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## Trichotillomania

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### Abstract

Trichotillomania, characterized by the repetitive pulling out of one's own hair leading to hair loss and functional impairment, has been documented in the medical literature since the 19<sup>th</sup> century, but has received scant research attention. Community prevalence studies suggest that trichotillomania is a common disorder with point prevalence estimate of 0.5% to 2.0%. Although recently grouped with OCD in the DSM-5, clinicians need to be aware that trichotillomania and OCD may have less in common than originally thought. In fact, approaches to treating trichotillomania, which include habit reversal therapy and medication (*n*-acetyl cysteine or olanzapine), are quite different from those used to treat OCD; and some first-line treatments used for OCD appear ineffective for trichotillomania. Based on our clinical experience and research findings, the article recommends several management approaches to trichotillomania.

### Case Vignette

“Ms. G” is a 22 year-old single female who pulled hair from the crown of her head on a daily basis. She began pulling at her eyebrows at age 14 years but the pulling shifted to her head and became a daily routine during the preceding three years. Ms G. tended to pull hair during times of stress, but only on approximately 50% of occasions was aware she was doing it. The rest of the time, she reported that she pulled “automatically” and would notice a pile of hair on the floor or on her desk when she had “snapped out of it”. Ms. G often pulled for one to two hours each day. The “urge” to pull immediately preceded or was simultaneous with touching the hair, and she reported that she was generally unable to resist this urge. The pulling episode usually ended when she felt the “right” tugging sensation and then saw a “good” root. She would then play with the hair, caressing her lips with the hair shaft and the root and then ingest the hair. The feeling of accomplishment from the pulling quickly turned into shame and embarrassment. Because of the alopecia from pulling, Ms. G never dated and limited her social activities to only a few friends. She had never sought help for her pulling prior to finding information about it on a website. On examination, Ms. G had a 3-inch diameter area of alopecia on the crown of her head. Despite swallowing hairs on occasion, there was no evidence of gastrointestinal problems. Ms. G met the diagnostic

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criteria for trichotillomania, and over the course of the next several weeks, underwent twelve sessions of habit reversal therapy and was treated with n-acetyl cysteine. Ms. G was able to reduce her pulling to only 5- 10 minutes every several days which she has generally maintained for over a year.

## Introduction

Trichotillomania (hair pulling disorder) is an often debilitating psychiatric condition characterized by recurrent pulling out of one's own hair, leading to hair loss and marked functional impairment (1–2). Although discussed in the medical literature for over a century (3), trichotillomania was not officially included as a mental health disorder in the American Psychiatric Association's Diagnostic and Statistical Manual until the DSM-III-R (1987) when it was classified as an Impulse Control Disorder Not Elsewhere Classified. In the 5th edition of the DSM (DSM-5) (4), trichotillomania was included in the chapter on Obsessive-Compulsive and Related Disorders with obsessive compulsive disorder (OCD), excoriation disorder, body dysmorphic disorder, and hoarding disorder.

The current diagnostic criteria for trichotillomania are: 1) recurrent pulling out of one's hair, resulting in hair loss; 2) repeated attempts to decrease or stop hair pulling; 3) the hair pulling causes clinically significant distress or impairment in social, occupational, or other important areas of functioning; 4) the hair pulling or hair loss is not attributable to another medical condition (e.g., a dermatological condition); and 5) the hair pulling is not better explained by the symptoms of another mental disorder (e.g., attempts to improve a perceived defect or flaw in appearance in body dysmorphic disorder) (4).

## Epidemiology

Nationwide epidemiological studies of trichotillomania are lacking, but small studies examining the prevalence of trichotillomania among college students in the United States, adolescents in Israel, and older adults within the community have found point prevalence rates ranging from 0.5% to 2.0% (1,5–6). In adults, trichotillomania appears to have a large female preponderance (4:1 female:male). In childhood, the sex distribution has been found to be equal (5,7). These studies further demonstrate that as a behavior, hair pulling appears to be quite common and often presents along a continuum from mild to severe. When hair pulling meets criteria for trichotillomania, as in the case vignette, interventions should be considered.

## Clinical Description

The typical age of onset for trichotillomania is remarkably consistent across studies, usually at a young age (10-13 years) (8–10). This peak age of onset appears to be consistent across different cultural settings (2,6).

