

# Nail tic disorders: Manifestations, pathogenesis and management

*Archana Singal, Deepashree Daulatabad*

Department of Dermatology and STD, University College of Medical Sciences (University of Delhi) and GTB Hospital, New Delhi, India

**Address for correspondence:**  
Dr. (Prof.) Archana Singal,  
Department of Dermatology,  
University College of Medical  
Sciences,  
New Delhi - 110 095, India.  
E-mail: archanasingal@  
hotmail.com

## ABSTRACT

Nail tic disorders are classic examples of overlap between the domains of dermatology and psychiatry. They are examples of body-focused repetitive behaviors in which there is an irresistible urge or impulse to perform a certain behavior. The behavior is reinforced as it results in some degree of relief and pleasure. Nail tic disorders are common, yet poorly studied and understood. The literature on nail tic disorders is relatively scarce. Common nail tics include nail biting or onychophagia, onychotillomania and the habit tic deformity. Some uncommon and rare nail tic disorders are onychoteiromania, onychotemnomania, onychodaknomania and bidet nails. Onychophagia is chronic nail biting behavior which usually starts during childhood. It is often regarded as a tension reducing measure. Onychotillomania is recurrent picking and manicuring of the fingernails and/or toenails. In severe cases, it may lead to onychotrophy due to irreversible scarring of the nail matrix. Very often, they occur in psychologically normal children but may sometimes be associated with anxiety. In severe cases, onychotillomania may be an expression of obsessive-compulsive disorders. Management of nail tic disorders is challenging. Frequent applications of distasteful topical preparations on the nail and periungual skin can discourage patients from biting and chewing their fingernails. Habit-tic deformity can be helped by bandaging the digit daily with permeable adhesive tape. Fluoxetine in high doses can be helpful in interrupting these compulsive disorders in adults. For a complete diagnosis and accurate management, it is imperative to assess the patient's mental health and simultaneously treat the underlying psychiatric comorbidity, if any.

**Key words:** Body-focused repetitive behavior, habit tic deformity, nail tic, onychophagia, onychotillomania

## INTRODUCTION

The literal meaning of “tic” is a persistent, recurrent or repetitive behavioral trait that is difficult, if not impossible to control voluntarily. When tics involve the nail unit, these are termed “nail tic” disorders. These disorders straddle the realms of both dermatology and psychiatry. A dermatologist should have a comprehensive understanding of these, for which a familiarity with psychiatric terminology is required.

In the field of psychiatry, various mental disorders are classified according to two established systems

of classification: Chapter V of the International Classification of Diseases-11 produced by the World Health Organization and Diagnostic and Statistical Manual of Mental Disorders produced by the American Psychiatric Association. For ease of communication, broadly both these systems tend to converge, but differences do exist.

“Body-focused repetitive behavior” disorder is characterized by difficulty or inability to resist the urge or impulse to perform certain behaviors that cause a degree of relief. The behavior is perceived as a pleasant

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**How to cite this article:** Singal A, Daulatabad D. Nail tic disorders: Manifestations, pathogenesis and management. Indian J Dermatol Venereol Leprol 2017;83:19-26.

**Received:** September, 2015. **Accepted:** January, 2016.

Access this article online	
<b>Quick Response Code:</b>	<b>Website:</b> www.ijdvl.com
	<b>DOI:</b> 10.4103/0378-6323.184202

state; thus, it is negatively reinforced and tends to persist.<sup>[1]</sup> In the long run, such behavior may lead to harmful physical and psychological problems.<sup>[2]</sup> Often these behaviors are simply referred to as nervous habits.<sup>[3]</sup> Conditions such as skin picking (dermatillomania), hair pulling (trichotillomania) and pathologic nail biting (onychophagia) are classically included in this subset. In both the classification systems, repetitive behaviors, including trichotillomania and skin-picking disorder have been listed under the spectrum of obsessive-compulsive disorders.

Nail tic disorders [Box 1], though common, are some of the most poorly understood, researched and misdiagnosed disorders.

## ONYCHOPHAGIA

Onychophagia or nail biting is defined as “putting one or more fingers in the mouth and biting on the nail with teeth.”<sup>[4]</sup> The behavior pattern usually starts in childhood or adolescence and may persist in adulthood. The condition is usually limited to the fingernails and there is no predilection to bite any one nail.<sup>[5]</sup>

### Epidemiology

Epidemiological data on onychophagia are limited with no large scale prevalence studies. This may be because onychophagia is often not considered a disorder at all and medical attention is generally not sought. It is

often picked up by the physician accidentally, when patients present with some other disorder.

