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Systematic Review of Pharmacological and Behavioral Treatments for Skin Picking Disorder

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Abstract

Skin Picking Disorder (SPD) is a newly recognized psychiatric disorder in DSM-5. A systematic review was conducted to assess the efficacy of pharmacological and behavioral interventions for SPD. Electronic databases were searched for randomized controlled trials (RCTs) or uncontrolled trials involving at least 10 subjects that examined the efficacy of pharmacological and behavioral interventions for SPD. We examined the improvement associated with interventions compared to inactive control conditions in RCTs and improvement over time in uncontrolled trials and within the treatment arms of RCTs. We stratified studies based on intervention type. Meta-analysis included 11 studies. All interventions (including inactive control conditions) demonstrated significant improvement over the course of short-term clinical trials in SPD. Only behavioral treatments demonstrated significant benefits compared to inactive control conditions. There was no evidence from RCTs that pharmacotherapy with selective serotonin reuptake inhibitors or lamotrigine were more effective at treating SPD than placebo. Our meta-analysis suggests that SPD subjects show significant improvement during short-term trials, regardless of the efficacy of the underlying intervention. This finding suggests that uncontrolled trials are of particularly limited utility for assessing efficacy of treatments in SPD. Future research should concentrate on developing larger placebo-controlled RCTs to examine efficacy of novel pharmacological agents. Additionally, research should focus on improving accessibility of behavioral treatments with demonstrated efficacy for SPD.

Keywords

Meta-Analysis; Skin Picking Disorder; Behavioral Therapy; Serotonin Uptake Inhibitors; Lamotrigine; Impulse Control Disorders

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Introduction

Skin picking disorder (SPD) is a newly recognized Obsessive-Compulsive Spectrum Disorder in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and has an estimated lifetime prevalence of 1.4% or higher (1). It was previously described as dermatillomania, skin picking, skin excoriation or psychogenic excoriation. People afflicted by SPD can experience recurrent and repetitive skin picking that can eventually lead to tissue damage, scarring, and skin lesions. Individuals with SPD often spend hours a day picking their skin, causing significant impairment in their social life, work life and self-esteem and leading to an avoidance of activities that expose picked regions (2). SPD is similar to trichotillomania (TTM; hair-pulling disorder), in that it can shift over time from an automatic, trance-like state of picking to a more aware, focused state of picking, incorporating the use of tweezers, pins, etc., often leading to self-injurious behavior (3). SPD, like TTM, is often triggered by stress, anxiety, and boredom, as well as physical sensations (e.g. the feeling of unevenness on the skin) (4). People with SPD are often too ashamed to seek help or come forward about their condition because of social embarrassment and the stigma associated with their condition, feeling that it is a “bad habit,” or untreatable (5).

The Skin Picking Impact Project, an Internet survey involving 760 affected adults, represents the largest descriptive study on SPD (6). This study revealed that less than 20% of SPD patients felt that the clinician they were seeing knew “much” about SPD (6). Only 15% of SPD respondents felt they were “very much” or “much” improved by the treatment they received for SPD (6). Medication management was the most common intervention utilized by SPD patients (35%) and psychiatrists were the health professional most commonly visited by SPD patients (56%) (6).

A previous systematic review has been recently published in SPD. This meta-analysis demonstrated significant improvement resulting from both pharmacological and behavioral interventions and concluded that psychological and pharmacological interventions seemed to be comparable for SPD (7). However, this systematic review contained several unusual methodological decisions that may have affected the conclusions of the systematic review. Particular limitations associated with the meta-analysis included (1) not comparing active interventions to inactive controls when possible; (2) including case-report studies that have an extremely small sample size and are prone to publication bias; and the (3) absence of any qualitative or quantitative tools to assess likelihood of bias within trials or the overall meta-analysis.

The University of York Centre for Reviews and Dissemination wrote regarding this systematic review, “The authors did not report a quality assessment, so it is difficult to know how reliable the results of the individual studies were. Many of the studies had designs prone to bias. Details about the comparator interventions, in the studies with control groups, were not reported. Given the heterogeneity across the studies, the limited reporting of study details and the unknown quality of the included studies, it seems inappropriate that the results were statistically synthesised, particularly for pharmacological and psychological interventions, for pathological skin-picking severity” (8). We therefore believe it is important

and timely to conduct an additional systematic review and meta-analysis in this area addressing some of the methodological short-comings of the previous meta-analysis.

