

Pathologic Hairpulling, Skin Picking, and Nail Biting

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Background. Pathologic hairpulling (HP), skin picking (SP), and nail biting (NB) are repetitive, intentionally performed behaviors that cause noticeable hair loss or substantial physical damage, and result in clinically significant distress or functional impairment. To date, HP, SP, and NB have received little attention in the psychiatric literature despite being widespread behaviors.

Methods. The present article reviews the up-to-date research findings on these three forms of pathologic behavior, highlighting their similarities and differences.

Results. Despite HP, pathologic grooming behaviors have not yet been explicitly included in the diagnostic nomenclature. Phenomenology, triggers, consequences and functionality of HP, SP, and NB are similar, which suggest their joint diagnostic categorization. Sufferers often fail to admit the self-inflicted nature of their physical damage out of shame and embarrassment, which complicates the recognition and differential diagnosis of sufferers. Thus, practitioners need to be particularly attentive to physical signs possibly related to these behavior disorders.

Conclusions. Research suggests that HP, SP, and NB are underrecognized problems that occur on a continuum ranging from mild to severe. Further research is needed, especially regarding the etiology of pathologic HP, SP, and NB, to foster the development of both effective and long-lasting treatments and prevention strategies.

Keywords Trichotillomania, Hairpulling, Skin picking, Nail biting, Body focused repetitive behaviors

INTRODUCTION

Hairpulling (HP), skin picking (SP), and nail biting (NB) are grooming behaviors that have often been reported to widely occur in their milder forms. Especially in childhood and early adolescence, episodes of recurrent HP and NB are common and are often accompanied by spontaneous remissions (1–3). Although first identified some time ago, these problem behaviors remain underrecognized and poorly understood in their more severe, pathologic forms. Pathologic HP, SP, and NB have been defined as repetitive, intentionally performed behaviors that cause noticeable hair loss or substantial physical damage and result in clinically significant distress or functional impairment. The current paper aims to provide an overview of the up-to-date research findings on these three

forms of pathologic behavior, highlighting their similarities and differences.

Diagnostic Criteria and Conceptualizations

Pathologic HP (i.e., trichotillomania) is currently classified as an impulse-control disorder in the *Diagnostic and Statistical Manual of Mental Disorders, 4th edition DSM-IV*. The diagnostic criteria for trichotillomania are: (A) recurrent pulling of one's own hair causing noticeable hair loss; (B) rising tension before, or when attempting to resist, hairpulling; (C) pleasure, relief or gratification while hairpulling; (D) the hair pulling may not be better accounted for by another psychiatric or somatic disorder; and (E) the hair pulling causes clinically significant distress or impairment in social, occupational or other important areas of functioning. Increasing tension before pulling and/or pleasure, relief or gratification while pulling are not endorsed by about 20% of people suffering from clinically significant hairpulling (5).

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This finding has led to the recommendation that these two criteria be excluded from the diagnostic specifications (6).

Although phenomenologically similar to pathologic HP, SP, and NB still lack their own diagnostic category in the DSM-IV. Repetitive SP may cause severe tissue damage. It has been described in the dermatological literature under a variety of names (e.g., dermatillomania, neurotic excoriations) but has received little empirical attention. It often takes the form of a grooming ritual in which the sufferers try to remove small irregularities of the skin (e.g., pimples). In more severe cases the individuals dig deep into their skin which can result in visible disfigurement (7).

NB (onychophagy) implies an insertion of the fingers (and less frequently toes) into the mouth with contact between the nail and teeth. As a form of self-grooming behavior, the length of nails is controlled by the teeth rather than nail scissors. In its severe forms nails are bitten frequently and high in intensity "beyond the free edge, with the nail margin below the soft tissue border," which can lead to serious morbidity (8).

