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Self-induced dermatoses: A great imitator

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Abstract The self-induced dermatoses represent about 2% of dermatology patient visits, and include the recurrent body-focused repetitive behaviors (BFRB) (skin-picking or excoriation disorder, trichotillomania, onychophagia and onychotillomania), dermatitis artefacta, and features of other psychiatric disorders, for example, secondary to excessive grooming in body dysmorphic disorder, skin picking in delusional infestation, or secondary to self-harm in depressive disease. Among the BFRBs, onychophagia and onychotillomania are most likely to be associated with lesions that mimic other dermatologic conditions (eg, nail psoriasis, lichen planus, vasculitis, onychomycosis, melanoma). Dermatitis artefacta (DA) describes lesions that are self-inflicted with the intention of assuming a sick role in the absence of obvious external rewards. DA lesions can be bizarre-appearing or may be created intentionally to mimic dermatologic disease (eg, Munchausen syndrome). The manipulation of the integument can have a focused obsessive-compulsive behavioral style which is more responsive to the standard behavior therapies, or an impulsive-dissociative style where patients have partial or no recollection of having self-induced their lesion; dissociative patients tend to have more severe BFRBs and DA, and greater psychopathology. Self-induced dermatoses may both imitate and co-occur with primary dermatologic disease, and may not be readily identified unless the clinician maintains an index of suspicion.

Background

The skin is a sensory and immune organ that acts as a metabolically active biologic, psychologic, and social interface between the individual and the environment, and as an organ of communication across the lifespan.[1–3] The appearance of the skin and its appendages, even when perceived as minimally flawed, can have a profound effect on body image especially during adolescence and young adulthood, and this can lead to self-induced dermatoses, for example, as a result of excessive grooming-related behaviors in an attempt to improve the appearance of the skin.[4] Alternately, self-induced lesions of the skin can serve to communicate emotional or psychosocial distress in a wide range of clinical situations.[4,5] The skin and its appendages are innervated with a dense network of afferent sensory and efferent autonomic nerves.[2,3] Unlike other organs, the efferent innervation to the skin is mainly autonomic and sympathetic; therefore, in contrast to other organs, the skin is uniquely vulnerable to psychologic stress and sympathetic activation as it reacts during times of stress with sympathetically mediated responses (such as pruritus and other cutaneous sensory clinical manifestations[6] that can lead to scratching and manipulation of the integument), largely without a significant opposing parasympathetic cutaneous response. In some clinical situations, physical stimulation, such as scratching and manipulation of the skin and its appendages, can serve as a means

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of regulating emotions and coping with intense emotional states (Figure 1)[1,7]; furthermore, classical conditioning experiments[8] designed to establish scratch responses when the unconditioned itch stimulus was paired with a conditioned stimulus such as a tone, have shown that individuals who were predisposed to excessive scratching (such as in lichen simplex chronicus) also conditioned more readily and extinguished more slowly than controls,[8] suggesting that some individuals with self-induced dermatoses may be predisposed to scratching excessively. The self-induced dermatoses may be the result of two major factors: (1) where the integument is manipulated to regulate emotions (eg, psychogenic excoriation, trichotillomania, dermatitis artefacta [DA]) or in response to other psychiatric factors such as in body dysmorphic disorder (BDD) where patients may engage in excessive grooming to rid themselves of a minor skin irregularity, or delusional infestation where patients may self-induce lesions while attempting to rid their skin of a perceived infestation or foreign object; and (2) where the patient self-inflicts wounds with the subconscious or conscious desire to assume the sick role (eg, DA and Munchausen syndrome) or achieve secondary gain (eg, malingering). Lesions produced by both mechanisms (eg, nail changes in onychotillomania can be mistaken for lichen planus or psoriasis of the nail, and in Munchausen syndrome the DA can be mistaken for a wide range of primary dermatologic disorders) can imitate primary dermatologic disease; furthermore, self-induced dermatoses may coexist with other primary dermatologic conditions, and may contribute to complications and exacerbations of the primary dermatologic disorder (eg, due to secondary infection or inflammation, exacerbation of the disorder due to the Koebner phenomenon, etc).