In trichotillomania, pulling can be undertaken at any bodily region with hair, but the scalp is the most common site (72.8% of patients) followed by eyebrows (56.4%), and pubic region (50.7%) (2). Triggers to pull may be sensory (e.g., hair thickness, length, and location, and physical sensations on scalp), emotional (e.g., feeling anxious, bored, tense, or angry), and

cognitive (e.g., thoughts about hair and appearance, rigid thinking, and cognitive errors) (8). Many patients report not being fully aware of their pulling behaviors – at least some of the time – a phenomenon known as “automatic” pulling; “focused” pulling, in contrast, generally occurs when the patient sees or feels a hair that is “not right”, or that the hair feels coarse, irregular, or “out of place” (11).

Psychosocial dysfunction, low self-esteem and social anxiety are all associated with trichotillomania largely due to an inability to stop pulling and the resulting alopecia (7,12). Individuals frequently report failure to pursue job advancement or avoidance of a job interview because of the pulling (2). Nearly one-third of adults with trichotillomania report a low or very low quality of life (13).

Trichotillomania may result in unwanted medical consequences. Pulling of hair can lead to skin damage if sharp instruments, such as tweezers or scissors, are used. Over 20% of patients eat hair after pulling it out (“trichophagia”), which can result in gastrointestinal obstruction and the formation of intestinal hair-balls (“trichobezoars”) requiring surgical intervention in extreme cases (14).

## Screening for Trichotillomania

Although the course of illness may vary, when untreated, trichotillomania is commonly a chronic disorder with fluctuations in intensity over time (1). Two studies of adults with trichotillomania found a mean illness duration of 21.9 years (14–15). Individuals report that the symptoms of their pulling, although waxing and waning in intensity, frequently persist without treatment.

Seeking help from a mental health clinician is uncommon among individuals with trichotillomania. In fact, one study found that of 1048 individuals, only 39.5% had sought treatment from a therapist and only 27.3% sought treatment from a psychiatrist (2). One reason for this low rate of treatment seeking seems to be that vast majority of individuals with trichotillomania (87%) feel that providers know little about the disorder. Other reasons for non-treatment seeking can include feelings of shame and embarrassment, lack of awareness that hair pulling constitutes a recognized medical condition, and fear of professionals’ reactions.

Trichotillomania occurs with a variety of other disorders such as major depressive (39-65%), anxiety (27-32%), and substance use (15-19%) disorders (11,16–17). Where data regarding age of onset are available, trichotillomania generally begins at an earlier age than these co-occurring disorders (18). A study of 894 individuals with trichotillomania found that 6.0% used illegal drugs, 17.7% used tobacco products, and 14.1% used alcohol to relieve negative feelings associated with pulling (2). Additionally, 83% of subjects reported anxiety and 70% reported depression due to pulling (2). Therefore, clinicians must screen for both trichotillomania as well as the secondary manifestations of the behavior if treatment is to be successful.

Trichotillomania is often misdiagnosed as obsessive compulsive disorder (OCD). Rates of co-occurring OCD are significantly higher in individuals with trichotillomania (13-27%)

(11,16–17) than those found in the community (1-3%) (19–20), and rates of trichotillomania among individuals with OCD have ranged from 4.9% to 6.9% (21–22) which is greater than the rate of 0.5%-2.0% found in the community. The repetitive motor symptoms of hair pulling share some similarity with the repetitive compulsive rituals in OCD (23). These findings raise the possibility of an underlying common neurobiological pathway, but several lines of evidence suggest that trichotillomania is distinct from OCD. Individuals with trichotillomania are more likely to be female, report higher rates of co-occurring body focused repetitive behavior disorders such as skin picking or compulsive nail biting, and are more likely to have first-degree relatives with picking or nail biting (11). Additionally, compulsions in OCD are often driven by intrusive thoughts; by contrast, hair pulling is seldom driven by cognitive intrusions and obsessional thoughts are not listed in the diagnostic criteria. While trichotillomania symptoms typically initiate in early adolescence, OCD usually initiates in late adolescence (24). Treatment approaches also differ – for example, with exposure and response prevention being used for OCD, and habit reversal for trichotillomania; and with selective serotonin reuptake inhibitors (SSRIs) showing efficacy in the treatment of OCD but not, generally, in trichotillomania (25).

### Possible Pathophysiology of Trichotillomania

Data regarding the pathophysiology of trichotillomania are limited, but there is a familial component. Several family studies have reported elevated rates of trichotillomania in first-degree relatives of probands with trichotillomania, along with elevated rates of mood and anxiety disorders (17). In a recent study, Keuthen and colleagues found that the relatives of probands with trichotillomania had higher recurrence risk estimates for hair pulling (26).

