

Ministry of Defence

Synopsis of Causation

Obsessive Compulsive Disorder

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Disclaimer

This synopsis has been completed by medical practitioners. It is based on a literature search at the standard of a textbook of medicine and generalist review articles. It is not intended to be a meta-analysis of the literature on the condition specified.

Every effort has been taken to ensure that the information contained in the synopsis is accurate and consistent with current knowledge and practice and to do this the synopsis has been subject to an external validation process by consultants in a relevant specialty nominated by the Royal Society of Medicine.

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1. Definition

- 1.1. Obsessive-compulsive disorder (OCD) is a relatively common neuropsychiatric disorder. It is, according to the European diagnostic classification (International Classification of Diseases 10; ICD-10) designated as belonging to the anxiety disorders.¹
- 1.2. The core feature of OCD, common to both the European and US classification systems, is the presence of disabling obsessions and/or compulsions, which interfere with normal function and which cause anxiety and distress. The European classification, ICD-10, does not state specific timescales for the symptoms to have interfered with function, only requiring that obsessional symptoms “be present on most days for at least 2 successive weeks.” The US Classification system, DSM-IV, states that the individual must experience obsessions and/or compulsions which are severe and time consuming (at least one hour per day) or which “significantly interfere with the person's normal routine, occupational (or academic) functioning, or usual social activities or relationships.”² The degree of symptoms at which OCD can be diagnosed is slightly higher, therefore, in DSM-IV.

2. Clinical Features

2.1. Demographics

- 2.1.1. The lifetime prevalence of OCD in the general population is 1.9%-3.1%.³
- 2.1.2. The incidence of OCD in service personnel is uncertain. Most of the information comes from US studies which have typically looked at Vietnam veterans. Lifetime prevalence rates among Vietnam veterans range from 0.5% – 5.5% depending on severity of “war zone stress”.⁴ However, the design of this study by Jordan *et al* (1991) did not permit the authors to determine whether the illness predated combat exposure.
- 2.1.3. Most epidemiological studies using structured interviews show that more women than men are affected by OCD, with female:male ratios for lifetime prevalence ranging from 1.1 to 3.1.³ Recent studies of the UK population reveal rates of approximately 1% in men and 1.5% in women.⁵
- 2.1.4. The peak age of onset is between 16 and 24 years,⁵ with men having a mean age of onset below that of women⁶ although most patients present to psychiatric services approximately 7 years after onset of symptoms.⁷

2.2. Differences in presentation according to gender

- 2.2.1. A history of birth trauma is reported more commonly in males than females, and males appear to have an earlier age of onset.⁸ Some authors have suggested that early-onset forms of OCD may be a sub-type of OCD, with characteristics such as: male preponderance; comorbidity with tics and Tourette’s syndrome; comorbidity with attention-deficit disorder; and a family history of OCD.⁹
- 2.2.2. In contrast, OCD in females tends to have a later age of onset and women with the disorder are more likely to be married. They also have higher rates of other comorbid anxiety disorders (e.g. generalised anxiety disorder, social phobia, and panic disorder).⁸

2.3. Diagnostic guidelines. In the European classification, obsessional or compulsive symptoms, or both, should be present most of the time for at least a two-week period. They are required to cause distress or interfere with the individual’s normal functioning. The obsessive and/or compulsive symptoms should be:

- 2.3.1. *Recognised as the individual’s own thoughts or impulses.* This typically differentiates the symptoms from psychotic disorders where the intrusive thoughts may be attributed to an outside agency or force.
- 2.3.2. *Unpleasantly repetitive.* The individual must experience distress or anxiety in association with the repetition of the thoughts or acts.
- 2.3.3. *Resisted.* Although the individual may offer little resistance to the act itself, they should attempt to resist its repetition. In most cases, resistance diminishes with duration of illness.

