



Published in final edited form as:

*Ann Clin Psychiatry*. 2008 ; 20(4): 199–203. doi:10.1080/10401230802437365.

## Case Series: Sensory Intolerance as a Primary Symptom of Pediatric OCD

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### Abstract

**Introduction**—Marked intolerance or intrusive re-experiencing of ordinary sensory stimuli that in turn drive functionally impairing compulsive behaviors are occasionally seen in young children with OCD.

**Methods**—We describe a number of children with DSM-IV OCD ascertained from a family genetic study of pediatric OCD, whose intolerance of ordinary sensory stimuli created significant subjective distress and time-consuming ritualistic behavior that was clinically impairing.

**Results**—In each case, these sensory symptoms were the primary presenting symptoms and were experienced in the absence of intrusive thoughts, images, or ideas associated with “conventional” OCD symptoms.

**Conclusions**—These symptoms suggest abnormalities in sensory processing and integration in at least a subset of OCD patients. Recognition of these sensory symptoms and sensory-driven behaviors as part of the broad phenotypic variation in children with OCD could help clinicians more easily identify OCD patients and facilitate treatment.

## Keywords

Obsessive Compulsive Disorder; Sensory Phenomena; Children

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## INTRODUCTION

Obsessive Compulsive Disorder (OCD) is one of the most prevalent psychiatric disorders affecting children and adolescents with population prevalence estimates of 1–2% (1,2). DSM IV-TR (3) defines the disorder by the presence of obsessions and/or compulsions that 1) are time consuming, 2) cause subjective distress and 3) cause functional impairment. The children's Yale-Brown Obsessive-Compulsive Disorder Checklist (CY-BOCS) contains over 60 such symptoms that are divided into major thematic categories such as contamination or hoarding. However, some repetitive behaviors *not listed* on the CY-BOCS and seen less commonly, predominantly in younger children, may yet satisfy all three DSM-IV criteria. An example of unusual OCD phenomena in children with OCD are marked intolerance or intrusive re-experiencing of ordinary sensory stimuli that in turn can drive functionally impairing compulsive behaviors. Such sensory symptoms may even be the *only* OCD symptoms present in some children. Because they are rarely reported and because they are not listed on commonly used assessment measures, there is a risk that such symptoms will not be recognized as part of the OCD symptom repertoire.

Sensory phenomena that precede or accompany repetitive behaviors in cases of OCD and Tourette's syndrome (TS) have been described (4–9) including bodily sensations, mental urges, and a sense of inner tension. Bodily sensations may be focal or generalized and include tactile (e.g., an oily feeling on the hands), musculo-skeletal (e.g., muscle tension in the neck) or visceral (e.g., stomach full of air leading to repetitive belching) discomfort (4). “Not just right experiences” include perceptions such as clothes not feeling right on one's body, or that when entering a familiar place, things somehow look different (8). We now describe a number of children with DSM-IV OCD ascertained as part of a family genetic study of 130 cases of pediatric OCD (PI DG) whose intolerance of ordinary sensory stimuli created significant subjective distress and time-consuming ritualistic behavior that was functionally impairing. Briefly this study comprehensively assessed children with OCD in multiple domains using parent and child structured diagnostic interviews using the Kiddie-SADS-E (10), clinical assessment including the CY-BOCS, and best estimate diagnoses (11) (methods are detailed in Geller et al. (12)). We present six cases exemplifying several sensory modalities to highlight the underlying sensory integration difficulties seen in this unusual presentation. In each case, sensory symptoms were experienced in the absence of any intrusive thoughts, images, or ideas (typical obsessions). In some, affects other than anxiety, such as disgust or abhorrence, seemed to be more important in driving compulsions. All children were medically well, had normal IQ and none met criteria for *either* specific or pervasive developmental spectrum disorders. Relevant clinical correlates are shown in Table 1.

Our aim is to help clinicians identify such symptoms as OCD-related, and to begin a discussion about broadening our understanding of the OCD phenotype that could in turn inform future research efforts. To this end we discuss our cases using the limited extant literature on this subject. The hospital IRB approved submission for publication of these anonymous case reports.

### Case 1

Christine presented with intolerance of clothing. Parents reported that she laid out multiple sets of underwear on her bed each morning trying each pair in sequence until she was able to

find one that was comfortable enough to wear. She would also tie and re-tie her shoes endlessly, complaining about the tension of her shoelaces and the feeling of her socks. She did not report any ideas, thoughts, or images preceding these repetitive behaviors. Dressing for school rarely took less than one hour and she was frequently tardy. Neither encouragement, nor rewards, nor punishment were helpful in enhancing her ability to tolerate an item of clothing that she felt as “uncomfortable.” She also demonstrated other more typical OCD behaviors including repeating and checking.