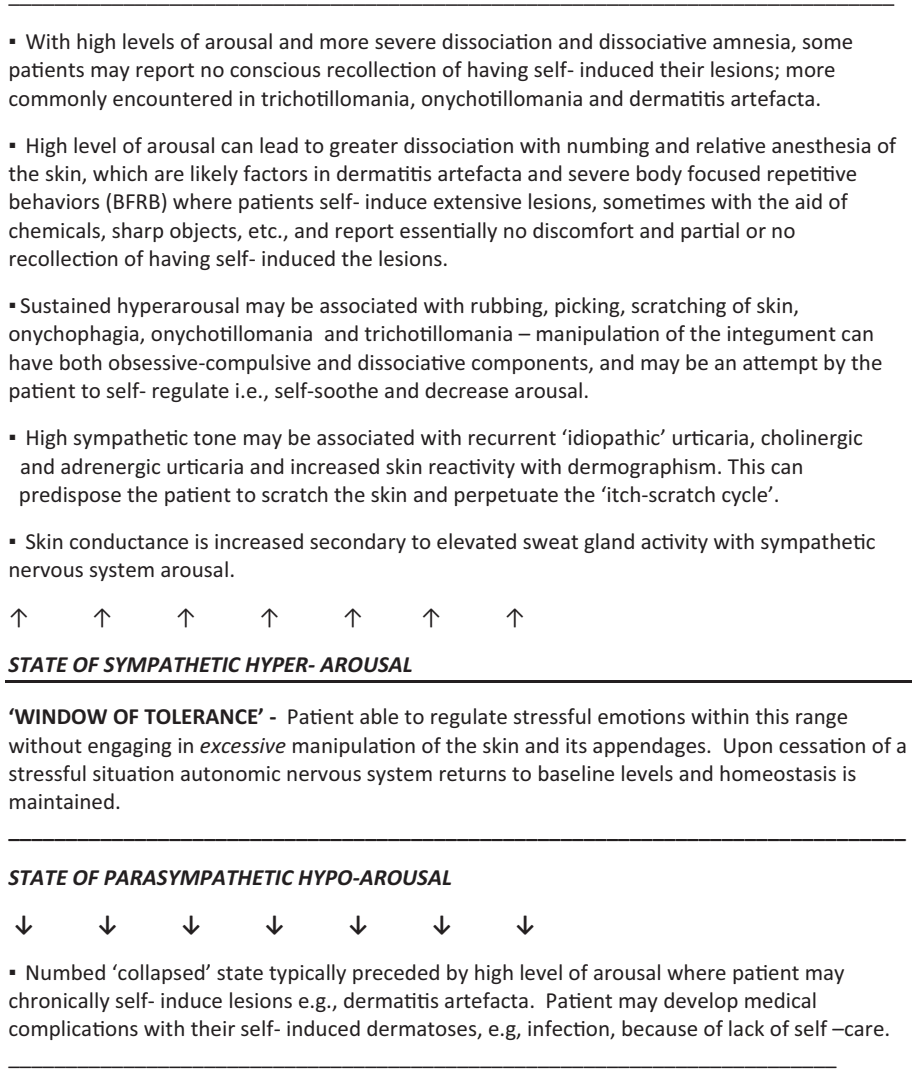

Fig. 1 Emotional regulation model and the self-induced dermatoses. (Reproduced with permission from the author and publisher of: Gupta MA. Emotional regulation, dissociation and the self-induced dermatoses: clinical features and implications for treatment with mood stabilizers. *Clin Dermatol*. 2013;31:110-117.)

Table 1 Recurrent body-focused repetitive behaviors[9] and self-induced dermatoses

Body-focused repetitive behavior	Nature of self-induced dermatoses
Excoriation or skin-picking disorder (psychogenic excoriation, neurotic excoriations, and acne excoriée classified in the DSM-5[9] under "Obsessive-compulsive and Related Disorders")	• Recurrent picking of the skin resulting in skin lesions • Patients typically acknowledge the self-induced nature of their lesions • Lesions typically a few millimeters in diameter, weeping, crusted or scarred with postinflammatory hypopigmentation or hyperpigmentation; in chronic cases scarring may be the only sign • Most common picked regions are the face, arms, and hands; any body region may by affected • Lesions typically do not mimic other dermatologic disorders; however, the repetitive self-excoriation can exacerbate a preexisting dermatosis (eg, acne excoriée) or exacerbate a lesion secondary to the Koebner phenomenon
Trichotillomania (h*air-pulling disorder*) (classified in DSM-5[9] under "Obsessive-Compulsive and Related Disorders") (Other similar disorders[1] include *trichotemnomania* or compulsive cutting or shaving of hair; *trichoteiromania* associated with rubbing of the scalp with fracturing of the hair shafts; *trichodaknomania* or *trichodaknomania by proxy* where individuals bite off the hair on their own or someone else's arm; and *trichorrhizophagia* associated with a compulsion to eat the roots of the pulled out hairs)	• Recurrent hair pulling resulting in hair loss • Can affect any hair-bearing body region, most common sites are scalp (most commonly the crown and parietal regions), eyebrows, eyelashes, less commonly axillary, facial, pubic, and perirectal regions • Automatic hair pulling and dissociation are more common, and patients may deny that the alopecia is self-induced • Pattern of hair loss variable, ranging from total alopecia to thinned hair density; "tonsure trichotillomania" involves alopecia of the entire scalp except the scalp perimeter • Trichophagia may result in trichobezoars and complications (eg, bowel obstruction) •Trichoscopy and histopathology of the scalp may be necessary to differentiate the traumatic alopecia in TTM from other alopecias
Onychophagia, onychotillomania Onychophagia refers to compulsive nail biting (classified in DSM-5[9] under "Other Specified Obsessive-Compulsive and Related Disorders") Onychotillomania or nail-picking disorder; patients repetitively manipulate different constituents of the nail unit[10]; considered to be in the same spectrum as onychophagia[9,10]; analogous to lichen simplex chronicus and prurigo nodularis of the skin[10]	• Nail-biting behavior and damage to the cuticle and nail plate can lead to nail shortening, partial or total nail loss, chronic paronychia, and secondary infections,[49] herpes whitlow and subungual warts,[25] and rarely osteomyelitis[25]; pterygium inversum unguis[49] which is most commonly associated with connective tissue diseases[50]; splinter hemorrhages most commonly distal when trauma-related, which may mimic[51] psoriasis, lichen planus and vasculitis; exaggerated stratum corneum in the distal nail bed, distal nail plate splitting or onychoschizia, longitudinal melanonychia, nail plate hypertrophy, and true leukonychia[49] • Onychotillomania tends to be associated with a more dissociative style of nail picking • Onychotillomania[10,52] can be associated with bizarre morphology of the nail plate (eg, in habit tic deformity and median canaliform nail dystrophy from damage to the nail matrix); damage to nail bed and periungual skin; some characteristic dermatoscopic features such as "wavy lines" and nail bed pigmentation with a gray hue[52] • Nonspecific nail changes in onychotillomania may be misdiagnosed as lichen planus, psoriasis, 20-nail dystrophy, epidermolysis bullosa aquisita, and onychomycosis[10] • In a Korean study[53] of 275 melanonychia patients being screened for melanoma, 14.5% had evidence of trauma-induced pigmentation

