"I Burn Myself to Get High": How Pain Can Be an Addiction

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Nonsuicidal self-injury (NSSI) refers to the intentional destruction of one's own body tissue without suicidal intent for reasons that do not adhere to cultural norms.[1] Common examples include cutting, burning, scratching, biting, or hitting and sometimes multiple methods of carrying out the act.[2] Researchers often opine that NSSI in some cases may fit in the framework of addiction. These parameters include loss of control, compulsivity, and continued use of substance or behavior while neglecting all consequences.[3] Initial studies[4] that presented NSSI as an addictive behavior suggested that the increase in negative emotions prior to self-injury is consistent with withdrawal symptoms experienced by drug users.

Furthermore, a connection between addictive behavior and increased tolerance to specific neurochemical processes such as the endogenous opioid system (EOS) can be established. The EOS plays a pivotal role in the control of several physiologic responses including pain perception (via nociceptors), emotional behavior, and regulation of reward circuits.[5] The development of tolerance results from downstream mechanisms and recurrent stimulation of the opioid receptors.[6] It is thus hypothesized that individuals who engage in NSSI bring about the release of endogenous neurochemicals such as endorphins, inducing an elevated mood that can become addictive.[7]

NSSI is most common among adolescents and young adults, and the age at onset is reported to occur between 12 and 14 years.[8] The prevalence rates of NSSI are 7.5%–46.5% among adolescents, 38.9% among university students, and 4%–23% among adults.[8] Most of the causes of NSSI have the comorbidity of childhood trauma or a potential independent factor for NSSI disorder.[8] We present the case of a patient who showed addictive patterns to her NSSI.

Case Report

The patient was a 24-year-old woman with history of major depressive disorder and substance use disorder, who initially presented to the Comprehensive Psychiatry Emergency Program for worsening depressive symptoms and suicidal ideation. She was admitted to the inpatient psychiatric unit for suicidal ideation and self-injurious behaviors demonstrated as burn marks on both forearms. Initially, she would not disclose information about her burns but denied that it was from any abuse. There were numerous unique teardrop-shaped burn marks at various stages of healing.

During the initial days of admission, the patient was isolative and spent most of her time in her room and was reluctant to discuss the circumstances of her admission. She endorsed that she was treated with an antidepressant in the past but was unable to recall the name. Escitalopram was started, to which she had a good response.

The patient also reported frequent episodes of anxiety and started to pick at the healing burns; some burns became infected with worsening erythema with discharge. She was prescribed hydroxyzine to be used whenever she experienced anxiety. She began to open up more to the treatment team and reported that she experienced "severe anxiety" and had used marijuana in the past to cope with the episodes. This method had worked for some time, but when she became homeless, she was unable to regularly obtain marijuana. At that time, she started to experiment with other methods to cope with her anxiety. The urine toxicology test was positive for cannabinoids and negative for other illicit substances.

She reported using her lighter to burn her arm to inflict physical pain, stating that the pain felt better than being anxious all the time. She explained that the pain leads to waves of relief and dissipation of anxiety, which led to her increasingly utilizing pain more often as her primary coping mechanism. She described her experience with burning as "sharp and good" and said that the burn gave her a high that was better than marijuana, as the high was intense at first but then mellowed out and lasted a long time. She explained that she picked at the burns to increase the pain, and as the wound worsened, she would experience more pain that "felt good all the time." Escitalopram and hydroxyzine were titrated. She started to attend group sessions and was more compliant with medication. She was also able to refrain from inflicting pain or picking at her wounds during her stay.

The patient was able to engage in discharge planning and agreed to attend an outpatient rehabilitation program. She recognized that she would need better ways to cope with her feelings, stating "I need to talk more about my feelings, and I really like groups here." At the time of this writing, she has not been readmitted to the hospital.