#### **Case 2**

Andrea's parents brought her in during a mid-winter New England storm wearing only a light cotton T-shirt. She had refused to wear any pants or dresses for months complaining that her clothes were uncomfortable. As a result she often went about the house naked and had been unable to attend school for several months. She reported no fears or obsessions related to this discomfort, and only mild contamination symptoms.

#### **Case 3**

Jonathan had many avoidance behaviors that were driven by the uncomfortable sensation of either popcorn butter or oily lotions on his skin, especially his hands. He had avoided movie theaters for over a year so as not to be around popcorn. He stated that if exposed to these things, he would feel like “jumping out of my skin.” Any perceived exposures led to extreme distress and compulsive washing. These avoidance and repetitive behaviors were not associated with typical contamination fears. There were more conventional symptoms of checking, ordering and arranging as well. Father said that as a young boy, Jonathan felt compelled to touch things with an odd texture.

#### **Case 4**

Tyler was distressed by certain common household smells, which led to avoidance of certain objects at home, such as the telephone earpiece or the sheets of his parents' bed that he believed emitted a peculiar smell he could not tolerate, even when freshly laundered. He repeatedly smelled his hands to check for these odors. He was unable to tolerate innocuous sounds that his father made such as drawing in air while breathing or picking at his cuticles and could not be in the same room with him. There were also more typical symptoms of OCD, including fear of contamination and compulsive hand washing, bathing and grooming. He picked at his nose compulsively.

#### **Case 5**

Travis presented with strong intolerance to smells of certain foods. If fish, salad dressing or “smelly” cheese were served at meals he would become distressed, angry and leave the room, insisting on eating in another part of the house. He would also spit his saliva on the floor to remove the taste and smell of unwanted odors in a compulsive fashion and in absence of any related thoughts or ideas. As a younger child he would only wear a limited number and type of clothes due to discomfort. He also had typical contamination symptoms of OCD including fear of burglars, germs and hand washing up to 50 times per day, checking, repeating and perfectionism.

#### **Case 6**

Taylor complained of unwanted intrusive sensory experiences. More specifically, if she heard her parents or brother whistling, snapping their fingers, rubbing their hands together, sniffing, singing, speaking in unusual voices such as they might to a pet, or chewing gum, she complained that these noises remained in her mind and “bugged” her. She also complained of intrusive re-experiencing of these unwanted sounds and rapidly became angry

if parents did not stop these behaviors. During the evaluation, she became very irritable when her parents rubbed their hands together or simply shifted in their seats. In order to deal with the intrusive sounds she would put on headphones and listen to music very loudly. She brought her fingers to her ears, put her fingers into her ears or pushed her ear lobes over her ears to block her ear canals to the point of creating small injuries on her skin. At times she retired to her room in order to remove herself from the family and the possible aggravation of these sensory intrusions. She had also begun to complain that certain visual experiences bothered her. If she saw somebody do something that “bugged” her, such as pointing or making some other gesture, she would rub her eyes, again with the same intention to avoid re-experiencing the image that she found upsetting. In the past she had typical contamination worries surrounding germs.

## DISCUSSION

In this case series we describe six children with OCD in whom intolerance and intrusive re-experiencing of sensory stimuli play a prominent role in their clinical presentation. Interestingly, these children perform their compulsions (either repetitive or avoidant behaviors) to relieve these sensations and not as a response to traditional obsessions. It is important to note that for these patients, the sensory phenomena are the primary presenting symptoms and more distressing than “conventional” OCD symptoms. In a comprehensive review of the literature we found no descriptions of sensory hypersensitivity associated with OCD. However, our search did yield circumstantial evidence of sensory dysfunction in OCD patients; specifically sensory phenomena that precede or accompany repetitive behaviors in cases of OCD and Tourette's syndrome (TS). Several reports, almost all in adult patients, describe sensory phenomena that precede or accompany repetitive behaviors in TS and OCD patients (4,5). These descriptions of sensory phenomena include bodily sensations, urges, a sense of inner tension occurring immediately before a tic, a feeling of energy release or relief with tic completion, and “just right” perceptions leading to repetitive behaviors (6–9).