- 2.3.4. *Not pleasurable in themselves.* Although people may experience a reduction in anxiety on carrying out compulsive acts, the act itself should not be pleasurable.
- 2.4. DSM-IV offers more clarification, adding that the content of the obsessions or compulsions should not be wholly related to another psychiatric disorder, for example depressive ruminations resulting from an affective disorder.
- 2.5. **Obsessions** are thoughts, fears, doubts, words, or images which are experienced as being intrusive, unpleasant, and repetitive. Obsessions can take many forms. The most common types are:
- 2.5.1. **Obsessional images** are vivid, intrusive, and often of a violent or sexual nature.
- 2.5.2. **Obsessional thoughts** are repetitive thoughts which interfere with the normal train of thought, and attempts to exclude them lead to distress. The thoughts may be words, phrases, or rhymes, for example, and they are often violent, obscene, or blasphemous.
- 2.5.3. **Obsessive ruminations** are endless internal debates which are typically inconclusive, but nevertheless persistent.
- 2.5.4. **Obsessive doubts** are worries over actions which have been performed, or not performed. Common doubts include not locking doors, or not switching appliances or the gas off.
- 2.5.5. **Obsessional convictions** involve the implicit belief that one's thoughts are equivalent to actions. For example, "if I think of him dying, then he'll die."
- 2.5.6. **Obsessional slowness** is slow activity which is out of proportion to other symptoms. It tends to affect goal-directed activity specifically (i.e. that which is intended to achieve a purpose) – automatic activity is carried out at normal speed. It is more common in men.
- 2.5.7. **Obsessional orderliness/symmetry.** Typically, the patient will be preoccupied by tidiness, order, and the layout of possessions or ornaments. They will characteristically feel compelled to keep readjusting objects long beyond that considered reasonable by the average person.
- 2.6. **Compulsions** are repetitive acts which an individual may perform incessantly in a rigid and stereotypical manner. They are often related to a particular obsession. For example, an individual with an obsessional fear of contamination may clean compulsively. Classically, compulsive rituals are performed to reduce anxiety or tension associated with the obsession. Common compulsions include:
- 2.6.1. **Cleaning.** This may involve excessive hand washing or cleaning of surfaces, cutlery, crockery, etc.
- 2.6.2. **Counting.** The person frequently counts to specific numbers, often in order to prevent some unspecified catastrophe.

2.6.3. **Checking.** Commonly associated with obsessional doubts, checking compulsions involve the repetitive checking that doors have been locked, switches turned off, or gas turned off, etc.

2.7. Differential diagnosis

2.7.1. **Schizophrenia.** Obsessional-compulsive symptoms in patients with schizophrenia have been reported to occur at a greater rate than that expected,¹⁰ and they appear to forecast a worse prognosis in schizophrenia.¹¹ Some have postulated similar involvement of neural circuits.¹² In terms of the differential diagnosis, in most cases other psychotic symptoms which do not occur in OCD, such as delusions and/or hallucinations and lack of insight, help to make the diagnosis clearer.

2.7.2. **Other anxiety disorders.** It may sometimes be difficult to differentiate OCD from other anxiety disorders such as generalised anxiety disorder or specific phobias, especially when intrusive thoughts or anxious ruminations are present. However, compulsive behaviour generally does not occur in other anxiety disorders, and the key features of obsessions and compulsions discussed above are absent in other anxiety disorders.

2.7.3. **Anankastic personality disorder.** Whilst anankastic personality disorder may present with recurrent doubts and obsessions with order and rules, the degree of functional impairment with OCD tends to be greater. Furthermore, the obsessions in OCD cause marked subjective anxiety and distress – the obsessive behaviour in anankastic personality disorder is not ego-dystonic. Compulsive behaviour of the type seen in OCD is generally not seen in anankastic personality disorder. In terms of age of onset, personality disorders must be present for most of the individual's adult life and the symptoms are much more likely to be stable, and with less clear onset than in OCD.

2.8. **Comorbidity.** Up to two-thirds of patients with OCD will have another major psychiatric diagnosis.¹³

2.8.1. **Depressive illness.** Up to one-third of patients with OCD may develop a comorbid depressive illness, with depressive symptoms having a negative effect on outcome.¹⁴

2.8.2. **Anxiety disorders.** Although anxiety is a common factor in both OCD and other anxiety disorders, the lifetime risk of having another anxiety disorder in OCD is elevated.⁶ The most common comorbid anxiety disorders reported are: generalised anxiety disorder (17.9%); social phobia (2.1%); and panic disorder (1.8%).¹⁵