Onychophagia usually develops in childhood, after the age of 3 to 4 years.<sup>[6]</sup> In America, the prevalence of onychophagia in preschool children was reported to be 23 per cent.<sup>[7]</sup> It increases to reach a peak in adolescence and decreases thereafter as many individuals discontinue the habit. This is supported by a study which reports a prevalence of 20–33% in 7 to 10-year-old children, increasing to 45% in adolescence,<sup>[8]</sup> but with only 21.5% of men having onychophagia.<sup>[9]</sup> In India, a lower prevalence (12.7%) has been reported, with girls being more affected than boys.<sup>[10]</sup> In an Iranian study on a community sample of schoolgoing children, the rate of onychophagia in boys and girls was 20.1% and 24.4%, respectively, with 36.8% (3–44.2) of these children having a positive family history of nail biting in at least one member.<sup>[11]</sup>

### Etiology

The precise etiology is not known. It is debatable whether onychophagia is just a habit or has some underlying psychodynamics. This ambiguity is reflected in the difference in its placement in the International Classification of Diseases-11 and the Diagnostic and Statistical Manual of Mental Disorders-V.

Onychophagia is grouped under body-focused repetitive behaviors, subgroup of obsessive-compulsive-related disorder. Obsessive-compulsive-related disorder tends to overlap with obsessive-compulsive disorders in terms of clinical features, co-morbidities and response to psycho-pharmacological and behavioral therapy.<sup>[12]</sup> Probably, the act of nail biting in onychophagia is a kind of compulsion that is associated with a sense of relief after the act. This leads to a positive feedback mechanism that maintains the habit. Onychophagia is also considered as an anxiety-related disorder.<sup>[13]</sup>

In a study, young adults often engaged in nail-biting as a result of boredom or while working on difficult problems and this may reflect a particular emotional state. On the contrary, when the individuals were involved in social interaction or reprimanded for nail-biting, the behavior was less likely to be seen.<sup>[14]</sup>

Another hypothesis is that the act of nail biting acts as a mechanism to relieve stress/anxiety which is suggestive of a negative reinforcement paradigm as the

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#### Box 1: Essential terminology in nail tic disorders

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**Onychophagia:** Chronic nail biting behavior that usually starts during childhood

**Onychotillomania:** Recurrent picking and manicuring of the fingernails and/or toenails leading to visual shortening and/or extraction of the nails

**Onychotemnomania:** Result of cutting the nails too short with secondary trauma to the nails

**Onychoteiromania:** When the patient rubs the fingernails until they virtually disappear

**Onychodaknomania:** When the patient bites on single nails to gain a lustful pain; this is a psychopathological behavior and requires psychiatric help

**Perionychotillomania:** Subjects pick and tear the periungual skin; this habit, also called perionychotillomania, may be initiated by hangnails but also causes them

**Bidet nails:** Triangular worn-down nails are usually limited to the 2<sup>nd</sup>-5<sup>th</sup> fingers of the dominant hand. Similar nail abnormalities may occur as a consequence of habit tic (rubbing the fingernails) or compulsive washing

**Habit-tic deformity:** A form of nail dystrophy caused by habitual external trauma to the nail matrix resulting in nail plate changes

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individual has learned a behavior to overcome another aversive state. Hence, it acts as a drive reduction mechanism.<sup>[15]</sup>

As is well-known, stress at different stages of the psychological development of a child is associated with different psychiatric disorders. Both thumb sucking and nail biting are considered to be due to difficulty in the evolution of the oral stage of a child's psychological development.<sup>[16]</sup> While thumb sucking is initiated in infancy, nail biting manifests after 3 to 4 years of age. Some consider nail biting behavior in early childhood as a replacement for thumb sucking.<sup>[17]</sup>

### Genetic factors

Higher concordance rates among monozygotic twins as compared with dizygotic twins (66% vs. 34%) suggests a genetic basis.<sup>[17]</sup> A higher incidence of onychophagia was documented in children of parents with a history of onychophagia than without (60% vs. 15.5%).<sup>[17]</sup>

### Clinical presentation

Clinically, patients present with short and damaged nails usually accompanied with hang nails or nail fold damage. Fingernails are most often affected and the involvement is more often symmetric [Figures 1 and 2]. In severe cases, the complete nail may be lost. Patients may develop episodes of acute paronychia due to secondary infection of the traumatized nail folds. Eventually, chronic paronychia may set in. Usually, the nails are chewed and thrown out and not swallowed; ultimately, there is an irreversible shortening of the nails.<sup>[18]</sup>

Often, there are periods of remission and exacerbation which may mirror an apparent psychological stress.



