenic cough is often linked to psychosocial stressor, and is more commonly seen in high achievers who are verbally and intellectually above average.

Occasionally, habit cough can be associated with other somatic symptoms, such as chest or throat pain, breathlessness, wheeze, stridor, nausea, vomiting, fatigue, headache, dizziness, and stress symptoms such as palpitations, hyperventilation and paraesthesia.[3] The presence of these often leads to multiple healthcare attendances and extensive investigations.[5]

Tics are fast, repetitive muscle movements leading to sudden involuntary (or difficult to control) body jolts or sounds. They can present as cough (as a form of vocal tics), often associated with throat clearing sounds, and can form a part of generalized tic disorders or Tourette's syndrome. Tics are common in childhood, typically appearing around the fifth year of life. In most cases, they improve or resolve over time. Tics can occur for no reason, or may be associated with stress, tiredness, or excitement. As with habit and psychogenic cough, bringing attention to the tic/cough may worsen it. The core features of tics include distractibility, suggestibility, variability[2]; and patients often report that tics begin with a build-up of an unpleasant sensation which is relieved by the tic – it is usually possible to suppress this urge (see "management" section).

## Investigations

Most children with a post upper respiratory tract infection cough require no investigation; 1–3 weeks of observation may allow differentiation between prolonged-acute and chronic cough[1] and investigations are generally recommended only after the 4-week mark.

Observations and detailed descriptions of the cough could help diagnose habit cough. A detailed history (onset, nature, quality, pattern, associations and precipitating factors of cough; perinatal history; family history; social history including psychosocial stressors, physical and cyber bullying, family and personal relationships; sleep pattern; environmental exposures; possible red flags for safeguarding issues) and a full clinical examination (normal respiratory examination, growth and development in habit or psychogenic cough) will provide pointers to narrow the differential diagnoses – for example, a chronic "wet" cough would suggest pathologies such as protracted bacterial bronchitis, cystic fibrosis, or primary ciliary dyskinesia. Parental report of wet vs dry cough is often accurate and correlates with investigation findings; however, their report of cough severity and frequency are often affected by the amount of sleep disturbance caused. Red flags suggesting underlying pathologies include neonatal onset, worsening cough, signs of chronic lung disease, cough associated with feeding, night sweats or weight loss. Although habit or psychogenic cough is often regarded as a diagnosis of exclusion, medical professionals should avoid unnecessary extensive investigations. Many children with habit cough are misdiagnosed and mismanaged as asthma, which is why it is important to rule in/out asthma.

First line investigations include chest radiograph (particularly in chronic or progressive cough; cough associated with other signs such as haemoptysis or features of chronic respiratory disorders) and spirometry ± bronchodilator responsiveness (BDR) or bronchial hyperreactivity (BHR); if feasible for age. These investigations are specific (positive results imply presence of disease) but not sensitive (negative results do not rule out disease). Additional tests should be individualized and performed based on clinical settings. Other potentially helpful investigations are microbiology culture and eosinophil counts on respiratory secretions and sputum. Atopy, supported by a detailed history and allergy tests (skin prick or RAST specific tests), may suggest asthma being a potential cause of cough. Other tests such as nasendoscopy, bronchoscopy, immunological tests, and investigations for gastro-oesophageal reflux, tuberculosis, *Bordetella pertussis,* and *Mycoplasma pneumoniae* may be considered – as guided by the clinical history. Once basic investigations have ruled out underlying pathologies, it is important to avoid ongoing futile tests which may reinforce any psychological problems.

In children with multiple tics (e.g. blinking, head banging, finger clicking, touching things, repeating sounds) and/or other behavioural problems, further investigations or referral for assessment for autistic spectrum disorder (ASD) and attention deficit hyperactivity disorder (ADHD) should be considered.

## Management

Children who are clinically well, with a non-specific isolated dry cough, are unlikely to benefit from pharmacotherapies for infection, asthma, allergic rhinitis or gastro-oesophageal reflux. Children should be removed from aero-irritants such as tobacco smoke,[1] and smoking cessation advice and support should be provided to the families. In 70% of otherwise well children, their cough will improve with no intervention other than education and reassurance.