3. Aetiology

- 3.1. The exact aetiology of OCD is unknown and whilst a number of theories have been put forward to explain the disorder, none is sufficient to account for all aspects of symptoms and the response to psychological, pharmacological, and neurosurgical treatments.
- 3.2. There is some convergence in opinion in recent years that many aspects of OCD are related to dysfunction of the basal ganglia, and OCD shares many characteristics with other disorders where there are abnormalities of basal ganglia function such as Tourette's syndrome.¹⁶ Furthermore, many believe that OCD shares pathophysiological links with other disorders such as trichotillomania and body dysmorphic disorder.¹⁷ Understanding of the neural circuitry of anxiety has helped to forward an understanding of the psychological aspects of obsessive-compulsive symptoms.
- 3.3. **Psychological theories**
 - 3.3.1. **Behavioural theories.** Behaviourists argue that obsessions are conditioned stimuli, and compulsions are responses which are learned in order to reduce anxiety, the nature of which may arise because of the significance that individuals attach to obsessional thoughts.
 - 3.3.2. **Psychoanalytical descriptions.** Psychoanalysts view OCD as arising from defence mechanisms that protect the person from conflicting desires and impulses. These defences include *isolation* (the separation of an idea from its emotional content) and *undoing* (reversing the consequences of an action, typically with a compulsive act). Such a viewpoint is arguably outdated and unsupported by the evidence.
 - 3.3.3. **Cognitive theories.** A variety of cognitive-behavioural explanations have been proposed as mechanisms for obsessive-compulsive symptoms. Early theories described obsessional thinking as being reflections of difficulties in the determining of categories and boundaries, and the overstructuring of sensory input. Recent developments have expanded on such theories to propose that early life experiences lead to dysfunctional perceptions of the self and a world-view that the world is generally threatening.¹⁸
 - 3.3.4. Modern cognitive explanations of obsessive-compulsive symptoms suggest that symptoms arise out of a belief system where the individual has an inflated sense of responsibility and guilt, and that harm will come to others as a result of their thoughts and actions. Neutralising behaviours (such as compulsive behaviour or thinking a 'good' thought after a 'bad' one) are an attempt to avoid being blamed, or being responsible.¹⁹⁻²¹ The concept of 'Thought-Action Fusion' has been developed to describe the apparent assumption that the thought of something happening (e.g. family being harmed) will make it more likely to occur, and/or the belief that having the thought (e.g. harming one's family) is equivalent to the act itself, both morally and in terms of personal responsibility.²²
 - 3.3.5. The extent to which such dysfunctional patterns of thinking are a consequence of abnormalities in brain function, or whether the cognitions and anxiety result in changes in brain activity, have yet to be determined.

- 3.4. **Genetic contributions.** The ratio of OCD between identical and non-identical twins is 80% and 25% respectively, suggesting that shared genetics is involved. Furthermore, 35% of first-degree relatives of an OCD sufferer also have the illness.
- 3.4.1. A genetic marker has been described in children that may make some individuals more susceptible to developing a cluster of symptoms (which include obsessive-compulsive symptoms, attentional deficits, and hyperactivity) in response to Group A beta-haemolytic streptococcal infection.^{23,24} It is speculated that infection produces antibodies which react with basal ganglia antigens, causing nerve damage.²⁵ Whilst these findings implicate the basal ganglia in the development of obsessive-compulsive symptoms, such a mechanism is very unlikely to account for the majority of cases of OCD.
- 3.5. **Neuroimaging.** Information from neuroimaging studies has provided useful clues about the possible underlying abnormalities of brain function that may underlie symptoms in OCD. For example, many studies have reported that symptom provocation is associated with hypermetabolism in the right orbitofrontal cortex, caudate nucleus, and anterior cingulate cortex.^{26,27} Overall, the data would suggest abnormalities in the orbitofrontal cortex, cingulate cortex, and the basal ganglia, which appear to normalise with response to treatment.²⁸ In addition, cognitive therapy has been demonstrated to reduce regional cerebral blood flow (rCBF) in the right head of the caudate nucleus as well as the orbitofrontal cortex.^{29,30} However, it must be remembered that such findings may be the result of obsessive-compulsive symptoms and not the cause *per se*.
- 3.6. **Structural brain abnormalities.** Along with findings from functional neuroimaging, there are also reports of abnormal brain structure in OCD. It has been hypothesised that reduced volumes of the orbital frontal cortex and amygdala in patients with OCD indicate a structural abnormality of these brain areas.³¹ It is not known whether such abnormalities result from the illness or are responsible for it, and it should be noted that there are few consistent findings across studies. Further, many imaging studies lack sufficient numbers to draw definitive conclusions³² and differences between studies may reflect heterogeneity in the disorder itself.
- 3.7. **Neural circuitry and a proposed pathophysiology of OCD.** Current biological theories are beginning to converge on the hypothesis that the symptoms in OCD represent dysfunction in a number of specific circuits which involve the brain areas mentioned above, and specifically the basal ganglia. Such circuits should be considered to be functional rather than structural, and in many cases are theoretical.
- 3.7.1 There appear to be closed pathways, or ‘loops’, connecting the frontal cortex with areas of the basal ganglia, including the striatum, the globus pallidus, and the thalamus. These pathways allow the processing of different components of cognition and behaviour. For example, the cortico-striatal-thalamic-cortical (CSTC) loop passes through the anterior limb of the internal capsule. Abnormalities have been detected in the fibre bundles of the internal capsule, to the extent that they can be correlated with right hemispheric dysfunction in cases of OCD.³³
- 3.7.2 Other areas of the brain are strongly implicated in the generation of anxiety in OCD. The amygdala mediates fear responses and is involved in the generation of anxiety in response to conditioned fear stimuli. The anterior cingulate cortex