**Figure 1: Shortening of nail plates of both hands in a young man with onychophagia. Note the surrounding erythema and hang nails**

During remission, normal nail growth is resumed. During exacerbations, treatment of the underlying co-morbidity is helpful.

Hemionychophagia is a relatively new terminology which was coined with respect to a 34-year-old woman who suffered a left middle cerebral artery stroke. Six months later, the patient developed asymmetric nail biting of fingernails of the left hand which was attributed to right-sided personal neglect, probably due to a functional disconnection between thalamus and cortex.<sup>[19]</sup>

### Co-morbidities

Nail biters tend to have a greater frequency of obsessive-compulsive behavior.<sup>[14]</sup> In a study of 509 individuals with obsessive-compulsive disorder, 56 were found to be nail biters, a much higher prevalence than expected in the normal population.<sup>[20]</sup>

Other co-morbid psychiatric disorders include attention deficit hyperactivity disorder (74.6%), oppositional defiant disorder (36%) and separation anxiety disorder (20.6%). Enuresis, obsessive compulsive disorder, major depressive disorder, mental retardation and pervasive developmental disorder have also been reported.<sup>[21]</sup>

### Complications

#### Physical complications

Acute paronychia is the most common complication, eventually leading to chronic paronychia. Skin surrounding the nails may show erythema, inflammation, excoriations, hang nails [Figure 3], scarring or even keloid formation in severe cases. Osteomyelitis of the underlying bone and intraosseous epidermoid cyst are rare complications.<sup>[22,23]</sup> The force



**Figure 2: Onychophagia persisting since early childhood in a 48-year-old woman**



**Figure 3: Low grade inflammation, pigmentation and hangnails secondary to onychophagia**

of biting nails can be transferred to the root of teeth and lead to apical root resorption,<sup>[24]</sup> alveolar destruction,<sup>[6]</sup> malocclusion,<sup>[25]</sup> temporomandibular disorders<sup>[26]</sup> and gum injuries.<sup>[27]</sup> Oral carriage of *Enterobacteriaceae* (*Escherichia coli* and *Enterobacter*) was found to be significantly higher in children with onychophagia.<sup>[28]</sup> Onychophagia-induced longitudinal melanonychia has also been described.<sup>[29]</sup>

### Social complications

Socially, onychophagia is considered as immature behavior that is often reprimanded by parents or relatives. Children who bite their nails are often bullied by their friends. Nail biters are often perceived as nervous, inattentive persons lacking in social skills.<sup>[30]</sup>

### ONYCHOTILLOMANIA

Onychotillomania, described by Alkiewicz in 1937, is an autoaggressive disorder that results from recurrent picking and manicuring of the nails.<sup>[31]</sup> It leads to visual shortening, distortion and, in severe cases, complete extraction of the nails.<sup>[32]</sup> Patients usually use their hands/nails to pick the affected nail, although anything accessible from scissors to knives to toothpicks may be used.<sup>[33]</sup>

Onychotillomania is 50 times less common than onychophagia. In a study conducted on 339 medical students in Poland, only 3 had onychotillomania.<sup>[32]</sup> International Classification of Diseases-10 classifies onychotillomania along with the other impulse control disorders such as trichotillomania.

As compared to onychophagia, onychotillomania has a higher propensity to be associated with underlying neuropsychiatric co-morbidities such as fixed hypochondriacal delusions, depression and obsessive-compulsive disorder.<sup>[33-37]</sup> Hence, a thorough psychiatric evaluation is imperative and may help in management of the patient as onychotillomania often regresses with correction of the underlying psychiatric disorder.

### HABIT TIC DEFORMITY

Habit-tic deformity is a form of nail dystrophy that results from habitual external trauma to the nail matrix that manifests as nail plate changes.<sup>[38]</sup> This is usually seen in adults and results from the habit of picking or pushing the cuticle backward [Figure 4].<sup>[39]</sup> The patient is often unaware or unconscious of this behavior. Although any nail may be affected, involvement of both the thumbnails is classical. The offending nail is either the contralateral thumbnail or any finger nail. With single nail involvement, usually the middle finger is implicated.<sup>[40]</sup> The cuticle is often detached, damaged and may be totally missing with loss of the adhesion of the proximal nail fold to the nail [Figure 5] thereby exposing the distal matrix leading to so-called pyramidal lunula [Figure 6]. Constant trauma to the distal matrix manifests as loss of nail sheen. Typically, patients present with a central linear depression surrounded by parallel transverse ridges running from the proximal to the distal end [Figure 7]. Overall, the nail resembles a washboard and hence the name “washboard nails.” In severe cases, lunulae may become hypertrophic and the proximal matrix may lie exposed.<sup>[40]</sup> A case of habit-tic deformity secondary to guitar playing that persisted for over 10 years has been reported. Stoppage of this activity led to spontaneous clearing of the proximal nail.<sup>[41]</sup>