TTM, trichotillomania.

Psychiatric classification of the self-induced dermatoses

The current psychiatric nosology in the *Diagnostic and Statistical Manual of Mental Disorders, 5th edition* (DSM-5)[9] refers to the self-induced dermatoses. (i) Skin-picking disorder (SPD) (eg, dermatillomania, excoriation disorder, psychogenic excoriation, neurotic excoriations, acne excoriée) and trichotillomania (TTM), or hair-pulling disorder, are classified as individual psychiatric disorders under "Obsessive-Compulsive and Related Disorders" (OCRD).[9] Onychophagia (and onychotillomania[10]) are classified as an "Other Specified OCRD" (Table 1).[9] In the DSM-5 as a group, SPD, TTM, and onychophagia are referred to as the recurrent body-focused repetitive behaviors (BFRBs) (Table 1).[9] Other conditions related to the factitious dermatoses that overlap with the BFRBs include dermatitis para-artefacta syndrome[11](eg, chronic cheek biting or morsicatio buccarum,[11] cheilitis factitia,[11] and pseudoknuckle pads[11]) and conditions such as lichen simplex chronicus[12,13,14] and prurigo nodularis,[14–16] which result from repetitive scratching and rubbing of the skin and often share common histologic features.[17] (ii) Factitious disorder[9] (under the DSM-5 chapter titled "Somatic Symptom and Related Disorders") is defined as the induction of injury or disease in the absence of obvious external rewards or gain and with the intention of assuming a sick role.[9] The dermatologic lesions that fall under the heading of factitious disorder[9] often meet the criteria for DA. In DA, the lesions can have wide-ranging morphologic features and are often bizarre appearing[5]; however, the artefactual lesions can mimic any skin disorder.[11] In contrast to the BFRBs where there is often a conscious and obsessive-compulsive quality to the behavior, in DA the self-induced lesions are typically created in a dissociated state[5,9,18] (Figure 1) and patients often have only partial or no conscious recollection of having self-induced their lesions. In malingering[9] (in contrast to DA where there is an absence of external rewards), the patient intentionally self-induces lesions with the intention of personal gain such as medical leave or financial compensation. It is important to recognize that comorbid primary medical or dermatologic disorders can often coexist with a factitious disorder such as DA.[9] Patients with Munchausen syndrome inflict self-injury, often by injecting foreign substances, in an attempt to mimic a medical condition and gain medical attention associated with having a difficult-to-identify disorder.[19] Munchausen syndrome by proxy (MSBP) refers to a situation where a caregiver, typically involving a mother and dependent child or caregiver of a dependent adult, induces factitious cutaneous lesions to gain medical attention.[19] Munchausen syndrome and MSBP involving the integument are considered to be rare.[19] (iii) There are a wide range of psychiatric disorders where cutaneous self-injury and self-induced dermatoses can be associated features, such as BDD,[9] also classified as an OCRD,[9] where patients have a distorted body image and are preoccupied by one or more perceived "defects" in their appearance that objectively are not observable or of minimal severity. Patients with BDD may self-induce lesions as a result of excessive grooming and skin picking to treat perceived "flaws" of the skin. Delusional disorder, which can be classified as Somatic Type[9] or delusional infestation (Morgellons syndrome), is manifested when patients injure their integument in an attempt to rid their skin of a perceived infestation or foreign material. Self-inflicted skin lesions are reported in two-thirds[11] of all patients with delusional infestation; trauma and stressor-related disorders such as posttraumatic stress disorder[9,20]; dissociative disorders[9,18] where the self-induced dermatoses have been conceptualized as a maladaptive emotional regulation mechanism (Figure 1)[7,21]; and a range of other psychiatric disorders. These include depressive disorders[9] where the patient may wish to inflict self-harm; certain personality disorders,[9] especially the DSM-5[9] cluster B (eg, borderline, histrionic) personality disorders where the self-induced lesions may represent an attempt to gain attention or regulate emotions[7]; and some substance-related and addictive disorders,[9] where self-induced dermatoses can be associated with drug intoxication and withdrawal.[9]