Since asthma is a common and treatable cause of non-specific isolated persistent dry cough, a 2-month trial of inhaled corticosteroids – ensuring adequate dosage, delivery and adherence, may be used in young children when asthma cannot be easily ruled out. Please note that the cough in the majority of these children will improve spontaneously regardless of treatment, so any "response" to inhaled corticosteroids may be deceptive. Treatments should therefore be stopped at the end of the 2-month trial and clinical situation re-evaluated; treatments should be discontinued if the cough shows no response.

Habit or psychogenic cough may be a manifestation of stress and conflict. Following explanation, education and reassurance (most effective if directed at the children rather than the parents); parents, teachers and patients should aim to shift the focus of attention away from the cough. It is important to stress that the child is neither faking sickness nor intentionally coughing to be

troublesome. Any associated school avoidance, psychosocial or behavioural problems should be addressed simultaneously by a multi-disciplinary team.

Tools such as questionnaires, monitors and apps (Table 1) can help assess the nature and severity of cough, identifying those with anxiety or depression, who may need psychological support. These tools are also useful in monitoring treatment progress.

Hydration, cough suppression and education are the mainstay of habit cough management (Table 2). Cough suppression techniques (e.g. chin tuck swallow, Buteyko technique, sipping and swallowing, suggestion therapy) can be taught by paediatric respiratory physiologists, whose involvement in habit cough management is invaluable.

Suggestion therapy has been shown to be effective in 96% of cases,[3] achieving resolution as quickly as 15–30 minutes within the session. Other therapies such as psychotherapy, family therapy, relaxation techniques, and hypnosis may also be of use[5] – some showing resolution as quickly as within a month; with the success of hypnosis reported to be 78%.[3] The "wrapping technique" (wrapping a bedsheet around the chest tightly, while assuring patient that cough will stop; the bedsheet is only removed when coughing stops) is mentioned in the literature. However, this method is not advocated in the UK where restraint is not recommended. Coughing (violently) against a tightly wrapped sheet can result in physical trauma (e.g. rib fracture).

For children with an element of dysfunctional breathing, breathing pattern control and relaxation exercises may be of help. Voluntary behaviours incompatible with maintenance of the cough, such as diaphragmatic breathing or swallowing, can be used. Establishing nasal breathing is crucial. Mouth breathing dries out the larynx which worsens the cough. The function of the nose should be explained to patients and families. The nose warms and humidifies the inhaled air, making it more comfortable to breathe. Nasal cilia and mucus filter harmful particles. The nose slows down the air before its entrance into the larynx and lungs. Speech should be observed and adjusted accordingly – fast talking can lead to rapid deep inhalations which can irritate the larynx. There is an ample amount of resources online and on social media to support patients and families – some of these are listed in Table 3.

In the presence of multiple tics or family history for tic disorder, the child should be referred to a paediatric neurologist or psychologist and psychiatrist for further assessment and management.

With support and appropriate treatment most children get better. In a study of 55 children over the age of 6 years, diagnosed with habit/tic cough from a UK tertiary paediatric respiratory centre,[3] 82% of the children followed up had complete resolution of cough; a further 15% of them showed improvement. For the children whose families were able to recall the timing of events, 59% reached resolution within

**Questionnaires and devices to help assess nature, severity and burden of cough, and monitor progress**

| Questionnaire | Use | Details/notes |
|---|---|---|
| Hospital Anxiety and Depression Scale (HADS) | Simple self-assessment scale to identify anxiety and depression. | >12 years of age<br>Thresholds:<br>• Anxiety: ≥7<br>• Depression: ≥5<br>• Total ≥10 might indicate anxiety or depression |
| Paediatric Index of Emotional Distress (PI-ED) | Simple self-assessment scale to identify anxiety and depression. | 8–16 years of age<br>Thresholds: ≥ 20 might indicate anxiety and depression<br>Detailed analysis of this questionnaire may identify the bigger problems for patients |
| Leicester Cough Questionnaire | Clinically useful in assessing the burden of cough. | Not validated in paediatric population. |
| Cough visual analog scale (VAS) scale | Patients' assessment of cough severity ranging from "no cough" to "worst cough". | It is useful for monitoring progress and is widely used in clinical practice and research, but the use in patients with refractory or unexplained chronic cough has not been validated (8). |
| Cough monitors | Objective assessment to assess severity of cough | |
| Video and audio recordings | Useful for assessment of nature and severity of cough, and for monitoring | |
| Apps | Sleep/snoring/cough apps | Increasingly used by patients and families to monitor symptoms. Useful to observe for nocturnal cough (if any). |

