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Excoriation disorder: Impulsivity and its clinical associations

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ABSTRACT

Excoriation disorder is the repetitive scratching or picking of skin that leads to physical damage, distress, and functional impairment. Skin picking has been associated with impulsivity and problems with inhibition. We hypothesized that problems in these areas could be disease severity markers. We recruited 73 adults meeting DSM-5 criteria for excoriation disorder, and 50 adult controls. Those with excoriation disorder were categorized as either "high impulsive" (HI) or "low impulsive" (LI) using either a neurocognitive task of motor impulsivity (Stop Signal Task) or the Barratt Impulsiveness Scale's (BIS-11) motor impulsivity subscale. The HI subjects, based on the BIS-11, showed higher urges scores, anxiety, and depressive symptoms. These data suggest that impulsivity may reflect a specific clinical presentation among those with excoriation disorder, but the clinical characteristics differ depending upon the impulsivity measure used. Agreement on how to measure various domains of impulsivity may be important in better understanding the disorder psychopathology and so improve future treatments.

1. Introduction

Excoriation Disorder, also known as Skin Picking Disorder, is characterized by the repetitive and compulsive scratching or picking of skin, which causes tissue damage (Arnold, Auchenbach, & McElroy, 2001; Grant et al., 2012). Excoriation may result in infections, scars and therefore embarrassment and social isolation. Recently, excoriation disorder was included in the Diagnostic and Statistical Manual – 5th edition (DSM-5) in the category of "Obsessive and compulsive, and related disorders" (American Psychiatric Association, 2013).

Despite being arguably quite common, excoriation disorder has not been well studied. Two community prevalence studies have been published, and both found notable rates of excoriation disorder. The first one used a nonclinical community sample of 354 people and found that 5.4% reported significant picking, meeting all DSM-5 criteria (Hayes, Storch, & Berlanga, 2009). The other study, based on 2513 telephone interviews, found 1.4% met all DSM-5 criteria for excoriation disorder (Keuthen, Koran, Aboujaoude, Large, & Serpe, 2010).

So far, there is no clear neurobiological explanation for the etiology and maintenance of this disruptive behavior. The only neuroimaging study on excoriation disorder used diffusion tensor imaging and showed bilateral abnormalities in the anterior cingulate cortex and abnormalities on the left temporoparietal junction – neural circuits involved in the generation and suppression of motor responses (Grant, Odlaug, Hampshire, Schreiber, & Chamberlain, 2013).

Recent research examining neurocognition in excoriation disorder has shown deficits in motor inhibition, which appears to be correlated with frontal cortex abnormalities. One study found impaired inhibitory control in excoriation disorder subjects compared with healthy controls (assessed using the CANTAB Stop-Signal Task-SST) (Odlaug, Chamerlain, & Grant, 2010). Another study, comparing excoriation disorder, trichotillomania and healthy controls showed greater inhibitory deficits in excoriation disorder, and the deficits were associated with greater severity of excoriation (assessed using the CANTAB SST and the Clinical Global Impressions scale-CGI) (Grant, Odlaug, & Chamberlain, 2011). Furthermore, severity of excoriation disorder may be associated with higher levels of impulsivity (assessed by the BIS-15, a shorter revision of BIS-11) but which domain of impulsivity, and how to measure it, remains unclear (Adams, 2012; Hayes et al., 2009; Patton, Stanford, & Barratt, 1995; Spinella, 2007).

The clinical relevance of impaired motor control to excoriation disorder, therefore, remains unclear. Because previous data

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implicate impairment in inhibitory control in repetitive picking behavior, we hypothesized that impaired inhibition would be associated with excoriation disorder severity.

2. Materials and methods

2.1. Subject population

Seventy-three adult subjects aged 18 or older, who met DSM-5 diagnostic criteria for excoriation disorder, and 50 adult control subjects (HC) without any current psychopathology, were recruited (via fliers and newspaper advertisements) (American Psychiatric Association, 2013). Inclusion criteria for the subjects with excoriation disorder included: (1) meeting DSM-5 criteria and (2) being able to provide informed consent for the study. Exclusion criteria included: (1) Unstable medical illness or clinically significant abnormalities on physical examination; and (2) clinically significant suicidality (score 3 or 4 on item 3 of Hamilton Depression Rating Scale). The 50HC subjects were defined by no current (past 12 months) history of psychiatry disorders and no use of psychotropic medications.

2.2. Clinical assessment

All subjects were assessed by a board-certified psychiatrist. Lifetime and current psychiatric comorbidity was assessed using Structured Clinical Interview for DSM-IV disorders (SCID) (First, Spitzer, Gibbon, & Williams, 2002).

All subjects (excoriation disorder subjects and controls) completed the following questionnaires:

Barratt Impulsiveness Scale 11th version (BIS-11): 30-item questionnaire that measures general levels of impulsiveness (total) and three distinct second-order factors, including attention, motor, and non-planning impulsivity (Patton, Stanford, & Barratt, 1995). The BIS-11 uses a 4-point scale ranging from 1 ("Rarely/Never") to 4 ("Almost Always/Always"), with 11-items using a reversed 4–1 scale. Second order factor scaled-scores are derived by adding the appropriate score of each item and dividing the total by the number of items.