Animal models represent useful tools for investigating the pathophysiology of trichotillomania particularly those which mimic the behavioral and clinical manifestations of the disorder. Three models in particular exhibit markedly elevated grooming: the HoxB8 knockout mouse (27), the SAPAP3 knockout mouse (28), and the SliTrk5 knockout mouse (29). The potential relevance of SAPAP3, in particular, to trichotillomania is reinforced by the finding that rare variations in the SAPAP3 gene are associated with human disorders such as hair pulling (30).

A few small neuroimaging studies have examined possible structural brain findings in trichotillomania, most of which have been ‘region-of-interest’. One study measured caudate volumes in trichotillomania (n=13) versus controls (n=12), and reported no significant between-group differences (31). Another study found reduced left inferior frontal gyrus and increased right cuneal volumes in patients with trichotillomania (n=10) versus controls (n=10) (32), one found smaller left putamen volumes in patients (n=10 per group) (33), and another study identified reduced cerebellar volumes in trichotillomania subjects (n=14) compared to controls (n=12) (34). In a study examining changes across the whole brain, patients with trichotillomania (n=18) exhibited grey matter density increases in several brain regions involved in affect regulation, motor habits, and top-down cognition (i.e. left caudate/putamen, left amygdalohippocampal formation, bilateral cingulate and right frontal cortices) compared to controls (n=19) (35).

Only one study has examined whether trichotillomania is also associated with aberrant white matter tracts, using diffusion tensor imaging. In that study, individuals with trichotillomania showed reduced fractional anisotropy in white matter tracts associated with bilateral anterior cingulate cortex, bilateral orbitofrontal cortex, pre-supplementary motor area, the left primary somatosensory cortex, and multiple temporal regions (36). Together, white matter connectivity and grey matter volumetric results in these regions implicate disorganization of neurocircuitry involved in motor habit generation and suppression, along with affective regulation, in the pathophysiology of trichotillomania.

There have been only three functional neuroimaging studies in people with trichotillomania. In the first study, functional MRI and the serial reaction time task were used to assess striatal and hippocampal activation during implicit sequence learning in participants with trichotillomania (n=10) compared to healthy controls (n=10). The study failed to find any significant differences in implicit learning, or in striatal or hippocampal activation, as had been found in OCD (37). A second study of adults with trichotillomania exhibited dampening of nucleus accumbens responses to reward anticipation (but relative hypersensitivity to gain and loss outcomes) as compared to controls (38). Finally, in the only study of children (aged 9 – 17 years) with trichotillomania (n=9) and healthy controls (n=10), those with trichotillomania exhibited significantly greater activation in left temporal cortex, dorsal posterior cingulate gyrus, and putamen during a visual symptom provocation, and greater activation in the precuneus and dorsal posterior cingulate gyrus during a visual and tactile provocation (39).

In terms of psychological etiology, it has been suggested that hair pulling may regulate emotional states or stressful events. Pulling may function as a means for a person to escape from or avoid aversive experiences, and temporary relief from these negative emotions may maintain the behavior through a negative reinforcement cycle (40). Studies that have measured emotional regulation in individuals with and without pulling found that these individuals have greater difficulty regulating negative affective states than controls (41). Boredom may also trigger pulling in some individuals. This has led some to hypothesize that pulling may similarly help to modulate negative emotions brought on by a feeling of perfectionism characterized by unwillingness to relax (42). This theory suggests that perfectionism leads to feelings of frustration, impatience, and dissatisfaction when standards are not met, particularly when experiencing boredom because productivity is impossible. Pulling may therefore function as a means of releasing tension generated by these emotions.

## Evaluation and Treatment

### Evaluation

Albeit the diagnosis of trichotillomania is fairly straight forward, a thorough examination is necessary, particularly when the person admits to ingesting hair or when such behavior is suspected. Approximately 5%-20% of individuals with trichotillomania engage in trichophagia, or the ingestion of hair (1,14,17). How many individuals with trichophagia develop trichbezoars is unclear with some studies suggesting it is extremely rare while others report frequent occurrences. (

The question of when trichophagia requires immediate medical attention is unfortunately unclear. Many people with trichophagia do not develop trichobezoars. Those who do, however, are potentially at risk of severe complications or even death. Based on the available literature, we therefore recommend a high standard of physical investigation for anyone eating their hair, but particularly those who present with any of the following symptoms: abdominal or epigastric pain, chest discomfort, change in stool color to dark green-to-black color, vomiting, unexplained weight loss, or diarrhea or constipation. The evaluation should include abdominal examination, particularly to check for left upper quadrant mass, blood test to assess for anemia, and consideration of an abdominal CT scan which is diagnostic in 97% of trichobezoar cases.