Aim of the Study

The purpose of this systematic review is to evaluate the current evidence-base of treatments for SPD and to compare the efficacy of these treatment modalities compared with inactive control conditions. Additionally, we will compare the measured efficacy of researched treatments for SPD across randomized, controlled and uncontrolled trials.

Material and Methods

Search Strategy

The electronic databases of MEDLINE (OvidSP), Embase (OvidSP), PsycINFO (OvidSP), and CENTRAL (Wiley Online inclusive) were searched for relevant trials during the 3rd and 4th weeks of June 2013 with the key words “dermatillomania” or “skin picking” or “skin excoriation” or “psychogenic excoriation.” The references of selected articles and relevant review articles in this area were additionally searched for citations of further relevant published and unpublished research. The searches were limited to humans and English language. Studies on SPD in individuals with developmental disabilities (e.g. Prader-Willi) were not included.

Inclusion Criteria

The titles and abstracts of studies obtained by the search strategy outlined above were examined by two reviewers (M.C.S. and C.A.B.) to determine if they were potentially eligible for inclusion in this review. Studies were eligible if they were controlled or uncontrolled studies examining treatments for compulsive skin picking. Participants were required to be older than age 16 and have a primary diagnosis or strong symptoms of SPD. Since SPD was not recognized as a formal psychiatric diagnosis until the introduction of DSM-5, we included studies where the subjects were selected as having a primary skin picking problem e.g. dermatillomania, SPD, compulsive skin picking, psychogenic or neurotic excoriation. Both studies examining behavioral and pharmacological interventions were included. We made the decision to include uncontrolled trials in order to increase the number of trials for this meta-analysis given the small number of randomized controlled trials in the area. Including uncontrolled trials additionally allowed us to compare improvement over time across controlled and uncontrolled trials which may also allow us to comment regarding the specific limitations of uncontrolled trials in SPD subjects.

We also excluded case studies or case series with less than 10 participants, as they are likely to be affected by publication bias. According to the Cochrane Handbook for Systematic Reviews of Interventions, case reports and case series are notably susceptible to bias (section 14.6.2–3) and can collectively be defined as having an outcome-reporting bias, as they contain selective reporting of outcomes (section 10.1.a) (9). Thus, we elected not to include small case reports or series of SPD in this review.

Meta-analytic Procedure

Specifically designed forms and coding spread sheets were used to collect data on methods, interventions, participants, and outcome measurements (M.C.S.). All data entry was checked for correctness by another reviewer (M.H.B.). Any disagreement between reviewers was resolved through discussion.

The primary extracted outcome for all included studies was a clinical rating scale specific to skin picking severity. We used the primary outcome identified by the authors unless a rating scale not designed to specifically assess skin picking severity was used preferentially to a non-specific scale (e.g. unmodified Y-BOCS scale or CGI). Rating scales utilized by studies included in the meta-analysis were the Skin Picking Scale (SPS)(10), the Visual Analogue Scale (VAS)(11), the Yale-Brown Obsessive Compulsive Scale for Neurotic Excoriation (NE-YBOCS)(12), the Modified Skin Picking Scale (M-SPS) (13), and the Treatment Evaluation Inventory-Short Form (TEI-SF)(14). Rating scales that were not designed to be specific to skin picking were only utilized when no specific scales were available.

Two main analyses were conducted in the meta-analysis. For randomized controlled trials, endpoint scores between active and control conditions were compared. Active treatments were stratified between pharmacological treatments and behavioral treatments. Pharmacological treatments were further stratified separately by medication class (SSRIs and lamotrigine). Other treatments used in the analyses that lacked known or postulated efficacy for SPD were defined by the authors as inactive comparative conditions such as placebo, waitlist, or nonspecific psychotherapy i.e. psychotherapeutic interventions designed to control for time without any postulated efficacy.

For uncontrolled studies as well as all treatment arms for randomized controlled studies, we examined change scores for improvement pre and post intervention. Patients with body-focused repetitive behaviors such as trichotillomania (TTM) are known to show significant improvement in short-term clinical trials, regardless of the underlying efficacy of treatment intervention, so using pre-post change scores can lead to spurious conclusions with regard to efficacy of SSRIs(15). Uncontrolled treatment studies and individual treatment arms in controlled studies were stratified by behavioral treatments, pharmacological treatments (SSRIs and lamotrigine separately) and inactive comparison conditions. Inactive comparison conditions were further divided into waitlist and placebo groups.

