

Received: 2018.07.30
Accepted: 2018.08.27
Published: 2018.11.07

e-ISSN 1941-5923
© Am J Case Rep, 2018; 19: 1329-1333
DOI: 10.12659/AJCR.912402

The Stuck Song Syndrome: A Case of Musical Obsessions

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Conflict of interest: None declared

Patient: Female, 32
Final Diagnosis: Obsessive compulsive disorder
Symptoms: Compulsive behavior • musical obsessions
Medication: —
Clinical Procedure: Treatment with serotonin selective reuptake inhibitors
Specialty: Psychiatry

Objective: Rare disease

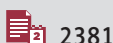
Background: Historically, clinical researchers have underestimated the prevalence and importance of musical obsessions, which are defined as intrusive, repetitive, persistent sounds or tunes, not controlled by the will, that cause clinically significant anxiety and distress. Musical obsessions have also been described as the “stuck song syndrome” and their prevalence is not clearly established, because few cases have been reported.

Case Report: This study reports a case of a 32-year-old female with a history of musical obsessions over the course of 12 years. She suffered episodes in which she heard repetitive musical fragments in her head, such as the chorus lines or portions of known or unknown songs, that caused high levels of anxiety in her daily life. The symptoms led her to introduce compulsive behaviors such as listening to the song that matched with the obsessive song. Treatment with fluoxetine 60 mg/day for 12 weeks reduced obsessive symptoms by 60%, improving her quality of life.

Conclusions: This case allowed us to explore the semiological spectrum that encompasses musical imagery, in which concepts that belong to normality are involved, such as musical imagination, involuntary musical imagery, and sticky songs, and other concepts that deal with psychopathological aspects such as musical obsessions, musical hallucinations, and palinacousis. Additionally, the case showed us an atypical form of compulsion that accompanied musical obsession, in which the patient sought to complete the obsessive content with real music. Treatment with fluoxetine 60 mg/day generated a symptomatic response but not remission of symptoms.

MeSH Keywords: Music • Obsessive-Compulsive Disorder • Serotonin Uptake Inhibitors

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Background

Obsessive-compulsive disorder (OCD) is a heterogeneous psychiatric disorder manifested by recurrent, unwanted, and distressing thoughts, impulses, images, or sounds (obsessions) and repetitive, irresistible, stereotyped behaviors (compulsions) [1]. Typically, obsessions include themes such as fear of disease or contamination; unwanted aggressive, sexual, or religious obsessions; and need for symmetry or exactness [2].

Historically, clinical researchers have underestimated the prevalence and importance of musical obsessions, which are defined as intrusive, repetitive, persistent sounds or tunes, not controlled by the will, that cause clinically significant anxiety and distress [3]. Musical obsessions differ from involuntary musical imagery (INMI) in that these arise as the recall and replay of musical imagery within the “mind’s ear” that repeat on an involuntary loop. Although INMI can be distressing, it is not egodystonic and does not deteriorate the quality of life of the individual [4].

Musical obsessions can be quite diverse in their content and might include various elements such as song fragments, genres, lyrics, and musical instruments. Although their prevalence is not clearly established, there have been approximately 100 cases reported in the world, with a predominant demographic pattern in young adults [3]. The frequency of musical obsessions is reported to be low in most psychiatric texts, can be misinterpreted as a psychotic symptom, and are generally not considered in the various diagnostic procedures for OCD [5].

A case of a young female patient with musical obsessions severely interfering with her daily life is presented in order to learn more about the psychopathological expressions of this condition and its possible treatments.