Psychopathologic factors underlying self-induced dermatoses

The physical manipulation of the integument in the self-induced dermatoses can be mediated by a wide range of psychiatric factors ranging from body image dissatisfaction to psychosis and delusional ideation. In the common primary self-induced dermatoses (ie, the BFRBs and DA) manipulation of the integument is associated with both obsessive-compulsive and dissociative behavioral styles (Figure 1).[22] An obsessive-compulsive style is associated with focused attention on the self-injurious behavior (such as skin picking or hair plucking), tension preceding the behavior, and relief upon

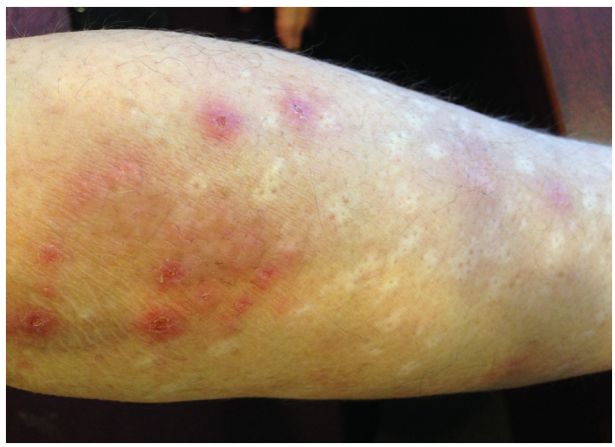

Fig. 2 Chronic skin-picking or excoriation disorder affecting the forearm of a 55-year-old woman. The self-induced lesions from picking and rubbing of the skin are in different stages of evolution with a background of chronic hypopigmented scars from earlier lesions.

completion of the behavior, and is more responsive to behavioral interventions as these patients are largely aware of their behavior. A dissociative style tends to be impulsive and automatic where the self-injurious behavior is carried out without full awareness or recollection (such as in DA and severe BFRBs), and is therefore less responsive to directed behavioral therapies.[22] Skin picking and trichotillomania can also occur during partial arousals from sleep. Dissociative features usually indicate more severe stress and trauma and often more complex psychiatric comorbidity (Figure 1).[7,11,18,23] Patients with high levels of dissociation are often "trapped" in complex abusive situations involving severe emotional, physical, or sexual abuse; in such situations self-induced dermatoses may reflect an attempt at regulating emotions[7] or in extreme cases, represent a state of severe self-neglect, or may serve to communicate a "cry for help."[5] The self-induced dermatoses may therefore be an indication that the patient is experiencing extreme stress that is outside the range of their usual coping capacity or "window of tolerance" (Figure 1) and would likely benefit from psychiatric attention.[7]

Clinical presentation of self-induced dermatoses

Body-focused repetitive behaviors

Table 1 has outlined some of the salient clinical features of the BFRBs. SPD is characterized by recurrent picking of one's own skin resulting in skin lesions and repeated attempts to decrease or stop the skin picking (Table 1).[9] The lifetime prevalence of SPD or excoriation disorder in the general population is 1.4%, with a woman-to-man ratio of about 3:1.[9] It is unclear whether this represents a sex bias in treatment seeking and cultural attitudes regarding appearance.[9] SPD may present at any age but most often has onset during adolescence with dermatologic conditions such as acne and may present as acne excoriée.[9] The skin lesions in SPD (Figure 2) are usually a few millimeters in diameter, may range in number from a few to several hundred, and are often in different stages of evolution.[22] The lesions may be weeping and crusted or scarred with postinflammatory hypopigmentation and hyperpigmentation. The most commonly picked body sites are the face, arms, and hands; however, any body region may be affected, as some patients use instruments such as back scratchers. The skin picking may be associated with a range of rituals or behaviors involving the skin or scabs, that may initiate the "itch-scratch cycle" and exacerbate a preexisting dermatosis.[22] In contrast to DA, the lesions in SPD typically do not mimic other dermatologic disorders; however, the repetitive self-excoriation can exacerbate a preexisting dermatosis (eg, acne excoriée) or lead to secondary infections such as cellulitis and abscesses. The skin sites of picking may vary over time and the untreated course of SPD is typically chronic with some exacerbations and remissions.[9]

TTM is characterized by recurrent pulling of one's own hair resulting in hair loss and repeated attempts to decrease or stop the hair pulling.[9] The 12-month prevalence of TTM among adults and adolescents in the general population is estimated to be 1% to 2%, with a woman-to-man ratio of 10:1 among adults and 1:1 among children.[9] TTM should be distinguished from benign hair pulling, which can be associated with thumb sucking, and nail biting in children.[22] In TTM, hair may be pulled from any body region, with the most common sites being the scalp, eyebrows, and eyelids (Table 1). The hair pulling