For both main analyses, improvement in the skin picking severity was measured as standardized mean difference and was pooled for overall meta-analysis. Standardized mean difference (SMD) was favored over weighted difference as the primary outcome because rating scales differed between included studies. All statistical analysis was performed in Comprehensive Meta-Analysis Version 2. When relevant endpoint and/or baseline rating scale scores were not available in original studies, other relevant study statistics (such as sample size, p-values, t-statistics) were used to extract SMD for studies.

We were unable to perform any analyses for publication bias given the small number of included trials for each intervention ($k = 5$). However, heterogeneity between trials was determined by means of two separate statistical estimates. First, a Q -statistic was employed

to provide a test of statistical significance indicating whether the differences in effect sizes were due to subject-level sampling error alone or other sources. In addition, we estimated heterogeneity using *I-square* statistic, which estimates the proportion of total variance that is attributable to between-study variance. Our threshold for statistical significance was selected to be $p < 0.05$ for all analyses.

Results

Included Studies

Figure 1 demonstrates the selection of studies from the 393 references identified using our search strategy. Table 1 depicts characteristics of the 11 studies included in our systematic review (12, 13, 16–25). Six of these studies were randomized controlled trials (3 behavioral therapy, 2 SSRIs, 1 lamotrigine) and 5 of these studies were uncontrolled (1 behavioral therapy, 3 SSRIs, 1 lamotrigine).

Behavioral Treatments

Figure 2 depicts a forest plot comparing behavioral treatments for skin picking to inactive comparison conditions. Meta-analysis of 3 randomized controlled trials (13, 22, 24) demonstrated a significant benefit of behavioral treatments compared to inactive comparison conditions ($SMD = 0.69 \pm 0.19$, (95% CI: 0.32–1.05), $z = 3.7$, $p < 0.001$). There was no significant heterogeneity between studies ($\chi^2 = 2.2$, $df = 2$, $p = 0.33$, $I^2 = 11\%$). Meta-analysis of 4 studies (active treatment arm of 3 randomized controlled trials (13, 22, 24) and 1 uncontrolled study involving 151 completers (18)) demonstrated a significant improvement of skin picking symptoms with behavioral treatments over time ($SMD = 1.07 \pm 0.09$, (95% CI: 0.90–1.24), $z = 12.3$, $p < 0.001$). There was a large amount of heterogeneity between studies ($\chi^2 = 10.5$, $df = 3$, $p = 0.02$, $I^2 = 71\%$).

Selective Serotonin Reuptake Inhibitors

Two randomized controlled trials involving 62 participants demonstrated no significant benefit of SSRIs compared to placebo in the treatment of skin picking ($SMD = 0.21 \pm 0.26$, (95% CI: -0.30 – 0.72), $z = 0.8$, $p = 0.41$) (16, 26). Meta-analysis of 5 studies (3 uncontrolled involving 58 participants (12, 17, 21) and 2 randomized controlled trials involving 29 participants assigned to SSRIs (16, 23)) demonstrated a significant improvement over time in participants treated with SSRIs ($SMD = 0.98 \pm 0.13$, (95% CI: 0.73–1.24), $z = 7.5$, $p < 0.001$). There was no significant heterogeneity between studies ($\chi^2 = 3.1$, $df = 4$, $p = 0.54$, $I^2 = 0\%$).

Lamotrigine

Only 2 studies (1 randomized controlled and 1 uncontrolled (19, 20)) examined the effects of lamotrigine on skin picking severity. A single, 12-week, randomized, placebo controlled trial of 32 adults with SPD demonstrated no significant difference between lamotrigine and placebo ($SMD = 0.11 \pm 0.35$, (95% CI: -0.59 – 0.80), $z = 0.3$, $p = 0.77$). Meta-analysis demonstrated a significant improvement over time in subjects receiving lamotrigine ($SMD = 0.67 \pm 0.18$, (95% CI: 0.32–1.01), $z = 3.8$, $p < 0.001$). Both the randomized controlled trial and the uncontrolled trial of lamotrigine demonstrated a significant improvement over time in subjects.