(ACC) is activated during decision-making and the control of attention, and may have a role in selecting specific behavioural responses based on perceived reward. Finally, the thalamus is involved in the ‘gating’ of information passing through it, including information passing between the frontal cortex and limbic regions such as the amygdala.

3.8. Biochemical abnormalities

- 3.8.1. **Dopamine.** Evidence for the involvement of dopamine in the pathophysiology of OCD comes from a number of observations: Firstly, dopamine antagonists are effective augmentation agents for OCD, although they have little efficacy by themselves. Patients with motor and vocal tics who have not responded to selective serotonin reuptake inhibitors (SSRIs) alone are more likely to respond to antipsychotic augmentation of the SSRIs.³⁴ Secondly, animal studies show that compounds which result in an increase in cerebral dopamine (e.g. amphetamine) cause stereotyped movements in animals and this can be blocked with dopamine antagonists.³⁵ Thirdly, the overlap between OCD symptoms and disorders of basal ganglia function (e.g. Tourette’s syndrome) which involve dysfunction of dopamine, points towards a role of dopamine in the disorder. However, biochemical markers of central dopamine activity are less developed than those for serotonin function, and the results so far are inconclusive.
- 3.8.2. **Serotonin.** The strongest evidence for serotonergic dysfunction in OCD comes from the fact that drugs which block serotonin reuptake (such as clomipramine and the SSRIs) are effective anti-obsessional agents. Studies looking at the 5-HT metabolite 5-HIAA in CSF are contradictory with most cases of OCD showing no difference from controls.³⁶ Neuroendocrine testing is also equivocal. However, long-term treatment with anti-obsessional drugs tends to reverse neuroendocrine abnormalities.³⁷

3.9. Other factors

- 3.9.1. **Military service.** There is little convincing evidence for combat trauma causing OCD in service personnel. Sasson *et al* reported on a small case series of 13 Israeli servicemen for whom the development of post-traumatic stress disorder (PTSD) and OCD was contemporaneous following a traumatic experience.³⁸ Many of these individuals experienced contamination obsessions after exposure to severe bodily trauma in others. However, in one of the four cases reported in any detail, the trauma was unrelated to current military service and involved exposure to terrorist actions. The nature of the trauma is not reported for 9 of the 13 cases. Furthermore, such findings have not been confirmed in much larger studies or studies involving service personnel in countries where military service is not compulsory.
- 3.9.2. A number of case reports have proposed a link between traumatic experiences and the development of OCD and PTSD.^{39,40} For most of these cases, the traumatic experience comprised an attack, sexual assault, (road traffic) accident, or childhood sexual abuse. Other studies have contested such a link, arguing that a combination of depression and overlap of symptoms (such as intrusive thoughts) may explain the association.⁴¹

3.9.3. **Psychological Stress.** In the 44 cases presented by Rasmussen and Tsuang⁶, only 25% of patients could recall an environmental stressor that may have triggered the disorder. Such stresses included the birth of a child, job promotion, loss of job, or the death of a family member. However, in the cohort examined by Lensi *et al*, 64.2% of subjects reported significant life events prior to the onset of OCD.⁸ It is possible that for some people compulsive behaviour may be reinforced by its anxiety-reducing effects, but despite speculation, there is no compelling evidence that psychological stress or traumatic experiences by themselves can trigger OCD.