To be classified as primary pathologic SP or NB, the behavior should not be better accounted for by another psychiatric illness, such as a delusion of parasitosis, dementia, or mental retardation (e.g., Prader Willi Syndrome). In addition it should not be the result of a dermatologic or physical illness (e.g., itch-provoking neurodermatitis, psoriasis, diabetes mellitus, or leukemia). Adequate evaluation of sufferers and cross-study comparisons of research findings is complicated by the different diagnostic definitions and classifications that have been utilized for SP and NB. These include impulse-control disorder (like pathologic HP), stereotypic movement disorder, and obsessive-compulsive disorder (9).

Pathologic HP, SP, and NB, have also been conceptualized as part of the obsessive-compulsive spectrum, which is defined as a group of disorders sharing features with obsessive-compulsive disorder (OCD) including phenomenology, clinical course, co-morbidity, family history, and/or treatment response (10). Like OCD, these disorders are characterized by the repetitive, intentional performance of behavior, which sufferers perceive as difficult to resist despite knowledge of potential adverse consequences. Furthermore, the compulsions in OCD, as well as the pathologic behaviors in HP, SP, and NB, appear related to negative affective states (7,8,11). In addition, there is evidence that the neurotransmitter serotonin plays a role in each of these disorders, given their similar responses to the class of medications known as serotonin reuptake inhibitors (1,7,12,13).

Similar to pathologic HP, many sufferers from SP and NB report increasing tension beforehand and feelings of relief while performing the pathologic behavior (7,14). Thus, although researchers have considered recurrent SP, NB, and HP as compulsive, (15) recent studies support the perspective that they have both compulsive and impulsive features, and should therefore be seen as part of a compulsivity-impulsivity spectrum (16,17).

Moreover, NB, SP, and HP have also been conceptualized as mild forms of self-mutilation (8). Favazza and colleagues

have considered these behaviors to be superficial, compulsive self-mutilations, that are repetitive, ritualistic, and typically occur in multiple episodes (15). In contrast to other (more severe) forms of self-harming behaviors, individuals suffering from HP, SP, and NB generally fail to express suicidal or parasuicidal intentions and lethality is low.

Epidemiology

The prevalence rates of clinically significant forms of HP, SP, and NB are difficult to estimate in the absence of consensually agreed-upon definitions of these problems. Current research, however, suggests that the severe, debilitating forms of these pathologic grooming behaviors are quite frequent. For pathologic HP, prevalence rates of 1–3% have been estimated (18) and about 2–4% for pathologic SP (19). For NB, the prevalence estimates are higher (14–48%) (8); however, these numbers are likely exaggerated due to poor differentiation between its pathologic and mild forms in many research studies.

More women than men have been reported to suffer from pathologic HP and SP, a finding based in part on the predominance of females in patient samples (9,20). In contrast, in severe NB a more balanced gender distribution (with a trend towards an even higher prevalence in men) has been reported (3). It may well be the case that the gender ratios in the HP and SP populations differ from that in NB sufferers. Alternatively, one may speculate that these findings simply reflect the populations studied, the severity of the problem behavior, and the age of the study cohort. NB has been mainly investigated in nonclinical populations while HP and SP have been more often studied in clinical populations (8,9,21). Thus, both genders may be equally affected by these pathologic behaviors but the female proportion may be exaggerated in clinical populations given the higher propensity for females to pursue treatment (22,23). Additionally, the gender ratio in samples with milder forms of pathologic behaviors (such as the findings for mild NB) might differ from the ratio in samples with its more severe form. Lastly, the prevalence estimates for NB have been based primarily on younger samples than the estimates for HP and SP (3). The younger age might affect the gender ratio given other evidence citing a more balanced gender distribution in younger children suffering from HP (24).

In pathologic HP and NB, a bimodal distribution has been found with peaks during early puberty (11–13 years of age) and in early childhood (2–6 years). And for the latter type a high rate of spontaneous remission has been reported in both HP and NB (24,25). Alternatively, in the late onset type, these behaviors tend to persist if untreated (3,26). Research findings on the relationship between severe SP and age, however, have been contradictory. For this disorder age peaks have been reported alternatively in the early 20s or between 30 and 45 years of age (9). Regardless of the age at onset, SP has been reported to be chronic, with a reported average duration of up to 21 years (7).