Inactive Comparison Conditions

Five trials involving 73 participants contributed to this outcome (12, 17–19, 21). Meta-analysis demonstrated a significant improvement over time in participants receiving inactive treatments in controlled trials ($SMD=0.52\pm0.13$, (95%CI: 0.27–0.77), $z=4.1$, $p<0.001$). There was no significant heterogeneity between studies ($\chi^2=2.4$, $df=4$, $p=0.67$). A significant improvement over time was observed in both placebo ($SMD=0.59\pm0.16$, (95%CI: 0.27–0.90), $z=3.7$, $p<0.001$) and waitlist control conditions ($SMD=0.41\pm0.21$, (95%CI: 0.01–0.82), $z=1.9$, $p<0.05$).

Overall Findings

Figure 3 depicts the improvement in skin picking symptoms over time experienced by participants receiving the researched treatment conditions as well as inactive comparison treatments. SPD patients demonstrated significant improvement over time across all treatment conditions including inactive comparison conditions (placebo or waitlist).

Figure 4 depicts the meta-analytic results comparing the efficacy of behavioral and pharmacological interventions for SPD to inactive comparison conditions. Only behavioral treatments have demonstrated significant efficacy compared to inactive control conditions.

Discussion

This meta-analysis demonstrates a significant benefit of behavioral treatments, such as cognitive behavioral therapy (CBT) and habit reversal therapy (HRT), compared to control conditions in the treatment of SPD. Behavioral treatments whether practiced by experienced clinicians or through self-help methods appear effective. CBT/HRT interventions were fairly consistently defined across trials included in this meta-analysis. Behavioral therapy interventions involved three stages: the first stage assessed awareness of skin picking behaviors plus psycho-education; the second stage consisted of learning strategies to reduce the frequency of skin picking behaviors i.e. competing response exercises e.g. clenching one's fist until the urge to pick has passed; the final stage focused on relapse prevention(13, 18, 22, 24).

By comparison, data supporting pharmacological interventions for SPD is at best mixed. Neither SSRI pharmacotherapy nor lamotrigine demonstrated significant benefit when compared to placebo. The temporal improvement across all treatments including the inactive comparison conditions i.e. placebo or waitlist may be in part due to the nature of SPD to fluctuate over time. Patients with SPD likely seek treatment and/or enroll in trials when their symptoms are worsening. We suspect for many subjects there is a natural regression to the mean in terms of SPD symptoms given the fluctuating nature of symptoms in the disorder. This phenomenon may make uncontrolled trials and assessment particularly challenging in an SPD population.

The results regarding pharmacotherapy stand in contrast to a previous treatment reviews of SPD. The systematic review in the area concluded that both pharmacological and psychological interventions appeared to be effective and comparable in the treatment of pathological skin picking even after excluding the outlier studies (7). The treatment review

stated that case studies, open trials, and small double-blind studies demonstrated the efficacy of SSRIs for the treatment of SPD (16). The difference in results and recommendations compared with prior meta-analysis and treatment reviews is due to an overemphasis on uncontrolled studies in these previous reviews. SPD patients show improvement in short-term trials when receiving behavioral therapy or even pharmacological treatments including SSRIs and lamotrigine. However, SPD patients even when treated with inactive comparison conditions (either placebo or waitlist), also consistently show improvement over this same time period. The significant improvement in short-term trials of patients with SPD could be due to a number of factors – the natural waxing and waning course, the benefits of psychoeducation, and the support that occurs through care of individuals that are familiar with SPD and/or placebo effects.

Regardless of the cause of the improvement in short-term clinical trials of SPD subjects in the inactive comparison conditions, the magnitude of this effect has implications for treatment and research in SPD. For research, uncontrolled trials are likely of little benefit in SPD. Uncontrolled trials of even ineffective interventions are likely to be positive. Given the effect size observed over time of inactive comparison conditions in randomized controlled trials ($ES=0.52$), we would expect an uncontrolled trial of 25 subjects to be positive 80% of the time, 12 subjects 50% and 5 subjects 25% of the time. The likelihood of positive findings in uncontrolled trials is probably underestimated using these assumptions because additional biases such as blinding and treatment expectancy are not controlled for in this experimental design. Therefore, positive uncontrolled studies are of limited utility in demonstrating efficacy and their results are unlikely to be replicated in randomized controlled trials. Uncontrolled studies have also been utilized as a means for assessing safety and tolerability. However, since SPD is rarely, if ever, used as a first indication for an emerging medication, much better safety data usually exists from large clinical trials data in other populations (e.g. anxiety and depression for SSRIs or bipolar disorder and seizures for lamotrigine).