4. Prognosis

- 4.1. OCD is recognised as being a chronic disorder.² Symptoms can be very persistent, and full sustained remission is relatively infrequent in those referred to specialist services. A 40-year follow-up of 144 patients with OCD found improvement in 83%, complete recovery in 20%, but ongoing subclinical symptoms in 28%.⁴² This large, long-term study concluded that 48% of patients had had OCD symptoms for over 30 years. Poorer outcome was associated with early age of onset, low social functioning, and a chronic course of illness. A two-year follow-up of 66 patients recruited within a university-based OCD clinic found that the probability of full remission was 12% and the probability of partial remission was 47%, this despite 68% of patients receiving adequate doses of serotonin-reuptake inhibitors for longer than 12 weeks. Only 18% received a full trial of behaviour therapy.⁴³
- 4.2. Little is known about individuals who do not receive treatment. For those that do, results from pharmacological treatment studies show that the response is frequently only partial. Probability of partial remission (an episode at less than full criteria) over 5 years is 53%.⁴⁴ At least 40% of cases do not show a satisfactory response to first-line pharmacological treatment.⁴⁵
- 4.3. OCD is frequently comorbid with anxiety disorders and depression^{14,15} and often results in significant impairment of function and quality of life.⁴⁶
- 4.4. **Good prognostic indicators.** Factors associated with a better prognosis include:
 - Milder symptoms
 - Shorter duration of symptoms
 - Absence of childhood symptoms
 - Absence of abnormal personality traits
- 4.5. **Poor prognostic indicators.** Factors associated with a worse prognosis include:
 - Symptoms involving the need for symmetry and exactness
 - Male sex
 - Earlier age of onset
 - Family history of OCD
 - Presence of hopelessness, hallucinations, or delusions
- 4.6. **Comorbid PTSD and treatment outcome.** A number of authors report a relationship between active symptoms of PTSD and poor response to anti-obsessional treatments but the numbers are small and there are no large studies to confirm such a finding.^{38,47}

4.7. Approaches to treatment

- 4.7.1. In most cases of adult OCD, initial treatment should be with psychological therapies such as cognitive behavioural therapy (CBT) or exposure and response prevention (ERP).^{48,49} However, in the UK, limited availability may restrict access to such therapies,⁵⁰ and behavioural treatments are often underused.⁴³
- 4.7.2. In more severe cases, it is common practice to use either CBT or ERP in combination with a serotonergic antidepressant drug.⁴⁸

4.8. Psychological treatments

- 4.8.1. Two forms of psychological treatment are used to reduce symptoms in OCD, and in clinical trials they appear to be broadly equal in effectiveness.⁵¹
- 4.8.2. **Cognitive behavioural therapy (CBT)** focuses on underlying assumptions about doubts and/or checking behaviour, and examines the meaning that intrusive thoughts have for the individual. The therapist aims to reach a shared understanding of the way that the patient's symptoms and disorder affects them and the meaning and significance that their symptoms have for them. By helping the patient conceptualise alternative ways of managing their intrusive thoughts, and interpreting them differently, the anxiety is reduced and the symptoms become less problematic. CBT involves a number of stages, from analysis of the problem and target-setting, through belief modification and behavioural experiments, to establishing strategies for relapse prevention. CBT is frequently combined with anxiety management techniques and is regularly used to treat obsessional ruminations, which traditionally respond less well to ERP.
- 4.8.3. Different techniques that have been used include:
- *challenging obsessional thoughts* – the therapist attempts to help find alternative approaches to the thoughts;
 - *challenging negative automatic thoughts* – the therapist aims to tackle the beliefs that the individual has in response to the thoughts; and
 - *thought stopping* – the individual is taught ways to interrupt the obsessional thoughts
- For a review, see James and Blackburn (1995).⁵²

- 4.8.4. **Exposure and response prevention (ERP)** tends to be most effective for compulsions, although it can be used for obsessional thinking. Firstly it involves the individual exposing themselves to triggers for the obsessions and secondly, the active prevention of compulsions and other neutralising behaviours when faced with a specific fear or obsession. The treatment involves the individual working through a hierarchy of anxious situations until the anxiety reduces through a process called 'habituation'. Recent research has suggested that intensive ERP may be the most effective treatment for OCD.⁵³ Due to the necessary exposure to anxiety-provoking situations, many individuals either refuse ERP treatment, or fail to complete an adequate course.