Some studies have indicated that these sensory phenomena are more common in patients with TS or OCD with comorbid TS compared to patients with OCD alone (6,8,13). In fact, some authors have suggested that the nature of these sensory phenomena may represent a phenotypic difference that can be used to distinguish TS from OCD and to identify subtypes of OCD (14). More recently, this hypothesis was also extended to early onset OCD cases. Rosario-Campos et al. (15), reported a higher frequency of sensory phenomena in adult OCD patients with early age at onset of obsessive-compulsive symptoms when compared to late onset cases, independent of the presence of tics. Similarly, in a study of 41 patients with OCD, Shavitt et al. (16), reported that sensory phenomena preceding compulsions predicted better response to treatment with clomipramine.

Underlying neurobiological mechanisms that could explain such sensory symptoms include several frontostriatal circuits that project to the striatum, globus pallidus, substantia nigra and thalamus in self-repeating loops which are thought to mediate OC symptoms (17–20). It has been hypothesized that the dorsolateral prefrontal cortex, which receives input from parietal (somatosensory), occipital (visual) and temporal (auditory) lobes and integrates this information with emotion via its connections with the medial orbital frontal cortex of the limbic circuit, fails to habituate or inhibit sensory information in the normal way so that sensory input (i.e., the feeling of a sock on a foot) continues to be experienced beyond the usual duration. Such abnormal “sensory gating” has been described by Rossi et al. (21), who suggested that OCD patients may be unable to inhibit or modulate sensory information due to tonic high level of cortical excitability likely resulting from basal ganglia dysfunction. Dysfunction in basal ganglia may also help explain the reported link with Tourette's syndrome.

Mataix-Cols et al. (22) has noted that specific symptoms may be less useful for understanding the heterogeneous nature of OCD than symptom “dimensions” (23), age at onset (24), comorbid tics (25), or familial versus sporadic occurrence (26). However, none of these efforts to subtype OCD have described or included sensory phenomena, which may provoke more than one type of compulsive behavior, e.g. repeating, washing or avoidance. While all our cases are children (early age at onset), some had tics while some did not and some had affected first-degree relatives while some did not. The developmental progression of putative sensory symptoms across the lifespan is unclear but they appear to be more common in younger subjects and remit in adolescence in the same way that tics (and any underlying sensory dysfunction) remit (27). Although sensory phenomena appeared to drive compulsions that cut across more than one symptom dimension, we note that five out of six of these children also had symptoms that best fit the OC dimension of contamination/cleaning.

The investigation of sensory phenomena has been hampered by a lack of consensus in the literature about how best to define such subjective experiences and by the lack of instruments capable of assessing them. It is possible, if not likely, that sensory symptoms may be present in other psychiatric and developmental disorders whose full phenotypic expression (that includes sensory symptoms) have yet to be described. However, not a single DSM-IV diagnosis uses sensory integration dysfunction as a core diagnostic criterion. In the cases presented in this report, none had neurological or developmental disorders and together with findings from studies on sensory phenomena they suggest abnormalities in sensory processing and integration in at least a subset of patients with OCD. They suggest that a better understanding of these sensory phenomena might help to provide better care for OCD patients. Clinicians should be aware of the broad phenotypic variation in children with OCD that could include sensory-driven behaviors and future research should more systematically assess for deficits in sensory function in affected children.

## Acknowledgments

This work has been funded by: NIMH K08 MH01481 and the Wallace Foundation. Dr. Daniel Geller receives/d research support from, is/has been a speaker for, or is/ has been on the advisory board for the following Pharmaceutical Companies: Shire, Eli Lilly, Pfizer, Bristol-Myers-Squibb, Novartis, Forest Laboratories, and Glaxo-SmithKline. Other Sources of Research Support include Private Foundations: Obsessive Compulsive Foundation, Tourette Syndrome Association, Wallace Foundation, McIngvale Family Foundation and NIH: NIMH, NINDS.