There are several limitations to our meta-analysis such as the fairly few studies and even fewer randomized controlled trials. The small number of included trials decreased statistical power of the meta-analysis and also did not allow us to examine moderators of treatment effects and assess for the possibility of publication bias. Additionally, as the diagnostic criteria for SPD were only established with the introduction of the DSM-5, which postdated the trials included in this meta-analysis, it is possible that these trials enrolled subjects with clinically significant hair pulling that may have not technically met criteria for SPD. It is unclear how many individuals were enrolled in these trials that did not meet strict criteria for SPD and how well these results generalize to DSM-5 defined SPD. No single consistent rating instrument was used to assess symptom severity and improvement among included studies, therefore standardized mean difference was used to standardize symptom improvement.

Furthermore, uncontrolled studies were used to examine efficacy of interventions for SPD. However, we stratified trials by study design and contrasted the findings between randomized controlled and uncontrolled studies where appropriate. Finally, several interventions commonly used to treat SPD, such as hypnosis, supportive psychotherapy,

support groups and antipsychotic medications, have not been rigorously assessed in clinical trials and thus we were unable to estimate their possible efficacy.

Conclusion

This meta-analysis demonstrates the efficacy of behavioral treatments for SPD in randomized controlled trials. Pharmacological interventions (SSRIs and lamotrigine) showed no benefit for SPD compared to placebo. In uncontrolled trials, SPD patients showed improvement over time with all interventions reported. However, SPD patients also demonstrate significant improvement over time in inactive comparison arms of randomized controlled trials. Given the significant improvement over time demonstrated in trials of SPD patients, future research should be limited to controlled clinical trials to determine efficacy. Future studies should also investigate the efficacy of additional pharmacological agents including glutamate modulating agents e.g. NAC, riluzole, ketamine; antiepileptic medications; naltrexone and antipsychotic medications.

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References

1. Keuthen NJ, Koran LM, Aboujaoude E, et al. The prevalence of pathologic skin picking in US adults. *Comprehensive psychiatry*. 2010; 51:183–186. [PubMed: 20152300]
2. Odlaug, B.; Grant, J. Trichotillomania, skin picking, and other body-focused repetitive behaviors. Arlington, VA: American Psychiatric Publishing, Inc ; US; 2012. Pathological skin picking; p. 21-41.
3. Bohne A, Wilhelm S, Keuthen NJ, et al. Skin picking in German students. Prevalence, phenomenology, and associated characteristics. *Behavior modification*. 2002; 26:320–339. [PubMed: 12080904]
4. Arnold LM, McElroy SL, Mutasim DF, et al. Characteristics of 34 adults with psychogenic excoriation. *The Journal of clinical psychiatry*. 1998; 59:509–514. [PubMed: 9818631]
5. Flessner CA, Woods DW. Phenomenological characteristics, social problems, and the economic impact associated with chronic skin picking. *Behavior modification*. 2006; 30:944–963. [PubMed: 17050772]
6. Tucker B, Woods D, Flessner C, et al. The Skin Picking Impact Project: phenomenology, interference, and treatment utilization of pathological skin picking in a population-based sample. *J Anxiety Disord*. 2011; 25:88–95. [PubMed: 20810239]
7. Gelinas B, Gagnon M. Pharmacological and psychological treatments of pathological skin-picking: A preliminary meta-analysis. *Journal of Obsessive-Compulsive and Related Disorders*. 2013; 2:167–175.
8. Gelinas, B.; Gagnon, M. Pharmacological and psychological treatments of pathological skin-picking: a preliminary meta-analysis. University of York, Database of Abstracts of Reviews of Effects (DARE); 2014.
9. Higgins, J.; Green, S. *Cochrane Handbook for Systematic Reviews of Interventions*. 2011. Version 5.1.0 Available at www.cochranehandbook.org