Clinical Presentation

Severe HP, SP, and NB are commonly triggered by similar stimuli including tension (often associated with negative feelings), specific postures (e.g., leaning the head on the hand in HP, folding hands in NB), and certain tactile or visual cues (e.g., touching irregular fingernails in NB, perceiving imperfect skin in SP) (3,5,7,16,27). In some cases specific thoughts (e.g., “these gray hairs have to go” in HP) might also function as triggers (27). HP, SP, and NB are all performed primarily when alone and often in sedentary situations when the mind is focussed elsewhere and the hands are idle (3,5,7,16).

The pathologic behavior may fluctuate in frequency and intensity between and within individuals. Weeks and months may pass with an individual being nearly or completely free of HP, SP, or NB but then experiencing a sudden and extensive relapse. Episodes may last a few minutes or up to several hours. They may occur infrequently or routinely several times each day. The pathologic behavior may follow a specific ritual or, alternatively, the individual may lack awareness of problem occurrence (3,5,7,16,27).

One or more body areas might be involved, with some areas more commonly the focus of the problem behavior (Table 1). The scalp, eyelashes and eyebrows are most often involved in HP (5), the face is most often involved in SP (7), and the fingernails are predominantly affected in NB (3). Some individuals may also pull hair (or pick skin) from other people or pets (clinical experience of the authors, SW and NK) (5). The picked tissue, nail or hair may be discarded immediately, but may also be utilized for sensual stimulation (e.g., of the lips) or may be swallowed (5,9).

Recurrent HP, SP, and NB generally result in significant physical and social consequences. Physical consequences in severe HP include the formation of potentially lethal trichobezoars (gastrointestinal hair balls from eating hair), dental erosion from chewing hair, and irreversible traumatic damage to the hair root potentially resulting in permanent hair loss (28). In severe SP, sufferers might dig deeply into their skin with potential life-threatening severity (29). More often the SP results in serious infections, lasting scars, and even visible disfigurement (7). In severe NB, dental complications, chronic infections and scars have been frequently described as significant physical consequences which sometimes require surgery (8). The repeated, and sometimes awkward, postures and behaviors involved in these disorders can result in repetitive motion injuries (30).

Social consequences to severe HP, SP, and NB often include shame and social avoidance, as well as sometimes repugnance among those who come into contact with the sufferer (31,32). Sufferers often feel ashamed by their inability to control the pathologic behavior and its physical consequences, and many suffer from low self-esteem (33). Intimate relationships are often avoided, which can cause or worsen depressive mood. Many individuals report considerable time lost to the pathologic behavior and in efforts to cover up damage to their appearance (5,7,28). Furthermore, sufferers may avoid doctors' appointments (e.g., dentists, gynecologists, internists, ophthalmologists) as a result of their shame over their self-inflicted physical damage (28,30). In turn, this might even worsen associated medical problems.

Obstacles to Recognizing Pathologic HP, SP, and NB

In general, sufferers from pathologic HP, SP and NB often fail to report/admit the self-inflicted nature of their physical damage out of shame and embarrassment (28). They may hide their problems from even their closest friends and family, or deny the behavior entirely. In addition to efforts to camouflage the physical sequelae of these problems (e.g., wearing bandages, covering clothes or make-up), sufferers often avoid doctors' appointments because they are afraid to reveal their hidden secret. These factors complicate the recognition and differential diagnosis of sufferers, and, thus, require practitioners to be particularly attentive to physical signs possibly related to these behavior disorders (Table 2). Clinicians may help sufferers by interviewing them with empathy and knowledgeable expertise regarding the nature and cause of these problems after excluding medical explanations for their physical damage.

