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What is misophonia and how can we treat it?

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Selective sound sensitivity syndrome or misophonia is a chronic condition characterized by unpleasant emotional experiences and autonomic arousal in response to specific sounds. Over the last few years there have been a few reports detailing the clinical features associated with this condition. These focused reports raise interesting questions about the nosological status of this potentially disabling clinical entity.

Selective sound sensitivity syndrome or misophonia (literally 'hatred of sound' in ancient Greek) is a chronic condition in which a person reports unpleasant emotional experiences and autonomic arousal in response to specific sounds. Since the first scientific descriptions by Jastreboff [1–3], there have been a few case reports [4–6] and original studies [7,8] focusing on this condition. It is now known that the repertoire of trigger sounds reported by people with misophonia can include repetitive and social sounds typically produced by another individual, including eating (chewing/crunching) sounds, pen clicking, clock ticking, finger tapping, whistling and lip smacking. Even the unavoidable noise produced by footsteps has been reported by a few people [8] as a potential trigger for intense aversive responses, including emotional reactions of irritability and anger. Interestingly, these symptoms do not seem to be associated with fear (thus distinguishing misophonia from phonophobia). In addition to these psychological effects, specific physical reactions have been described: these are usually manifestations of atypical autonomic nervous system responses and can include feelings of pressure or pain in the chest, arms, head or entire body, muscular tension, sweating, breathing difficulties and increase in heart rate, blood pressure or body temperature. Apparently, people with misophonia have good insight into the disproportionate nature of their feelings and reactions, which do not seem to arise when the trigger sounds are produced by themselves. Overall, these symptoms can compromise ability to complete daily activities and enjoy normal interpersonal interactions, as stimulus-avoidance behaviors can limit sufferers' potentials to function in their social and professional life.

Misophonia is a chronic condition, with onset most commonly described in childhood. The time course can vary, depending on life circumstances and degrees of exposure to trigger sounds. There is also uncertainty with regard to a possible hereditary component to misophonia, as several sufferers identified the condition in at least one family member. Of course, these notions are derived from early observations whose interpretation requires caution, as future large-scale studies might question the chronicity and familial patterns of misophonic symptoms. In terms of differential diagnosis, most of the existing literature focused on the analogies with tinnitus, to which misophonia appears to exhibit some general similarities [1–3,5]. Jastreboff and Hazell [9] proposed that both conditions are associated with hyperconnectivity between the auditory and limbic structures, resulting in heightened reactions to sounds. However, misophonia differs from tinnitus in a crucial aspect: it is triggered by external, human-produced

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sounds and situations, rather than focusing on internally perceived, abstract sounds. The catalog of conditions included in the differential diagnosis of misophonia encompasses specific phobias, post-traumatic stress disorder, social phobia, obsessive compulsive disorder, intermittent explosive disorder, personality disorders (emotionally unstable, borderline, antisocial and obsessive compulsive personality disorder), autistic spectrum disorders, sensory processing disorders, phonophobia and synesthesia [7,8]. Moreover, recent reports have suggested that misophonic symptoms could be ascribed to the wider clinical spectrum of Gilles de la Tourette syndrome [10–14], obsessive compulsive disorder [7,14–16], generalized anxiety disorder and schizotypal personality disorder [17]. These observations raise the possibility that at least in some cases misophonia could be attributed to different underlying primary psychiatric disorders.

Schröder *et al.* [7] recently characterized the largest sample to date, consisting of 42 persons with misophonia. Their findings led them to suggest that misophonia is a primary disorder, rather than being secondary to the presence of other known neurological or psychiatric conditions. The authors therefore proposed a set of six diagnostic criteria for this new nosological entity: the presence or anticipation of a specific sound produced by other people (e.g., eating or breathing sounds) provokes an impulsive aversive physical reaction, which starts with irritation or disgust that instantaneously becomes anger; this anger initiates a profound sense of loss of self-control with rare but potentially aggressive outbursts; the person recognizes that the anger or disgust is excessive, unreasonable or out of proportion to the circumstances or the provoking stressor; the individual tends to avoid the misophonic situation or, if he/she does not avoid it, endures encounters with the misophonic sound situation with intense discomfort, anger or disgust; the individual's anger, disgust or avoidance causes significant distress or significant interference in the person's everyday life; and the person's anger, disgust and avoidance are not better explained by another disorder, such as obsessive compulsive disorder or post-traumatic stress disorder. The same group also developed a useful self-report rating scale to assess the type and severity of misophonia symptoms: the 6-item Amsterdam Misophonia Scale.

Little is known about the pathophysiology of this condition, as the clinical phenotype has been characterized only recently and research into the neurobiological mechanisms underlying its core symptoms is still in its infancy. It has been highlighted that the majority of typically developing subjects experience general and unelaborated emotional reactions to a range of annoying sounds: common examples familiar to most people are the sounds of fingernails on glass, chalk on blackboard and train wheels on rail tracks [18–20]. It is possible that persons with misophonia experience a more extreme physiological response and discomfort in response to these and other emotionally evocative stimuli. The hypothesis that misophonia is a disorder that produces anomalous physiological/autonomic effects has recently been tested. In a recent study by Edelstein *et al.* [8], physiological measurements were acquired on six persons with misophonia using skin conductance responses to provide an objective corroboration of their reports that specific sounds evoke intense emotional and physical reactions. Results showed that these subjects had an increased autonomic response to auditory stimuli (but not visual stimuli), compared with a control group of typically developed individuals. Useful insights into the pathophysiology of misophonia are also provided by observations that pharmacological agents can modulate the severity of the condition: for example, caffeine has been reported to aggravate misophonic experiences, whereas alcohol appears to decrease symptom severity [8].

Management strategies for misophonia are empirical and based on anecdotal data. The coping strategies adopted by persons with this condition do not necessarily involve avoidance (removing self from certain situations) or other socially dysfunctional behaviors (challenging other people in order to stop them making noises): mimicry to 'cancel out' the trigger sound, use of earplugs/headsets/music, focus consciousness to own sounds, self-distraction and positive internal dialogues have all been reported as useful techniques to cope with misophonia symptoms [8]. It is also possible that patients who report misophonia in association with severe obsessive compulsive symptoms [6–8,14] might benefit from serotonergic or antidopaminergic agents; however, these suggestions are speculative at the moment and need to be tested in future clinical studies.

There is a current dangerous trend in neuropsychiatry to mix symptoms, syndromes, disorders and illnesses, as if they had the same diagnostic importance. The nosological status of misophonia remains a matter of debate: is it a mere symptom or a true comorbidity? The available literature to date does not provide definite answers. Clearly, both the pathophysiology and treatment of misophonia are currently elusive and further research needs to be conducted before firm conclusions can be drawn. In addition to improving the clinical characterization of misophonia, future studies should investigate the underlying brain mechanisms (including possible connectivity alterations between auditory and limbic/autonomic regions) in order to develop effective management strategies for this intrusive and yet mysterious condition.

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