Case Report

The patient was a 32-year-old Hispanic female, single, with studies in psychology but unemployed for the last 3 years. She lived with her mother and had no children. She had a history of bulimia nervosa in adolescence successfully managed with psychotherapy. She had no history of mental or neurological illness in her family. Twelve years ago, she suffered episodes in which she heard a series of repetitive songs in her head, lasting an average of 1 to 2 weeks. The phenomenon occurred from the time she woke up until going to bed, with monthly frequency. These songs were musical fragments such as the chorus lines or portions of known or unknown songs by various artists, some she liked, such as songs by the singer Adele, and others were not to her liking or even aversive, such as songs by the group Kudai. In some cases, the songs included television

commercials. Song speed was not modified from the original and could contain both vocal and instrumental elements.

The patient was aware that the musical fragments were not voluntarily imagined memories or songs. She considered that the songs appeared absurdly in her mind and never had delirious interpretations about their origin. She experienced musical obsessions as repetitive sounds inside her head, not under conscious voluntary control, causing a high level of distress in her daily life: “They interfere too much; people talk to me, and I cannot pay attention... when I sit down to read, the songs are overwhelming, and I cannot focus”. During the past 2 years, she developed sleep onset insomnia, which was successfully treated with eszopiclone 3 mg.

Her musical obsessions caused marked anxiety and led her to introduce behaviors that sought to neutralize them. Initially, she tried to wear headphones and listen to music different from what she had in her head; however, this increased her anxiety even more because she felt that the songs did not “match”. Over the years, she learned that her anxiety was allayed when she listened with headphones to the same song that sounded in her head, at a high volume; however, the therapeutic effect did not last long, and musical obsessions recurred after a while. Her inability to manage her symptoms triggered feelings of frustration, sadness, despair, and poor academic performance, negatively impacting her quality of life.

The patient was evaluated institutionally in the Department of Psychiatry. She signed an informed consent form. A structured clinical interview was conducted to evaluate the semiology and phenomenology of musical obsessions, fulfilling the diagnostic criteria for OCD according to DSM-5. The Yale-Brown Obsessive-Compulsive Scale (Y-BOCS) was applied in its Spanish version [6], obtaining a score of 17 for obsessions and 16 for compulsions, for a total of 33 (severe OCD). Other types of obsessive ideas or compulsive behaviors were not documented. The Beck Depression Inventory was applied obtaining a score of 8 (negative for depression) and in the Hamilton Anxiety Rating Scale scored 31 (moderate to severe). The neurological examination did not find alterations or the presence of tics. Paraclinical tests were requested to rule out secondary causes. Complete blood count, TSH, free T4, vitamin B12, folic acid, VDRL, ionogram, auto-antibodies (anti-Ro, anti-La, antineuronal antibodies), and kidney and liver function tests were normal. Brain magnetic resonance imaging and electroencephalogram did not show abnormal findings.

Treatment with fluvoxamine was indicated, which progressively increased to 200 mg/day over 12 weeks; however, symptoms persisted with the same intensity, although less frequently. Subsequently, treatment was changed to paroxetine controlled-release tablets 50 mg/day; however, that medication was not

Table 1. Clinical history timeline.

Date	Description	Comments
2006	First manifestations of musical obsessions	Mild symptoms
2012	Exacerbation of musical obsessions and compulsive behaviors	Moderate to severe symptoms
2013	Fluvoxamine treatment up to 200 mg/day	Poor response
2016	Sleep-Onset Insomnia treated with eszopiclone 3 mg	Excellent response
2017	Paroxetine controlled-release tablets 50 mg/day	Side effects: drowsiness and dizziness
2017	Persistence of severe OCD symptoms	Total Y-BOCS score=33
2018	Fluoxetine treatment up to 60 mg/day	Total Y-BOCS score=13

tolerated because of drowsiness and dizziness. Finally, fluoxetine 60 mg/day was administered, which partially reduced the symptoms after 12 weeks of treatment. The dose of fluoxetine was increased to 80 mg/day, but it was not tolerated due to headache. The Y-BOCS was applied after treatment obtaining a score of 10 for obsessions and 3 for compulsions, for a total of 13 (mild OCD), which implies 60% reduction of symptoms with respect of the pre-treatment scale. The Hamilton Anxiety Rating Scale also was applied after treatment obtaining a score of 16 (mild). It was suggested to start cognitive behavioral therapy (CBT) but the patient refused to do it. She also did not accept other psychotherapeutic approaches. A summary of the clinical history is shown in Table 1.