## REFERENCES

1. Flament MF, Rapoport JL, Berg CJ, Sceery W, Kilts C, Mellstrom B, Linnoila M. Clomipramine treatment of childhood obsessive-compulsive disorder: A double-blind controlled study. *Arch Gen Psychiatry*. 1985; 42:977–983. [PubMed: 3899048]
2. Kessler RC, Chiu WT, Demler O, Merikangas KR, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry*. 2005; 62:617–627. [PubMed: 15939839]
3. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. Fourth edition, text-revision. American Psychiatric Press; Washington, D.C.: 2000.
4. Coles ME, Frost RO, Heimberg RG, Rheaume J. “Not just right experiences”: perfectionism, obsessive-compulsive features and general psychopathology. *Behav Res Ther*. 2003; 41:681–700. [PubMed: 12732376]
5. Coles ME, Heimberg RG, Frost RO, Stekette G. Not just right experiences and obsessive-compulsive disorder: Standardised assessment and comparison with schizophrenia. *Behav Res Ther*. 2005; 43:153–167. [PubMed: 15629747]

6. Diniz JB, Rosario-Campos MC, Hounie AG, Curi M, Shavitt RG, Lopes AC, Miguel EC. Chronic tics and Tourette syndrome in patients with obsessive-compulsive disorder. *J Psychiatr Res.* 2006; 40:487–493. [PubMed: 16289552]
7. Leckman JF, Walker DE, Goodman WK, Pauls DL, Cohen DJ. “Just right” perceptions associated with compulsive behavior in Tourette’s syndrome. *Am J Psychiatry.* 1994; 151:675–680. [PubMed: 8166308]
8. Miguel EC, Rosario-Campos MC, Prado HS, do Valle R, Rauch SL, Coffey B, Baer L, Savage C, O’Sullivan RL, Jenike M, Leckman J. Sensory phenomena in obsessive-compulsive disorder and Tourette’s disorder. *J Clin Psychiatry.* 2000; 61:150–156. [PubMed: 10732667]
9. Woods DW, Piacentini J, Himle M, Chang S. Premonitory Urge for Tics Scale (PUTS): Initial psychometric results and examination of the premonitory urge phenomenon in youths with tic disorders. *J Dev Behav Pediatr.* 2005; 26:397–403. [PubMed: 16344654]
10. Orvaschel, H.; Puig-Antich, J. Schedule for Affective Disorders and Schizophrenia for School-Age Children: Epidemiologic. Nova University, Center for Psychological Study; Ft. Lauderdale, FL: 1987. 4th Version
11. Leckman J, Sholomskas D, Thompson W, Belanger A, Weissman M. Best estimate of lifetime psychiatric diagnosis: A methodological study. *Arch Gen Psychiatry.* 1982; 39:879–883. [PubMed: 7103676]
12. Geller DA, Petty C, Vivas F, Johnson J, Pauls D, Biederman J. Examining the relationship between obsessive compulsive disorder and attention deficit hyperactivity disorder in children and adolescents: A familial risk analysis. *Biol Psychiatry.* 2007; 61:316–321. [PubMed: 16950231]
13. Miguel EC, Coffey BJ, Bear L, Savage CR, Rauch SL, Jenike MA. Phenomenology of intentional repetitive behaviors in obsessive-compulsive disorder and Tourette’s disorder. *J Clin Psychiatry.* 1995; 56:246–255. [PubMed: 7775367]
14. Miguel EC, Baer L, Coffey B, Rauch SL, Savage CR, O’Sullivan RL, Phillips K, Moretti C, Leckman JF, Jenike M. Phenomenological differences appearing with repetitive behaviours in obsessive-compulsive disorder and Gilles de la Tourette’s syndrome. *Br J Psychiatry.* 1997; 170:140–145. [PubMed: 9093502]
15. Rosario-Campos MC, Leckman JF, Mercadante MT, Shavitt RG, Prado HS, Sada P, Zamignani D, Miguel EC. Adults with early-onset obsessive-compulsive disorder. *Am J Psychiatry.* 2001; 158:1899–1903. [PubMed: 11691698]
16. Shavitt RG, Belotto C, Curi M, Hounie AG, Rosario-Campos MC, Diniz JB, Ferrao Y, Pato MT, Miguel EC. Clinical features associated with treatment response in obsessive-compulsive disorder. *Compr Psychiatry.* 2006; 47:276–281. [PubMed: 16769302]
17. Alexander GM, Crutcher MD, DeLong MR. Basal ganglia-thalamo-cortical circuits: Parallel substrates for motor, oculomotor, “prefrontal” and “limbic” functions. *Prog Brain Res.* 1990; 85:119–146. [PubMed: 2094891]
18. Baxter LR Jr, Saxena S, Brody AL, Ackermann RF, Colgan M, Schwartz JM, Allen-Martinez Z, Fuster JM, Phelps ME. Brain mediation of obsessive-compulsive disorder symptoms: Evidence from functional brain imaging studies in the human and nonhuman primate. *Semin Clin Neuropsychiatry.* 1996; 1:32–47. [PubMed: 10229782]
19. Fitzgerald KD, MacMaster FP, Paulson LD, Rosenberg DR. Neurobiology of childhood obsessive-compulsive disorder. *Child Adolesc Psychiatr Clin N Am.* 1999; 8:533–575. [PubMed: 10442230]
20. Insel TR. Toward a neuroanatomy of obsessive-compulsive disorder. *Arch Gen Psychiatry.* 1992; 49:739–744. [PubMed: 1514879]
21. Rossi S, Bartalini S, Olivelli M, Mantovani A, Di Muro A, Goracci A, Castrogiovanni P, Battistini N, Passero S. Hypofunctioning of sensory gating mechanisms in patients with obsessive-compulsive disorder. *Biol Psychiatry.* 2005; 57:16–20. [PubMed: 15607295]
22. Mataix-Cols D, Rosario-Campos MC, Leckman F. A multidimensional model of obsessive-compulsive disorder. *Am J Psychiatry.* 2005; 162:228–238. [PubMed: 15677583]
23. Stewart ES, Rosario MC, Brown TA, Carter AS, Leckman JF, Sukhodolsky DG, Katosovitch L, King R, Geller D, Pauls DL. Principal components analysis of obsessive-compulsive disorder symptoms in children and adolescents. *Biol Psychiatry.* 2007; 61:285–291. [PubMed: 17161383]