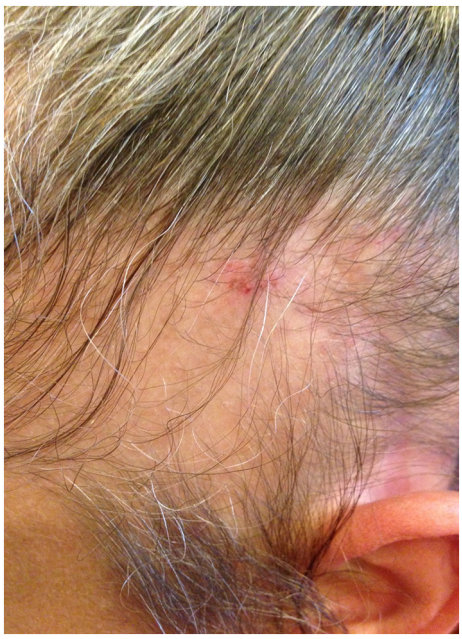

Fig. 3 Trichotillomania affecting the left temporal region in a 35-year-old woman. The affected region is not completely devoid of hair. There is a small excoriated lesion in the superior aspect of the region of alopecia. The patient also picks her scalp.

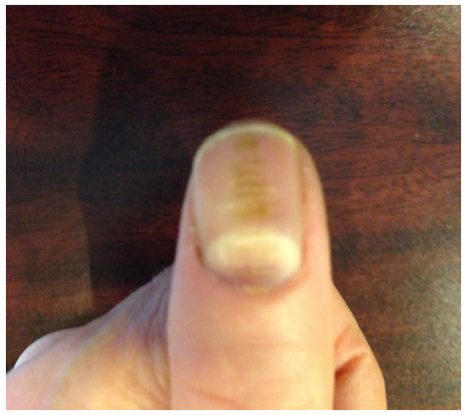

Fig. 4 A 60-year-old woman with onychotillomania and habit tic deformity demonstrating macrolunula and transverse ridges in a "Christmas tree" pattern. The patient denied that the lesion could have been self-induced and insisted that it was due to a vitamin deficiency.

may be associated with various behaviors and rituals including trichophagia (Table 1), which can lead to trichobezoars and gastrointestinal complications such as acute pancreatitis and bowel obstruction.[22] In TTM, an affected skin region is rarely completely devoid of hair, and irregularly broken hairs and hairs of various lengths are typically partially distributed over the area of alopecia (Figure 3).[22] Dermatoscopy of the hair and scalp and scalp histopathology may be necessary to distinguish the traumatic alopecia in TTM from other alopecias.[22] The typical course of TTM is chronic, with some exacerbations and remissions.

Onychophagia or nail biting (and onychotillomania[10] or nail picking) (Table 1) are BFRBs that have received less attention in the psychiatric literature. In contrast to SPD and TTM, the nail changes from onychophagia may mimic other dermatologic disorders (eg, nail psoriasis, lichen planus) (Table 1) and be associated with systemic complications. Nail-biters are more likely to be carriers of Enterobacteriaceae such as *Escherichia coli,* and in some cases transfer of the bacteria to the oral cavity can lead to serious local or systemic complications due to dissemination of bacteria during oral surgical procedures.[24,25] Onychophagia is reported to affect 20% to 30% of the general population.[25] Even though a common condition, the physician has to maintain a high index of suspicion as many patients are embarrassed to acknowledge their problem or ask for help.[25] Onychophagia has been reported to affect up to 45% of children from age 10 years to puberty, after which there is a decline in prevalence to 10% in patients postpuberty to 35 years of age, with a progressive decline after age 40 years.[25] In a study of 4,335 college students[26] a 33.5% prevalence of subclinical nail biting and a 3.0% prevalence of pathologic nail biting were observed.[26] Women tend to be more commonly affected with onychophagia than men.[25,26]

Table 2 Psychiatric disorders associated with some self-induced dermatoses

Psychiatric disorder associated with a self-induced dermatologic lesion as a primary clinical manifestation	Some characteristics of the self-induced dermatoses
Factitious disorder[9] (classified in DSM-5[9] under "Somatic Symptom and Related Disorder"). Munchausen syndrome and Munchausen syndrome by proxy are included in this group.[19] • Dermatitis artefacta is a term that describes cutaneous lesions that are wholly self-inflicted. DA lesions meet the diagnostic criteria for factitious disorder in most instances. • Factitious disorder consists of falsification of medical signs or clinical manifestations in oneself or others and the intention of assuming a sick role, in the absence of obvious external rewards.	• In DA, lesions[5] can have wide-ranging morphologic features depending on the methods used to create the lesions and can mimic a wide range of primary dermatologic disorders.[5] • Alternately, DA lesions[5] can be bizzare-looking with sharp geometric borders surrounded by normal looking skin. • In DA, full-thickness skin loss, severe scarring and extensive self-induced lesions can necessitate extensive plastic surgery and amputation(s) in up to 10% of cases.[5] • In Munchausen syndrome involving the integument most patients inject foreign materials in the skin and soft tissue. • Methods used to falsify disease can include exaggeration of complaints so that the person appears more ill or impaired, fabrication, simulation and induction of disease (eg, by injection of fecal matter to produce an abscess). • Presentation can be acute, often with a history of multiple hospitalizations. • Patients are typically willing to subject themselves to extensive and invasive procedures. • Consider this diagnosis when encountering unusual cutaneous lesions that defy diagnosis and exhibit normal findings with customary investigations.
Body dysmorphic disorder also called dysmorphophobia and dermatologic nondisease. (Classified in DSM-5[9] under "Obsessive-Compulsive and Related Disorders"). • Preoccupation with one or more perceived defects or flaws in the physical appearance that most commonly involves the skin (eg, perceived paleness or darkness of skin, wrinkles, scars, excessive hair, etc).	• Excessive grooming associated with behaviors such as squeezing or picking of pimples, hair plucking, onychotillomania, and other cosmetic procedures leading to injury to the skin, hair, or nails. • Excessive tanning. • Injudicious use of skin lightening products among darker skinned individuals. • Injudicious use of cosmetic surgical procedures.
Delusional disorder, somatic type (delusional parasitosis, Morgellons disease) Fixed false belief that one is infested by parasites or other living or inanimate pathogens (eg, fibers, wax, crystals, needles).	• Patients may try to treat skin by scratching, or with topical disinfectants, repellants and pesticides. • Tactile or olfactory hallucinations related to the delusional theme may be associated with corresponding self-injurious behaviors.