**Table 1**

## A summary of management of habit/psychogenic cough

| Management | Method |
|---|---|
| Hydration | Ideally water, avoid sugar or caffeine |
| Cough suppression | 1. Chin tuck swallow, or sip water with chin tuck swallow<br>2. Buteyko technique:<br>• Smother the cough: put hand firmly over mouth.<br>• Swallow hard once.<br>• Stop, resist the urge to breath<br>• Small breath in and out through the nose.<br>• Slow gentle breathing for 30 seconds.<br>• Repeat as needed.<br>3. Sipping water:<br>• Swallow hard a few times.<br>• Sniff in quickly through the nose (warming and moisturising the air) 2 to 3 times in succession and then blow out gently through pursed lips (as if blowing through a straw — this channels the air and cushions the vocal cords to help reduce irritation<br>4. Suggestion therapy:<br>• Assure the patient with confidence that the cough will stop<br>• Explain that the cough started because of an initial irritant (e.g. viral infection) which has resolved, but the cough is now causing irritation and perpetuating further cough.<br>• Patient is instructed to focus on resisting the urge to cough for an initially brief timed period (e.g. 1 minute), which is progressively increased, with alternative distraction behaviours (e.g. sipping luke-warm water, sucking on sugar-free throat lozenges) to ease the irritation.<br>• Explain that each second the cough is delayed makes cough suppression easier — this will empower them to control the urge to cough.<br>• When ability to suppress cough is observed (usually by about 10 minutes), assure the patients that they can resist the urge to cough, ensuring positive response from them.<br>• Similar instructions (autosuggestion) can be used at home |
| Addressing any postnasal drip, hay fever allergies | 1. Nasal rinsing<br>2. Nasal sprays and anti-histamines<br>3. Ensure child can blow nose properly<br>4. Avoid allergens |
| Education | Coughing and throat clearing lead to vocal cords closure, which irritates the throat and causes more coughing. Repeated coughing results in increased mucus production as a protective mechanism for the vocal cords. The sensation of mucus on the vocal cords could trigger further coughing.<br>The repeated irritation causes airway hypersensitivity, resulting in further coughing. This vicious cycle of coughing is often difficult to break. Assure patients and families that habits (i.e. cough) can be altered. Increasing their awareness when clearing throat can help.<br>"Rash Analogy" for throat irritation: cough can be thought of as scratching a rash or a bite, the more one scratches, the worse it gets. The throat gets more irritated the more they cough, because the force of coughing can be vigorous. |
| Identifying and avoiding triggers | Keep a diary of the frequency and timing of cough.<br>Avoid allergens and areas of poor air quality.<br>Avoid active and passive smoking.<br>Reduce caffeine intake. Caffeine causes dehydration of the mucus membranes, increasing throat irritation. |
| Establishing nasal breathing and improving breathing pattern | Mouth breathing will dry out the larynx and worsen the cough<br>Explain the functions of the nose (heats, humidifies, slows air before entering the larynx and lungs, and filters air)<br>Fast talking can lead to deep fast inhalations which can irritate the larynx. |
| Other helpful tips | Sucking on sugar free lozenges may be helpful (note: sugar can irritate larynx; beware of choking risk of sweets and lozenges).<br>Relaxation: stress leads to increased stomach acid production which increases reflux, precipitating further cough. |