Since pathologic HP and NB often begin in childhood or early adolescence, pediatricians are often the first medical professionals to have contact with sufferers. If the patient is too young, or unwilling to talk about the condition, interviewing parents (and teachers) and educating them about these pathologic behaviors may help to determine whether the physical damage could be self-inflicted. Since these behaviors might “serve an important function for developing children [...] it may be important [...] to consider the functions of the behaviors before [...] try[ing] to force the child to stop engaging in them. [...] At least some of the time these behaviors could serve as a marker for a negative mood state in a child.” (1). Thus, it is important to examine the reasons why the child

Table 1 Clinical Presentation and Behavioral Functions in Pathologic HP, SP, and NB

	HP	SP	NB
Pathologic behaviors	Pulling, Breaking, Eating	Squeezing, Scratching Biting, Rubbing, Digging	Biting, Tearing
Body parts possibly affected	Scalp Eyebrows, Eyelashes, Pubic hair, Facial hair/beard, Extremities	Face, Scalp, Pubic area, Breasts, Back, Extremities	Fingernails, Toenails
Common motives	Tension reduction, Emotion regulation, Remove irregularities	Tension reduction, Emotion regulation, Remove irregularities, Improve appearance	Tension reduction, Emotion regulation, Remove irregularities

engages in the behavior so that one may best help/teach the child to find a appropriate functional alternative to it.

In internal medicine and primary care, adult sufferers might be seen more frequently than young sufferers. Adult cases often exhibit more chronic cases with less chances of spontaneous remission. Physical damage might be more severe in these chronic cases. Other than notable changes in physical appearance (such as excoriation or hair loss), serious internal medical complications may be present that need recognition and treatment. For example, in pathologic HP internists may find trichobezoars (hairballs) in the stomach or intestines from repetitive swallowing of extracted hair, which could result in possibly life-threatening consequences (34).

Dermatologists might also commonly come in contact with sufferers of pathologic HP, SP, and NB as all these behaviors lead to serious tissue damage causing inflammation, infections, scars, and eventually keloids. In addition to physical disfigurement and greater damage to the soft tissue surrounding the nails, chronic cases of pathologic NB frequently present with recurrent paronychia, onychodystrophia and pigmentation of the nails (3,8). In pathologic SP, sufferers may recurrently dig into their skin leading to deep craters (7) and subsequently seek medical help (e.g., cosmetic surgery) to address the visible disfigurement. Pathologic HP sufferers may seek out dermatologists for hair re-growth or growth-speeding medications.

Dentists, orthopedists, gynecologists and obstetricians may also be attentive to physical signs of the behavior disorders. Pathologic HP sufferers may present with gingivitis and dental erosion from hair chewing (26). Individuals with chronic NB may suffer from cranio-mandibular dysfunction and higher root resorption due to the excessive pressure (8). Orthopedists might recognize carpal tunnel syndrome due to excessive HP (30) and osteomyelitis resulting from direct infection of the bone underlying the nail in NB (8). Partial or complete loss of pubic hair, or excoriation in the pubic area, might be a sign of pathologic HP or SP visible only to gynecologists and obstetricians. In addition, pathologic HP frequently starts around the time of menarche and some female sufferers from pathologic HP and SP experience exacerbation of symptoms dependent on their menstrual cycle (7,35).

Comorbidities

These pathologic behaviors may trigger, consequate, or independently co-occur with other psychological problems. In pathologic HP, which has been much more thoroughly investigated than SP and NB, about 80–90% of sufferers are thought to have at least one comorbid psychiatric condition (26). For all three behavior disorders, comorbid depression and anxiety disorders have frequently been reported, as well as body dysmorphic disorder (i.e., preoccupation with an imagined or slight defect in one's physical appearance) and OCD in HP and SP sufferers (5,7,8,16). In addition, these three pathologic behaviors often co-occur with each other (3,36,37). The co-occurrence of additional psychological problems might impede the diagnosis of these behavior disorders and complicate their treatment.