24. Geller D, Biederman J, Faraone SV, Belloirde CA, Kim GS, Hagermoser LM. Disentangling chronological age from age of onset in children and adolescents with obsessive compulsive disorder. *Int J Neuropsychopharmacology*. 2001; 4:169–178.
25. Leckman JF, Grice D, Barr LC, de Vries AL, Martin C, Cohen DJ, McDougle CJ, Goodman WK, Rasmussen SA. Tic-related vs. non-tic-related obsessive compulsive disorder. *Anxiety*. 1994–1995; 1:208–215. [PubMed: 9160576]
26. Hanna GL, Fischer DJ, Chadha KR, Himle JA, Van Etten M. Familial and sporadic subtypes of early-onset obsessive-compulsive disorder. *Biol Psychiatry*. 2005; 57:895–900. [PubMed: 15820710]
27. Coffey B, Biederman J, Geller D, Frazier J, Spencer T, Doyle R, Gianini L, Small A, Frisone D, Magovcevic M, Stein N, Faraone S, Klein R. Re-examining tic persistence and tic-associated impairment in Tourette's disorder: Findings from a naturalistic follow-up study. *J Am Acad Child Adolesc Psychiatry*. 2004; 192:776–780.

**Table 1**

## Clinical Correlates of Case Vignettes of Children with OCD and Sensory Symptoms

Case	Age at Assessment Years (Age at Onset)	CYBOCS Score at Assessment	Brief Case Description and Clinical and Family History
1	8 (7)	20	History of comorbid separation anxiety disorder and transient tics. One parent was affected with OCD. She responded well to CBT.
2	7 (7)	25	There were no comorbid disorders. Two siblings were affected with OCD. She responded well to a standard SSRI intervention.
3	14 (13)	27	History of comorbid Tourette's disorder, agoraphobia, specific phobia and separation anxiety disorder. Father had a remote history of subclinical compulsive symptoms and mild trichotillomania. Patient responded well to combined SSRI and CBT.
4	10 (10)	21	During the clinical assessment, several repetitive movements of squeezing his nose and sniffing were noted although parents reported no history of tics. He also admitted to feeling sad and to intermittent passive suicidal thoughts. Mother had OCD and a remote history of overeating and father had a remote history of phonic tics. Patient did not enter treatment with our clinic and was lost to follow up.
5	10 (7)	27	Comorbid ADHD and Tourette's disorder with explosive behavior requiring atypical antipsychotic and lithium. Family history was unremarkable. Sensory symptoms responded poorly to combined SSRI and CBT but abated gradually over several years. He maintained honor roll at school throughout years of treatment.
6	11 (5)	24	History of motor and vocal tics, separation anxiety, agoraphobia, specific phobia, mood disorder NOS with depressive symptoms and explosive rages. Mother reported a history of eating disorder and father of subclinical OCD. Patient responded poorly to multiple medication trials including atypicals and SSRIs and intensive CBT and eventually went away to boarding school.