## Interventions

Individuals with trichotillomania rarely seek psychological or psychiatric treatment for their condition. Patients avoid seeking treatment due to social embarrassment or due to a belief that their condition is just a “bad habit” or that it is untreatable. Without treatment, response rates in adults are low (approximately 14%) (2). When diagnosed early and appropriately treated, however, up to 50% of individuals may experience symptom reduction at least for the short term (43).

The evidence base for psychotherapy for trichotillomania is small but suggests the use of behavioral therapy. Behavioral therapy for trichotillomania has generally used habit reversal therapy (HRT) and has sometimes included components of acceptance and commitment therapy and dialectical behavior therapy as well (44). There are seven controlled studies of behavioral therapy, using HRT alone or with other components, for trichotillomania

Habit reversal therapy (HRT) was first developed approximately 40 years ago by Azrin and Nunn for the treatment of nervous habits and tics. Typically HRT is conducted on a weekly basis, although higher severity of the disorder may necessitate more frequent sessions. HRT has shown benefit in many different frequency formats and anywhere from 4-22 sessions (usually 60 minute sessions) may be helpful. The core aspects of HRT include self-monitoring (i.e., asking the patient to track his/her hair pulling, picking, etc.), awareness training, competing response training, and stimulus control procedures (i.e., modifying the environment to reduce cues for hair pulling or skin picking). HRT appears to be superior to wait list and minimal attention control based on controlled studies. In addition, HRT has shown benefit with the addition of components of acceptance and commitment therapy and dialectical behavior therapy (2,45). HRT can be delivered in person, online using a self-help method, or in a group format (46). Acute treatment gains obtained from HRT have been generally maintained from three to six months. Although in practice many clinicians use a combination of HRT and more traditional cognitive therapy, the empirical data support HRT as the first-line psychotherapy treatment for these disorders.

In terms of medication options, there are currently no pharmacotherapies that would be universally accepted as first-line treatments for trichotillomania. A recent Cochrane review concluded that although clomipramine has demonstrated some benefit for trichotillomania, there is no strong evidence of a treatment effect for the selective serotonin reuptake inhibitors (SSRIs) (47).



Other agents that might be beneficial for trichotillomania include glutamatergic agents, antipsychotic medications, and cannabinoid agonists. In terms of glutamate agents, N-acetylcysteine (NAC) has demonstrated benefit in a double-blind placebo-controlled study for trichotillomania using a dose of 1200mg twice a day and giving it approximately 9 weeks to work (48). Side effects with NAC are generally mild and usually only involve some bloated feelings and flatulence. The antipsychotic, olanzapine, has also been studied in one small (n=23) double-blind, placebo-controlled trial. After 12 weeks using a mean dose of 10.8 mg/day, olanzapine significantly reduced symptoms of trichotillomania (49). Olanzapine has been associated with metabolic syndrome and so the decision to use it in the treatment of trichotillomania needs to be tempered by its adverse side effect profile. Finally, an open-label study of dronabinol, a cannabinoid agonist, demonstrated marked reductions in trichotillomania symptoms during a 12-week trial using a mean dose of 11.6 mg/day (50). Dronabinol, a generally well tolerated medication at these low doses with only slight sedation, may be a promising option, but without a controlled trial the results must be viewed cautiously.

## Summary and Recommendations

If untreated, trichotillomania is a chronic illness that often results in substantial psychosocial dysfunction and that can, in rare cases, lead to life-threatening medical problems. Control of the hair pulling is therefore critical for maintaining long-term health and quality of life. Based on our clinical experience and research findings, we suggest the following management strategies:

1. Begin with a thorough psychiatric assessment to establish an accurate diagnosis and to assess for co-occurring psychiatric disorders;
2. Thorough medical evaluation if the person admits to ingesting hair to assess for possible gastrointestinal blockage;
3. Provide education about the disorder to the patient, including possible etiologies, and treatment risks and benefits; and
4. Provide Habit reversal therapy to treat trichotillomania. Habit reversal therapy has demonstrated benefit for trichotillomania but finding someone trained in habit reversal therapy is essential for appropriate treatment outcomes. The Trichotillomania Learning Center provides a list of behavioral therapists by geographical region ([www.trich.org](http://www.trich.org))
5. In terms of pharmacotherapy, there is no evidence that SSRIs are beneficial for trichotillomania. Based on our clinical experience, and on findings from a double-blind study, we find that N-acetyl cysteine in doses of 1200mg twice a day has been quite helpful in reducing urges to pull and probably should be considered as the initial pharmacotherapy treatment.
6. Since treatment response is often only partial, attending to quality of life and long-term functioning is critical.

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