This disorder is more of a habit and there is often no anxiety before the fingernail manipulation or any feeling of relief after the act. It is less often associated with psychiatric co-morbidities such as obsessive compulsive disorder.

Treatment aims at complete cessation of the habit following which the nail changes revert completely. Gentle massaging with bland ointment from the proximal to the distal end, thrice daily, was found to be effective in two-thirds of patients.<sup>[40]</sup> Use of physical



**Figure 4: The act of pushing the cuticle of thumbnail with the ipsilateral index finger**



**Figure 5: Detached, damaged and missing cuticle on thumb, index and middle finger in a young boy**



**Figure 6: Pyramidal lunula on both thumbnails exposed by the pushed cuticle. Note the lost cuticle in both nails, inflamed in the right hand and accompanied by early transverse ridging of habit tic deformity in the left nail plate**



**Figure 7: Classical "washboard" nail of habit tic deformity with parallel transverse ridging**

barriers such as bandaging or tape application on the proximal nail fold helps both by directly preventing trauma and by acting as a reminder and deterrent to the habit of picking. Recently, the use of cyanoacrylate adhesive (a kind of instant glue) has been found to be a useful and inexpensive therapeutic modality. The glue is used to recreate the barrier between the proximal nail fold and nail plate thereby preventing further trauma and allowing time for the nail matrix to heal.<sup>[39]</sup> One should be cautious about the development of contact sensitization to the glue.

In persistent cases or in those with coexisting psychiatric disorders, a trial of serotonin reuptake inhibitors (SSRIs) may be attempted.<sup>[42]</sup> Habit reversal therapy is another alternative.<sup>[43]</sup>

This condition must be differentiated from median canalicular dystrophy of Heller (dystrophia unguium

mediana canaliformis) that has a similar clinical presentation with central longitudinal splitting of the nails with multiple oblique ridges running outwardly and proximally giving a fir-tree appearance.<sup>[39]</sup> However, this entity is relatively rare and devoid of damage to the cuticle. Its precise etiopathogenesis is not known.<sup>[40]</sup>

#### **OTHER NAIL TIC DISORDERS**

Published reports about the following nail tic disorders is scanty.

##### **Onychotemnomania**

Patients have a tendency to cut the nails extremely short, with scissors, blade or knife, sometimes going as far as up to the proximal end of the nails.<sup>[40]</sup> This leads to extremely small nail plates with exposed distal nail

beds. It is considered a severe variant of factitious nail disorder.

### Onychoteiromania

Onychoteiromania refers to extremely thin nails that crack or split easily with excessive filing or rubbing of the nail surface.<sup>[44]</sup> Patients may even file the nail folds and in worse cases, the nail bed epithelium may be reached.<sup>[40]</sup> Onychoteiromania has been considered analogous to trichoteiromania (compulsive rubbing of hair).<sup>[45]</sup>

### Onychodaknomania

It is an extremely rare and almost frankly psychotic behavior where the patient bites the fingernails between his teeth (between the premolars or the canines) and is extremely painful.<sup>[44]</sup> The condition is strongly associated with an underlying psychiatric disorder. This maneuver leads to the development of irregular and deep depressions on the nail plate surface along with punctate or striate leukonychia. It is a self-mutilating behavior which is often denied and warrants a thorough psychiatric evaluation. It may respond well to combination therapy with anti-psychotics and antidepressants.<sup>[46]</sup>

### Bidet nails or worn down nail syndrome

Bidet nails were first reported by Baran and Moulin in three unrelated French women who presented with a remarkably similar clinical presentation of a triangular defect in the nail plate with its base at the thinnest free edge of the nail. All three had a common obsession about their personal vaginal hygiene. The nail defect was acquired from trauma inflicted by cleaning against the glazed earthenware

of the bidet.<sup>[47]</sup> Subsequently, many cases have been described with one of them developing secondary to a habit tic in an 8-year-old girl.<sup>[48]</sup> Classically, bidet nail involves the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> fingernails of the dominant hand. Dermoscopy of the affected nails demonstrates dilated capillaries and pinpoint hemorrhages.<sup>[48]</sup> All these changes revert on complete cessation of the habit. Bidet nails may also be considered as a variant of onychoteiromania.<sup>[44]</sup>

### Perionychotillomania

It is the habit of picking and tearing the periungual skin, also known as perionychophagia. The presence of hangnails may be the initiating factor. However, this habit itself leads to the development of hangnails, creating a vicious cycle of picking and tearing the periungual skin [Figure 3].