Discussion

The present case refers to a young female who over the course of 12 years experienced obsessions with musical content, causing significant distress and deteriorating her quality of life. Secondary causes of OCD were ruled out, and the patient responded to treatment with high doses of fluoxetine. Because musical obsessions correspond to a psychopathological extreme of relatively common phenomena such as remembering music, the clinical spectrum of these phenomena is described from normal to pathological.

Musical imagination

In general, most human beings can imagine or remember music voluntarily. In fact, musical imagery is used by many musicians to create their compositions or mentally practice their musical works. At a higher level, great composers such as Beethoven or Smetana, who became deaf later in their lives, nonetheless were able to compose magnificent music, presumably because they were able to conjure up musical images solely internally [7].

Functional neuroimaging has revealed that activation of the secondary auditory cortex is fundamental to the phenomenological

experience of imagining music [8]. This process involves top-down regulation in which the interaction between the frontal and auditory cortex appears to be essential [9]. When one imagines a song with known music and lyrics, bilateral activation of the auditory cortex is observed [10], but when only imagining the instruments, the activation pattern moves toward the right auditory cortex [11]. These studies revealed that when imagining songs with lyrics, the linguistic functions of the left hemisphere are recruited, and when we imagine instrumental music, tonal information processing preferentially activates the right hemisphere.

Sticky tunes

Another phenomenon is known as sticky tunes, or “earworms”, which are explained by the repetitive loop of INMI. Although they do not reach the level of an obsession, they can cause distraction. Earworms occur more commonly in individuals highly involved with music and in those who consider music to be essential in their lives [12]. Approximately 98% of the Western population has experienced earworms at some point in their lives [3]. Although earworms may occur spontaneously, INMI is generally triggered by recent exposure to a piece of music or by sound associations recruiting musical memory [13]. Therefore, it is not surprising that sticky tunes initially arise from external stimuli and in some cases are unpleasant songs that get stuck in a loop for minutes or hours. We have all had this strange experience of having an earworm of a musical group or genre not to our liking and being unable to get rid of it. The most common strategies to eliminate earworms are calmly waiting and allowing time to pass so the earworm fades away or using distracting stimuli such as listening to, singing, or humming other songs. Although these behaviors may be effective at dismissing earworms, they are ineffective at eliminating musical obsessions [4]. Notably, some afflicted individuals are relieved when they hear the same song that is repeated in the INMI. This can be interpreted in line with the emergent theory that some episodes of INMI occur as a result of a Zeigarnik effect. Zeigarnik theory states that intrusive thoughts are triggered

by the sensation that those same thoughts are incomplete, and it is this incompleteness that results in them being retained for longer in memory [4]. That fragmentation, which may be part of a song (stanza, chorus, verse), tends to be resolved or forgotten when the entire song is heard. This gestalt approach allowed us to understand why the patient felt a partial reduction in anxiety when listening to the obsessive song with headphones.

Etiologically, earworms are related to memory: auditory information functions as a strong mnemonic. Psychologically, earworms are a «cognitive itch»: the brain automatically scratches back, resulting in a vicious loop [14].

Musical obsessions

Musical obsessions have also been described as the “stuck song syndrome” and can be quite disabling in OCD cases [14]. As we mentioned previously, its prevalence is not clearly established and there have been few cases reported in the world, with a predominant demographic pattern in young adults, approximately 33 years of age, with no gender difference [3], data that are consistent with the profile of our patient.