4.9. Pharmacological treatment

- 4.9.1. The most effective drugs are those with high activity on serotonergic systems, namely the tricyclic antidepressant clomipramine, and the selective serotonin reuptake inhibitors (SSRIs) such as fluoxetine and paroxetine. The mean response rate to SSRIs is approximately 50%.⁵⁴
- 4.9.2. Clomipramine has been found to have greater effectiveness compared to the SSRIs⁵⁵ but the SSRIs tend to be first-line treatment due to greater tolerability. For treating OCD, doses of SSRIs are generally higher than those used to treat depression, with fluoxetine 60mg per day being typical. Treatment for at least 12 weeks (compared to 6 weeks in depression) is often required before concluding that the treatment is ineffective.
- 4.9.3. For those patients who do not respond to a number of trials with SSRIs or clomipramine, and in those with comorbid tic disorders, adjunctive treatment with an antipsychotic has demonstrated efficacy in controlled trials.⁵⁶

4.10. Neurosurgery for mental disorder (NMD)

- 4.10.1. A very small number of individuals will have no appreciable improvement in symptoms despite aggressive and protracted treatment with medication and psychological therapies. For some patients, ablative neurosurgery may offer some hope of symptom improvement. Bilateral anterior cingulotomy and bilateral anterior capsulotomy are the procedures with the greatest evidence base, with up to 85% of patients showing some improvement after surgery.⁵⁷ The difficulty in evaluating the outcome following NMD means that there remain considerable uncertainties about the treatment and many still consider it to be experimental.
- 4.10.2. Newer treatments include deep brain stimulation (DBS), which involves electrical stimulation, using implanted electrodes, of brain regions such as the anterior limbs of the internal capsule.⁵⁸ DBS should be considered experimental with only 27 patients having undergone such treatment to date, and its role in the treatment of OCD has yet to be determined.

5. Summary

- 5.1. OCD is a complex neuropsychiatric disorder in which the individual experiences obsessions and/or compulsions which interfere with normal function
- 5.2. The exact aetiology is, as yet, uncertain, but a combination of genetic predisposition and a disturbance of normal brain function are likely to be involved.
- 5.3. The most effective treatment is a combination of antidepressant medication and psychological therapy, such as cognitive behavioural therapy (CBT) or exposure and response prevention (ERP).
- 5.4. Although most people will experience some improvement in symptoms with treatment, chronicity is common and many individuals will not experience full symptomatic relief.

6. Related Synopses

Bipolar Affective Disorder

Schizophrenia

Depressive Disorder

7. Glossary

5-HIAA	5-hydroxyindoleacetic acid, a metabolite of 5-HT (serotonin), which is commonly measured in cerebrospinal fluid (CSF) as a marker for central 5-HT turnover.
anterior capsulotomy	A neurosurgical treatment that involves bilateral lesions being placed in the anterior limbs of the internal capsule, which carries information from the frontal cortex to areas such as the basal ganglia and limbic system (which is involved in mood regulation).
anterior cingulotomy	An ablative neurosurgical treatment for severe and chronic depression and OCD which places lesions in the anterior cingulate cortex.
basal ganglia	<p>The basal ganglia consist of:</p> <p>Striatum = caudate nucleus, putamen, and nucleus accumbens.</p> <p>Corpus striatum = striatum, globus pallidus.</p> <p>Lentiform nucleus = putamen + globus pallidus.</p> <p>The basal ganglia have a wide variety of roles including the integration of emotion and movement, motivation, suppression of unwanted motor behaviours, initiation of movement, and fine motor control.</p>
regional cerebral blood flow (rCBF)	Measured by specialised imaging techniques. Greater flow is associated with increased activity in that brain area.
Tourette's syndrome	Gilles de la Tourette syndrome/Tourette syndrome is a neurological disorder characterised by persistent motor and/or vocal tics. It usually presents in childhood.
trichotillomania	Compulsive hair-pulling.

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