DA, dermatitis artefacta.

Onychotillomania, defined as self-induced trauma to the nail unit, usually by picking or pulling at the nails,[27] tends to be underreported in the medical literature (Table 1).[10] Although representing a behavior distinct from onychophagia, onychotillomania is grouped as a BFRB in the same general category as onychophagia.[10] In a study of 339 Polish medical students,[28] there was a 0.9% prevalence of onychotillomania, defined as recurrent destructive picking and manicuring of the nails, and two out of the three individuals with onychotillomania in this study were female; a review of the onychotillomania literature[27] observed a man-to-woman ratio of 1.5:1, with average age of presentation being 47.5 years (range 7-84 years). A characteristic nail finding[10,27] that is associated with onychotillomania is the habit tic deformity, which presents as a midline furrow along the length of the nail with associated transverse ridges in a "Christmas-tree pattern" (Figure 4). Onychotillomania is associated with multiple nonspecific and sometimes bizarre-appearing dermatologic findings[10] (which can be mistaken for other dermatologic disorders such as nail psoriasis and lichen planus, onychomycosis, and possibly melanoma) including generalized dystrophy and atypical nail morphology, macrolunula, involvement of periungual skin including involvement of the cuticle and nailfolds, nail pigmentation and longitudinal melanonychia secondary to repetitive trauma to the proximal nailfold, and chronic paronychia or anonychia, secondary to manipulation of the nail unit (Table 1).[10] Patients with onychotillomania often deny their behavior,[10] which can make treatment difficult, and this is consistent with high levels of dissociation where patients have partial or no recollection of having self-induced their lesion (Figure 1).[10] High levels of dissociation tend to be associated with greater psychopathology, and onychotillomania has been associated with significant psychiatric morbidity including completed suicide.[29]

In a recent study[26] of self-reported prevalence of current (during past 1 month) subclinical and pathologic BFRBs among a sample of 4,335 college students,[26] 59.6% reported subclinical BFRBs, and 12.3% (77.2% women) met the criteria for at least one pathologic BFRB (pathologic[26] is defined as clinical manifestations causing distress and physical or functional impairment and help-seeking behavior similar to the DSM-5[9] definition of BFRBs) with the following prevalence rates of pathologic BFRBs: hair pulling, 0.7%; skin picking, 5.7%; nail biting, 3.0%; and cheek biting, 3.2%.[26] Within the group reporting pathologic BFRBs,[26] 83.1% reported only one pathologic BFRB; 13.1% reported two concurrent pathologic BFRBs; and 3.1% reported three concurrent pathologic BFRBs.[26] In addition, 73.2% of individuals reporting pathologic BFRBs also reported concurrent subclinical BFRBs.[26] The authors comment that earlier studies have reported lower prevalence rates[9] due to a failure to assess multiple forms of BFRBs at once, and have tended to focus on patient groups with specific BFRBs, that is, SPD versus TTM. Pathologic BFRBs also tend to be underreported as patients tend to be shamed by their clinical presentations that are often perceived as unhygienic behavioral manifestations of anxiety.[26] The authors[26] comment that BFRBs such as SPD, TTM, and onychophagia are a related class of conditions and that evidence suggests that a single latent factor related to an urge to self-groom may underlie these BFRBs.[30]

Dermatitis artefacta

DA can be best described as a DSM-5 factitious disorder[9], where the patient self-induces injury or disease with the intention of assuming a sick role, in the absence of obvious external rewards (Table 2). In Munchausen syndrome, patients create artefactual lesions or disease with the view of gaining medical attention and multiple hospitalizations associated with having a difficult-to-treat disease.[19] In MSBP, where the perpetrator is typically the caregiver of a dependent child or adult (infants and preschool children are most often affected), three approaches may be used to present the factitious complaint: the perpetrator may inflict the injury, may fabricate the history and "invent" clinical manifestations, or manipulate the laboratory results, for example, by manipulating the blood or urine samples.[19] Primary cutaneous involvement in Munchausen syndrome is reported to be rare,[19] and it has been observed that this is surprising, given the proximity of the skin, suggesting perhaps that Munchausen syndrome and MSBP involving DA may be underdiagnosed.[19] The prevalence of artefactual skin lesions in the general population is reported to be 0.05% to 0.4%[11,31] and 2% in dermatology clinics,[11] and because patients may not be aware of the self-inflicted nature of their lesions (such as patients with high levels of dissociation), this frequency is likely an underestimation of the true prevalence.[31]