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Discussion

It is essential to delve deeper into the neurochemical processes involved in NSSI (ie, the EOS). Those who engage in repeated NSSI acts have a decreased sensitivity to endogenous opioids.[9] Chronic low levels of endogenous opioids result in hypersensitivity of opioid receptors. Individuals who induce self-injurious pain do so to enable the release of endorphins via EOS activation, and this in turn helps elevate their mood, and they receive the immediate rush or "fix" that they crave. This increase in endorphins acting upon the already hypersensitive receptors invokes a sensation of self-comfort and control, while contributing to the effects of analgesia. This cycle results in a greater potent effect of analgesics and endogenous opioids, creating a euphoric elevated mood.[7] It perhaps is the strongest indication as to why NSSI is seen alongside many comorbid psychiatric disorders, such as anxiety disorders, depressive disorders, social phobias, and posttraumatic stress disorder.[10]

Altered neural circuitry may also contribute to NSSI. Magnetic resonance imaging studies[11] in patients with borderline personality disorder who have a history of NSSI showed that pain and tissue damage had a soothing effect after an induction of a stressor. The painful stimuli led to an increased inhibition of limbic areas, especially the amygdala.[12] The hyperconnectivity of the amygdala–frontal lobe circuit and hyperconnectivity between the amygdala–supplementary motor area can explain the habitual nature of the behavior.[11] An enhanced activation in the ventral anterior cingulate cortex is also seen in situational settings (ie, social exclusion versus inclusion).[11] These results point toward a higher responsiveness to social exclusion in adolescents with NSSI, which may develop into increased sensitivity to other forms of social experiences in adulthood.[11] Enhanced activation in the putamen is noted, showing a heightened feeling of social exclusion compared to healthy groups.[11] This makes those who engage in NSSI vulnerable to rejection sensitivity.[11]

When applying the parameters of addiction to NSSI, it is important to look at the various components of addiction exclusively as well as holistically, which include compulsivity, loss of control, and tolerance.[3] Compulsivity is the uncontrollable urge to indulge in a substance or behavior that is precipitated by the desire to avert negative emotions.[3] This meets the criteria for NSSI per the *DSM-5*, in which self-injuring individuals repeatedly engage in this behavior to avert or alleviate unpleasant emotions. The act of self-injury was identified as an affect regulator, as a means of altering the person's emotional state.[3]

Those who self-injure have a loss of control over their behavior when experiencing an urge to perform NSSI. An NSSI episode is preceded by experiencing an urge and a period of preoccupation with the intended behavior that is difficult to resist.[3] This can be mirrored with substance dependence, which is the persistent desire or unsuccessful effort to cut down or control the use of a substance.

Tolerance is defined as a reduced effect with the same dose of a substance over time, or an individual needs to use larger amounts of the substance to experience the intended effect.[3] Researchers have found that self-injuring individuals develop tolerance to the act of NSSI, and their efforts become progressively intensified and frequent in occurrence as the act continues over time.[3] However, the self-inflicting act carried out can far exceed the initial intent of the action, indicating a lack of control and compulsive behavior. The repeated act of NSSI may result in a developed tolerance to the excess release of endorphins and decreased pain sensitivity to endogenous opioids.[13]

Self-inflicted injury can also be associated with behavior seen in borderline personality disorder. Based on the *DSM-5*, at least 5 of the following criteria should be present: unstable interpersonal relationships, attempts to avoid abandonment, recurrent suicidal or self-destructive behavior, reckless impulsivity, unstable mood or affect, persistent unstable self-image, chronic feelings of emptiness, struggling with anger management, and transient paranoia or dissociative symptoms.[14] The patient presented here did not meet the required criteria for a borderline personality disorder diagnosis.

Therapy-driven treatment alongside pharmacotherapy have proved effective and should be in the forefront in the management of individuals who self-harm. Such treatment includes dialectical behavioral therapy, cognitive-behavioral therapy, psychodynamic psychotherapy, interpersonal psychotherapy, and family therapy.[15] For patients engaging in NSSI who do not respond to psychotherapy, a combination of a selective serotonin reuptake inhibitor, serotonin-norepinephrine reuptake inhibitor, or second-generation antipsychotic along with psychotherapy can provide strong positive results.

Conclusion

The *DSM-5* includes NSSI as a condition requiring further study. With more empirical data forthcoming about NSSI in the *DSM-5*, relevant psychometric data, prevalence rates, and patterned clinical signs will help strengthen and validate the guidelines for the diagnosis of NSSI as an addiction disorder.[16] In summary, it is strongly believed that individuals with high pain tolerance who partake in NSSI and meet the criteria for the disorder should be classified under the gamut of substance use disorder and should be treated with modalities that have been successful in this realm.

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