**Table 2**

**Helpful online resources for patients and families**

| | |
|---|---|
| Physiotherapy for breathing pattern disorder (BPD) | Guide to Cough Control www.physiotherapyforbpd.org.uk |
| Buteyko Technique | Part 1: The Stop Cough - a one minute Buteyko breathing technique. Just learn four simple steps www.youtube.com/watch?v=ZoBoo6ec4uU<br>Part 2: The Stop Cough - Buteyko breathing technique. More on how to control or reduce coughing www.youtube.com/watch?v=JvfIY9V9TEQ |
| Anxiety Canada | Fight Flight Freeze — A Guide to Anxiety for Kids www.youtube.com/watch?v=FfSbWc3O_5M<br>Fight Flight Freeze — Anxiety Explained For Teens www.youtube.com/watch?v=rpolpKTWrp4 |
| The Feelings Channel | How To Tame My Anxiety Monster www.youtube.com/watch?v=JP6qNv9Gxq8 |

**Table 3**

1 month (12% on the day; 12% within one week); 26% took 1–6 months and 12% took over 6 months to recuperation. Treatments for these children included education, reassurance, referral to respiratory physiotherapists for breathing pattern exercise and relaxation techniques. 54% of these followed up children had no cough recurrence, 44% had further mild and self-limiting episodes, usually triggered by viral illnesses or anxiety.[3]

Resolution of cough was more pronounced in those with parents who believed in the diagnosis of habit or psychogenic cough.[3] The authors found no correlation between the child's gender, age at specialist review, cough duration and likelihood of cough resolution.

Habit cough is associated with psychological comorbidity — some children may also be diagnosed with a tic disorder, functional symptoms, anxiety disorders, conversion disorder, behavioural or psychiatric disorder. It is worth remembering that some children may have both a medical illness with underlying pathology such as asthma, as well as a habit cough[4]; it is therefore important to investigate and refer appropriately in order to not miss other diagnoses.

## Case study of extreme habit cough

A 10 year old girl with an 11-month history of progressively worsening strong dry cough, following a viral lower respiratory tract infection, was referred to a tertiary respiratory service following unsuccessful management with inhaled corticosteroids in primary care. Blood tests and spirometry were normal, with no evidence of bronchodilator response. Further history revealed that the cough completely disappeared at night, so the diagnosis of habit cough was considered. The patient was referred to physiotherapy for assessment and treatment, and she was subsequently diagnosed with autism spectrum disorder.

Breathing pattern assessment showed that the patient was a chronic mouth breather. However, there were no nasal patency problems and she was able to nose breath. Her speech was rapid, with large fast inhalations after speaking 3–4 sentences, often followed by a bout of dry cough. It was observed that the patient's cough would reduce when the physiotherapist and parents were engaged in conversation, but coughing would become more prominent whenever the word "cough" was mentioned. School attendance remained good, with no report of disruptive cough or associated anxiety.

### Progress

**First session:** education (nature of habit cough, function of the nose, importance of nasal breathing, techniques to break mouth breathing habit) and reassurance on habit cough were offered.

**Second session (2 weeks later):** cough and "rash analogy" (see Table 2) explained. Patient was taught the Buteyko Cough suppression technique. The importance of hydration was explained and permission to place water bottle on school desk was sought.

**Third session (4 weeks later):** cough frequency was much improved, patient was only coughing when nervous. Throat clearing was noted, and was addressed by chin tuck swallow/sip. Fast speech and rapid oral inspiration were addressed by speech pacing during reading — pauses and gentle nasal inhalation at the end of a sentence were encouraged.

**Fourth session (8 weeks later):** patient was nasal breathing, cough had resolved, throat clearing was significantly reduced to once every few days. Patient was pacing her speech well with much improved breathing pattern, and was discharged.

## Conclusion

While there is no significant underlying pathology in habit or psychogenic cough, the symptoms can be debilitating and detrimental to patients' and their families' quality of life. It can lead to repeated healthcare attendances, school absences, and is a major source of anxiety in both children and parents. While pharmacotherapy has limited effect, behavioural therapies have been shown to be effective in most cases. Habit or psychogenic cough should always be included in the differential diagnoses of chronic cough, especially when conventional treatments for common causes of cough such as asthma, gastro-oesophageal reflux, sinusitis and postnasal drip have failed. Correctly identifying habit cough and providing appropriate treatment can reduce unnecessary interventions and treatments, as well as iatrogenic complications such as side effects of long term steroids. ◆

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