Self-harming of the skin is reported to be three to eight times more common among women versus men, except for malingering which is more common among men.[11] The self-induced lesions in DA can sometimes appear obviously artificial and have a bizarre appearance, surrounded by normal-appearing skin; however, DA lesions can mimic any disorder.[11] DA has been reported to mimic a wide range of dermatologic disorders including pyoderma gangrenosum,[32] intertriginous and flexural erythema or baboon syndrome,[33] and recurrent deep forehead ulcers resembling rare cancers.[34] DA patients commonly self-induce lesions by injecting foreign substances and may present with erythema, swelling and tissue necrosis, fever and sepsis secondary to the intracutaneous injection of a wide range of substances (some of materials reported include air, gasoline, talc, turpentine, blood, bacteria, feces, saliva, and milk[19]). Patients can present with varying degrees of tissue loss and a wide range of methods may be employed to mimic dermatologic lesions, for example, applying blue dye to the skin to simulate Raynaud syndrome. Patients with factitious disorder tend to be well versed in medical terminology and willingly submit themselves to extensive and invasive diagnostic procedures, while demanding attention from medical staff.[19] Full-thickness skin loss and severe scarring resulting from self-inflicted lesions may necessitate extensive plastic surgery and even amputation in about 10% of cases.[5]

Management

Assessment

Patients with suspected self-induced dermatoses require both a psychiatric and dermatologic evaluation. The clinician should be aware that the self-induced dermatoses may also coexist with other primary dermatologic disorders, and that the manipulation of the integument may further exacerbate the dermatologic condition. Whenever possible, collateral history should be obtained from previous hospital records and other individuals involved in the patient's treatment, as in DA and Munchausen syndrome individuals are invested in assuming a sick role and seeking excessive medical attention (Table 2). Tables 1 and 2 summarize some of the salient clinical features of the commonly encountered self-induced dermatoses. In the patient with a BFRB (Table 1) the clinician should be aware that more than one BFRB may coexist and even subclinical BFRBs must be identified as they can have dermatologic implications.[26] The clinician must maintain an index of suspicion in cases when patients deny self-inducing their lesions as they may have little or no recollection of having self-induced their lesions due to high levels of dissociation (Figure 1). High levels of dissociation are typically associated with both more severe and treatment-resistant skin lesions and more severe psychopathology, including suicide risk.[29]

In the case of DA, where the lesions are wholly self-induced, it has been observed that "the atypical is typical"[11,31] and the dermatologist should consider DA[11,31] when the history is hollow or lacking key information, the lesion runs an atypical course (eg, a history of spontaneous development), the lesions do not appear to respond to standard treatments, or the lesions have an atypical distribution, location, and morphology (eg, bizarre geometric shapes or lines).[11,31] Some other clinical findings[19] in DA include cultured organisms from cutaneous wounds that are normally found in other locations such as saliva and the gastrointestinal tract, sparing of skin regions that are decorated with tattoos, and involvement of nondominant side or patient being able to predict where the next lesion will arise.

DA and possible Munchausen syndrome should be suspected when the dermatologic presentation is dramatic, with a history of multiple previous procedures or hospitalizations with lesions that are difficult to diagnose or associated with negative findings.[19] One study[31] has examined the literature on histologic evidence corroborating a suspected diagnosis of artefactual skin lesions (especially DA where patients may deny the self-induced nature of their lesions). They note that in the few studies where the clinical and histologic findings were suggestive of artificially-induced lesions, elucidation of the exact mechanism of injury was often not possible, making it difficult to definitively confirm that the lesion was self-induced.[31] Clinically, patients with DA may present with various types of scars (eg, keloid scars, hypertrophic scars, and contracture scars from self-induced burns) that represent the final stage of a wide range of self-induced lesions.[31] Recurrent histologic evidence of scarring in one patient is suggestive of DA.[31]

Treatment

Overall, the cognitive-behavioral and extinction-based treatments such as habit reversal therapy (HRT)[35] have the strongest evidence for the treatment of BFRBs.[10,22,25,36–39] For HRT to be effective, the patients have to be aware of their self-injurious behavior, as HRT involves the replacement of the harmful urge to self-injure (eg, pick the skin or pluck the hair) with a less harmful competing response. In all instances of self-induced dermatoses, it is very important to establish an empathic and supportive approach that focuses on the patient's complaint and distress, rather than challenging the patient about the self-inflicted nature of their lesions. There are reports of the beneficial effects of occlusive dressings over the self-induced lesions, when practical. There are no standard US Food and Drug Administration–approved pharmacotherapies for the BFRBs.