Excoriation disorder subjects completed the following questionnaires and scales:

Yale-Brown Obsessive Compulsive Scale modified for Neurotic Excoriation (NE-YBOCS): 10-item scale that rates picking symptoms during the past 7 days on a severity scale from 0 to 4 for each item (total scores range from 0 to 40 with higher scores reflecting greater illness severity). The first five items of NE-YBOCS assess urges/thoughts to pick – i.e., time occupied with urges/thoughts; interference and distress caused by urges/thoughts; resistance against picking; and control over urges/thoughts. The second five questions assess actual picking behavior – i.e., time spent picking; interference and distress owing to picking; ability to resist and control picking behavior. This modification of YBOCS has been used in treatment studies of excoriation disorder, showing good psychometric properties (Arnold et al., 1999; Goodman, Price, et al., 1989; Goodman, Rasmussen, et al., 1989; Grant, Odlaug, & Kim, 2007).

Sheehan Disability Scale (SDS): A reliable, valid, 3-item, self-report scale that assesses functioning in three areas of life: work/school, social/leisure activities, and home/family life. Scores on the SDS range from 0 to 30, with each question ranging from 0 (no disruption) to 10 (extreme disruption). If the subject is not studying or working, assessment is based only on the final two areas, with a total possible score of 20 (Sheehan, 1983).

Hamilton Anxiety Rating Scale (HARS): A reliable, valid, 14-item, clinician-administered scale, which provides an overall measure of global anxiety (Hamilton, 1959).

Hamilton Depression Rating Scale (HDRS): A reliable, valid, 17-item, clinician-administered rating scale which assesses severity of depressive symptoms (Hamilton, 1960).

Clinical Global Impression-Severity (CGI): Consists of a reliable, valid, 7-item scale used to assess clinical severity of overall symptoms. The CGI ranges in score from 1 = "not ill at all" to 7 = "among the most extremely ill" (Guy, 1976).

Quality of Life Inventory (QoLI): A valid, reliable, 16-item, self-reported rating scale which assesses life domains such as health, work, recreation, friendships, loving relationships, home, self-esteem, and standard of living. It comprises four quality of life categories based upon the calculated T-score: high (58–77), mean (43–57), low (37–42), very low (0–36) (Frisch, Cornell, & Villaneuva, 1992).

2.3. Cognitive testing

Cognitive testing was conducted using a previously validated test taken from CANTABeclipse software (Cambridge Cognition Ltd. 2006) in a controlled environment to minimize confounding variables among subjects. All subjects (excoriation disorder subjects and controls) completed the cognitive tests.

Stop-signal task (SST): The SST is used to assess motor inhibition (impulsiveness) (Aron & Poldrack, 2006; Aron, Robbins, & Poldrack, 2004). On this test, subjects are instructed to respond to a left- or right-facing arrow which appears on a computer screen for a short time. Corresponding motor responses are measured according to subjects' ability to inhibit responses when a sound "beep" (stop-signal) occurs on a subset of trials. The key outcome variable is Stop-Signal Reaction Time (SSRT). The time taken to internally suppress imminent motor responses was measured by an algorithm, i.e., mean reaction time on 'go' trials. This task has been shown to be dependent on distributed neural circuitry including the right inferior frontal gyrus (Aron, Behrens, Smith, Frank, & Poldrack, 2007). Previous research has found a significant correlation between motor impulsiveness (on the BIS-11) and the Stop-Signal Task (Gorlyn, Keilp, Tryon, & Mann, 2005).

2.4. Statistical analysis

There is no pre-established value to classify between normal and impulsive individuals, using either the neurocognitive SST or the BIS-11. To circumvent this barrier, we found the mean scores of healthy controls (HC) for both neurocognitive tests and BIS-11 questionnaire.

A mean value of stop-signal reaction time (SSRT) among 43HC, [0(26.3%) male; mean age, 20.56 ± 2.77 [range 18–28])was calculated. The mean SSRT was 159.92 ± 40.03 [range 119.89–199.95]. The excoriation disorder subjects were thus divided in two groups – "high impulsive" (HI) and "low impulsive" (LI) – using the mean SSRT among the HC plus one deviation (159.92 + 40.03 = 199.95). Thereby, SSRT values among HI subjects were 199.95 or greater and values among LI subjects were below 199.95.

Also, a mean value of motor impulsiveness (assessed by the BIS-11) was calculated for the same HC group (21.19 ± 4.47 [range 12–36]). Again the Excoriation disorder subjects were divided in two groups using the BIS-11 motor impulsiveness mean plus one standard deviation: "high impulsive" (HI′) and "low impulsive" (LI′). Therefore, the motor BIS-11 values among HI′ subjects were 25.66 or greater and values among LI′ subjects were below 25.66.

Demographic, clinical, neurocognitive indices of the two study groups (HI × LI and HI′ × LI′) were compared using independent *t*-tests. The Levene's test was used to verify sample distribution while equality of variances was assumed. All comparison tests were two-tailed and were statistically significant at $p < 0.05$.