Etiology and Maintenance

Although research on pathologic HP, SP, and NB has increased greatly over the past decade, knowledge about the etiology of these disorders remains sparse. Early models of etiology have mainly been psychoanalytic in nature, generally explaining the pathologic behaviors as the result of unresolved (intra-psyhic) conflicts and suppressed aggression. To date, none of these models have been empirically validated (8).

Ethologic models have been proposed which conceptualize pathologic HP, SP, and NB as disorders of abnormal grooming. Similar behaviors, so called derived activities, have been observed in animals in times of stress (e.g., acral lick dermatitis in dogs, avian feather picking in birds) (38,39). The function of derived activities is defined as providing relaxation via the performance of an irrelevant activity. This activity releases tension which occurred due to an irresolvable conflict of two antagonist drives or an unsatisfiable desire (40).

In contrast, learning theorists propose that HP, SP, and NB be considered acquired habits that are not necessarily related to

Table 2 Possible Physical Signs and Medical Complications in Pathologic HP, SP, and NB

	HP	SP	NB
Skin	Infections, Scars	Inflammation, Scars, Excoriation, Keloids	Inflammation, Scars, Excoriation, Keloids
Hair	Self-inflicted alopecia, Thinning hair, Damage to hair follicle		
Nails			Paronychia, Onychodystrophia, Pigmentation
Mouth	Gingivitis, Dental erosion		Higher root resorption, Cranio-mandibular dysfunction
Musculoskeletal	Carpal tunnel syndrome		Osteomyelitis
Gastrointestinal	Trichobezoars, Trichophytobezoars		

underlying emotional conflicts. They hypothesize that these pathologic behaviors are maintained by operant reinforcement, most likely negative reinforcement. This means that the pathologic behavior is maintained or even exhibited more frequently because it is effective in reducing aversive affective states (11). In addition, pathologic HP, SP, and NB might, like other self-harming behaviors, also be positively reinforced by the release of endogenous opioids (41). Hormonal factors may also play a role in grooming disorders, indeed they can induce grooming in preclinical models (42). For example, hairpulling often begins around time of menarche, and in both HP and SP some women experience premenstrual exacerbation of symptoms (7,35,43). In summary, HP, SP, and NB might be stress management strategies, albeit dysfunctional, that are directly available and immediately effective in reducing aversive affective states, though at the cost of moderate self-harm and long-term aversive social and psychological consequences.

Therapy

Medical and non-medical treatments may be effective in the treatment of pathologic HP, SP, and NB. Antidepressant medications with serotonergic properties (e.g., clomipramine and serotonin reuptake inhibitors, SRIs) are in many cases effective in reducing the pathologic behaviors (44–46). Dopamine-blocking neuroleptics seem to be especially useful as an augmenting agent with SRIs (47). In addition, lithium (48) and the opiate-antagonist naltrexone (49) have also been reported to be helpful in some cases. Medications, however, are not effective with all sufferers from these pathologic behaviors and may lose their efficacy over time.

HP as well as NB have also been shown to respond to behavioral treatment. Habit reversal training (HRT) is considered the first-line intervention for these problems (50–52). HRT is a multi-component treatment package which entails, among other techniques, self-monitoring of urges and behavior, incompatible response training, and coping skills training (53). Awareness of habit occurrence and training in the use of alternative coping responses are viewed as critical treatment steps. In addition, relaxation techniques and stimulus control procedures have also been successfully integrated into treatment (54).

CONCLUSION

Pathologic HP, SP, and NB have long been considered to be rare and benign problems. Most clinicians report seeing only one or two cases throughout their career. This situation most likely reflects a lack of awareness of the disorder by clinicians, who fail to inquire about the behavior even when presented with suggestive clinical evidence. Public awareness of these common and debilitating disorders should be increased so that sufferers can be correctly diagnosed by professionals in the

health care system, less stigmatized by the lay public, and encouraged to seek treatment for their problem. Further research is needed, especially regarding the etiology of pathologic HP, SP, and NB, to foster the development of both effective and long-lasting treatments and sorely needed prevention strategies.

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