For SPD,[22] double-blind trials of fluoxetine and citalopram, and open trials of fluvoxamine, citalopram, and sertraline support the use of selective serotonin reuptake inhibitor antidepressants as a potential treatment.[37] The anticonvulsant mood-stabilizer lamotrigine has been associated with a reduction in skin-picking behavior but was not superior to placebo.[40] A 12-week placebo-controlled randomized controlled trial (RCT)[22,41](n = 66) of dietary supplement and glutamate modulator N-acetylcysteine (NAC) (dosage range 1,200-3,000 mg daily) has reported that NAC was associated with a significant improvement in skin-picking behavior but not psychosocial functioning.[41] A systematic review to assess pharmacologic and behavioral interventions of SPD concluded that all interventions for SPD demonstrate improvement in short-term clinical trials; however, only behavioral treatments demonstrated significant benefits compared with inactive controls.[36]

In TTM, with appropriate treatment at least 50% of patients experience symptom reduction at least in the short-term versus a 14% improvement without treatment.[22,38] A 2013 Cochrane review[42] identified eight RCTs of medication versus placebo or other treatment, and concluded that none of the three studies of selective serotonin reuptake inhibitors involving fluoxetine and sertraline demonstrated a strong treatment effect on any of the outcome measures (number of hair-pulling episodes or an urge to pull).[22] In one placebo-controlled study of olanzapine[43] (n = 25) (mean ± SD [mg] dosage 10.8±5.7 daily), 85% of olanzapine versus 17% of placebo were treatment responders ($P = .001$).[22] The Cochrane review[42] further identified one study comparing clomipramine to desipramine that demonstrated a treatment effect of clomipramine on two out of three measures of treatment outcome[44]; however, a study comparing clomipramine to placebo[45] found no statistically significant difference between the two groups.[22] One placebo-controlled study[46] (n = 50) of NAC (dosage range

1,200-2,400 mg daily) showed 56% of NAC versus 16% of placebo group were treatment responders (P = .003). The Cochrane review[42] concluded that preliminary evidence suggests treatment benefits of clomipramine, olanzapine, and NAC based on three small trials.[22]

For onychophagia, a placebo-controlled RCT compared a 2-month trial of NAC 800 mg per day[47] to placebo in 42 children with oncyhophagia, with primary outcome measure being nail length. NAC was found to be superior to placebo after 1 month; however, there was no difference between the two groups at the end of the trial at 2 months.[25,47] A 10-week double-blind cross-over trial in 25 subjects with severe onychophagia[48] and no obsessive-compulsive disorder (14 out of 25 completed the trial) comparing clomipramine versus desipramine, revealed that clomipramine (mean±SD [mg]: 120±48 daily) was superior to desipramine (mean±SD [mg]: 135±53 daily) in decreasing nail biting as measured by three rating scales.[48] There are no published RCTs of pharmacologic treatments of onychotillomania.

In most cases of DA and severe BFRBs, a multidisciplinary approach that includes a mental health professional is recommended as they tend to have more complex psychopathology. More than two-thirds of patients with DA have a history of serious psychologic trauma during early development, for example, sexual abuse or severe neglect, and most commonly tend to be highly dissociated and have personalities with immature coping mechanisms where the self-induced lesions may serve as a "cry for help."[5,11]

Comment

The self-induced dermatoses represent complex and typically multifactorial conditions that need to be assessed using an individualized biopsychosocial approach. The self-induced dermatoses constitute about 2% of dermatology patient visits, and can both mimic and coexist with primary dermatologic disease. Self-induced dermatoses can exacerbate the course of a primary dermatologic disorder (eg, due to secondary infections, exacerbation of underlying inflammation, Koebnerization) or lead to unnecessary treatments. Self-induced dermatoses may not be readily identified unless the clinician maintains an index of suspicion for several reasons: a significant number of patients self-induce their lesion in a highly dissociative state, such as in the case of severe BFRBs and DA, and have only partial or no recollection of having self-induced their lesions; some patients are embarrassed to report that their lesions are self-inflicted due to the social stigma associated with such behaviors; and a small number of patients may consciously withhold information because they are seeking medical attention associated with a difficult-to-diagnose condition (such as in Munchausen syndrome) or in cases of malingering. It is also important to identify the dissociative patients, who may have no recollection of having self-induced their lesions, because they tend to have greater comorbid psychopathology. The self-induced dermatoses that tend to imitate primary dermatologic disorders most frequently include (1) DA where patients self-induce lesions with the intention of mimicking primary dermatologic disease and (2) certain BFRBs, especially onychophagia and onychotillomania (which are the least studied) and some instances of trichotillomania, where the lesions created by the patients may inadvertently mimic primary dermatologic conditions (eg, nail psoriasis and lichen planus or nonscarring alopecias). Management of all self-induced dermatoses first involves the establishment of a supportive and empathic attitude where the clinician does not directly confront the patient about the self-inflicted nature of their lesions. Currently, there are no standard US Food and Drug Administration–approved pharmacotherapies for the self-induced dermatoses such as the BFRBs; however, the evidence is strongest for the efficacy of behavioral interventions such as HRT.

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