The content of musical obsessions can vary and comprise single songs or series of songs over time. The songs are generally musical fragments heard in the past by the person, primarily popular music. In some cases, they may have a special meaning for the person or comprise jingles [3]. Obsessions with cell phone ringtones have also been reported [15]. This patient experienced various musical contents, of commonly known artists or television commercials, music not particularly to her liking. Regarding the duration, symptomatic episodes vary; and have been described as lasting from months to years, with a continuous or intermittent course. In our patient, the course was intermittent over the last 12 years, and her symptomatic episodes lasted an average of 15 days, recurring monthly.

For some time, neuroimaging studies in OCD have revealed overactivity of the cortico-striato-thalamo-cortical pathways and, in particular, of the prefrontal/orbitofrontal cortex during the resting state, symptom provocation, and positive reward [16]. However, very few studies have addressed the neurobiological activation patterns during musical obsessions; in one study, the authors performed single-photon emission computerized tomography (SPECT) on 2 patients with musical obsessions, showing reduced brain blood flow in the temporal and frontal lobes [17]. Although their findings contrasted with the data classically described in OCD – remaining in need of more functional studies – the data were consistent with the temporal lobe dysfunction observed in other musical disorders such as musical hallucinations [18], musicogenic epilepsy [19], and musical illusions.

Regarding differential diagnoses, other similar entities should be ruled out such as palinacousis and musical hallucinations.

Palinacousis, described as persistent/recurring paroxysmal auditory illusions, is understood to be a phenomenon in which environmentally produced auditory perceptions persist or recur in the form of exact replicas or fragmented sounds after the initial stimulus has ended [20]. This symptom, rarely reported, suggests temporal lobe dysfunction [21]. Unlike musical obsessions, palinacousis is an illusory phenomenon in which not only musical sounds persevere but also environmental and vocal sounds as if they were echoes. In our patient, the songs were not generated in response to an auditory stimulus.

Musical hallucinations represent a subset of complex auditory hallucinations in which individuals perceive music in the form of tunes or melodies, which can be continuous or intermittent, in the absence of a corresponding external stimulus [22]. The fundamental characteristic is that the individuals experience them as coming from outside their heads, as if they were environmental sounds. The individuals might or might not be aware of the abnormality of the experience, which is generally associated with elderly people with hearing loss [23]. They can also be present in cranioencephalic trauma, epilepsy, major mental disorders, drug side effects (e.g., corticosteroids), and intoxication [24]. In the case of our patient, she always heard the repetitive songs inside her head and was aware of their absurd origin.

In general, the treatment for musical obsessions is the same as for OCD, with selective serotonin reuptake inhibitors (SSRIs), clomipramine, and CBT being the most recommended [3]. This patient was treated with paroxetine, fluvoxamine, and fluoxetine; clinical response was obtained only by administering fluoxetine at a dose of 60 mg/day for 12 weeks, positively impacting her quality of life. Unfortunately, it was not possible to develop a psychotherapeutic process on this patient which probably would have improved the remaining symptoms.

A recent multiple treatment meta-analysis found similar magnitude of the effects of SSRI in adult patients with OCD [25]. However, the pharmacodynamic properties of each SSRI are different. For example, in addition to serotonin reuptake inhibition, fluoxetine has norepinephrine reuptake inhibition and serotonin 2C (5HT_{2C}) antagonist actions. Some animal models have investigated the role of the 5HT_{2C} receptor in OCD, suggesting that its antagonism could explain part of the therapeutic effect in this condition [26]. Paroxetine and fluvoxamine do not have 5HT_{2C} antagonist properties.

Conclusions

This case allowed us to explore the semiological spectrum that encompasses musical imagery, in which concepts that belong to normality are involved, such as musical imagination, INMI, and sticky songs, and other concepts that deal with psychopathological aspects such as musical obsessions, musical hallucinations, and palinacousis. Additionally, this case showed us an atypical form of compulsion that accompanied musical

obsessions, in which the patient sought to complete the obsessive content with real music. Treatment with fluoxetine 60 mg/day for 12 weeks reduced obsessive symptoms by 60% improving her quality of life.

Declarations of interest

None.

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