### Onycholysis semilunaris

This is a very common but often underrecognized factitious nail disorder that primarily afflicts women. Clinically, it presents with a sharp, distal, asymmetric onycholysis without any evidence of inflammation [Figure 8], particularly without the proximal brownish-red margin characteristic of psoriasis [Figure 9]. Classically, a semi-lunar shape is described in one or many nails, both in the dominant and non-dominant hand, that results from vigorous manicure with hard brushes, or use of chemicals to clean the distal nail fold. This leads to injury to the hyponychium and tends to push the distal nail fold backward. Fingernails are more often affected and many times, secondary bacterial colonization occurs, especially by *Pseudomonas*, at times forming



**Figure 8: Classical onycholysis semilunaris with a white onycholytic nail plate and a regular margin in a 32-year-old woman**



**Figure 9: Psoriatic onycholysis in a 40-year-old woman with a classical reddish-brown band of discoloration just proximal to the irregular onycholytic margin**

biofilms. The hyponychium acts as an empty recess under the nail plate and keeps on accumulating dirt, thereby reinforcing the habit of cleaning this recess and thereby aggravating the onycholysis. Treatment is difficult as patients usually deny the habit of vigorous cleaning. The biofilms interfere with attachment of the nail plate to the separated nail bed. Thus, nails have to be cut short to the point of attachment and the free finger tips must be kept microbe-free by twice daily application of antibiotic creams. Monthly evaluation and trimming of nails may be necessary for a long period before complete resolution.<sup>[40]</sup>

### Lacquer nail

Lacquer nail has significant overlap with worn down nail syndrome. It occurs as a result of excessive rubbing of the nail plate with nail filers provided with topical antifungal nail lacquers.<sup>[49]</sup>

## MANAGEMENT

A thorough evaluation of psychiatric co-morbidities is a prerequisite before choosing the most appropriate therapeutic modality. Different treatment modalities have been tried for nail tic disorders but there is a scarcity of systematic studies evaluating the efficacy and level of evidence. N-acetylcysteine has been tried with limited efficacy in onychophagia.<sup>[50]</sup> Clomipramine was found to be more efficacious in onychophagia than desipramine in a double-blind study.<sup>[51]</sup> In onychophagia, there is preliminary Level 2 support for the first-line use of selective serotonin reuptake inhibitors (SSRIs) and strong Level 2 evidence for the first-line use of behavioral therapy.<sup>[52]</sup> Although selective serotonin reuptake inhibitors (SSRIs) are effective in severe onychophagia and onychotillomania, there are reports of treatment-emergent mania in patients with co-morbid bipolar disorder. Lithium was reported to be effective in severe onychophagia associated with bipolar disorder.<sup>[53]</sup> In patients with coexistent depression, treatment with bupropion, a norepinephrine-dopamine reuptake inhibitor, was found to improve the depression, associated sexual dysfunction and onychophagia.<sup>[54]</sup> Hence, it is essential to evaluate a patient comprehensively and to individualize treatment depending upon the severity of the tic disorder and the underlying co-morbid psychiatric condition, if any.

In addition to psycho-pharmacological treatment, various non-pharmacological modalities have been

tried such as psychotherapy, hypnosis, cue-controlled relaxation and various behavioral treatments. There is strong Level 2 evidence for the first-line use of behavioral therapy.<sup>[52]</sup>

In behavioral therapy, various techniques can be used such as non-removable reminders for onychophagia,<sup>[55]</sup> progressive muscle relaxation, self-help techniques,<sup>[56]</sup> habit reversal,<sup>[57]</sup> aversion therapy, competing response therapies to improve nail length<sup>[58]</sup> and positive reinforcement.

## CONCLUSIONS

Nail tic disorders are common yet poorly explored and grossly under-reported. There is a scarcity of data pertaining to their prevalence and there are no standard treatment guidelines. As nail tic disorders involve cosmetic concerns also, it is imperative for dermatologists to have adequate knowledge of their clinical presentation and associated psychological co-morbidities.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

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