10. Keuthen NJ, Wilhelm S, Deckersbach T, et al. The Skin Picking Scale: scale construction and psychometric analyses. *Journal of psychosomatic research*. 2001; 50:337–341. [PubMed: 11438115]
11. Paul-Dauphin A, Guillemin F, Virion JM, et al. Bias and precision in visual analogue scales: a randomized controlled trial. *American journal of epidemiology*. 1999; 150:1117–1127. [PubMed: 10568628]
12. Arnold L, Mutasim D, Dwight M, et al. An open clinical trial of fluvoxamine treatment of psychogenic excoriation. *J Clin Psychopharmacol*. 1999; 19:15–18. [PubMed: 9934938]
13. Moritz S, Fricke S, Treszl A, et al. Do it yourself! Evaluation of self-help habit reversal training versus decoupling in pathological skin picking: A pilot study. *Journal of Obsessive-Compulsive and Related Disorders*. 2012; 1:41–47.
14. Kelley ML, Heffer RW, Gresham FM, et al. Development of a Modified Treatment Evaluation Inventory. *Journal of Psychopathology and Behavioral Assessment*. 1989; 2:235–247.
15. Bloch MH, Landeros-Weisenberger A, Dombrowski P, et al. Systematic review: pharmacological and behavioral treatment for trichotillomania. *Biological psychiatry*. 2007; 62:839–846. [PubMed: 17727824]
16. Arbabi M, Farnia V, Balighi K, et al. Efficacy of citalopram in treatment of pathological skin picking, a randomized double blind placebo controlled trial. *Acta Medica Iranica*. 2008; 46:367–372.
17. Bloch M, Elliott M, Thompson H, et al. Fluoxetine in pathologic skin-picking: open-label and double-blind results. *Psychosomatics*. 2001; 42:314–319. [PubMed: 11496020]
18. Flessner C, Mouton-Odum S, Stocker A, et al. StopPicking.com: Internet-based treatment for self-injurious skin picking. *Dermatol Online J*. 2007; 13:3. [PubMed: 18319000]
19. Grant J, Odlaug B, Kim S. Lamotrigine treatment of pathologic skin picking: an open-label study. *Journal of Clinical Psychiatry*. 2007; 68:1384–1391. [PubMed: 17915977]
20. Grant J, Odlaug B, Chamberlain S, et al. A double-blind, placebo-controlled trial of lamotrigine for pathological skin picking: treatment efficacy and neurocognitive predictors of response. *J Clin Psychopharmacol*. 2010; 30:396–403. [PubMed: 20531220]
21. Keuthen N, Jameson M, Loh R, et al. Open-label escitalopram treatment for pathological skin picking. *Int Clin Psychopharmacol*. 2007; 22:268–274. [PubMed: 17690595]
22. Schuck K, Keijsers G, Rinck M. The effects of brief cognitive-behaviour therapy for pathological skin picking: A randomized comparison to wait-list control. *Behav Res Ther*. 2011; 49:11–17. [PubMed: 20934685]
23. Simeon D, Stein D, Gross S, et al. A double-blind trial of fluoxetine in pathologic skin picking. *Journal of Clinical Psychiatry*. 1997; 58:341–347. [PubMed: 9515971]
24. Teng E, Woods D, Twohig M. Habit reversal as a treatment for chronic skin picking: a pilot investigation. *Behavior modification*. 2006; 30:411–422. [PubMed: 16723422]
25. Keuthen NJ, Jameson M, Loh R, et al. Open-label escitalopram treatment for pathological skin picking. *Int Clin Psychopharmacol*. 2007; 22:268–274. [PubMed: 17690595]
26. Simeon D, Stein DJ, Gross S, et al. A double-blind trial of fluoxetine in pathologic skin picking. *The Journal of clinical psychiatry*. 1997; 58:341–347. [PubMed: 9515971]

Figure 1.
Selection of Studies

Figure 2. Forest Plot of Comparison of Behavioral Treatments to Inactive Control Conditions
Behavioral treatment demonstrated significant benefit compared to inactive control conditions in the treatment of Skin Picking Disorder.

Figure 3. Improvement of Skin Picking Disorder Symptoms Over Time in Response to Treatments
All interventions (behavioral therapy, selective-serotonin reuptake inhibitors (SSRIs), lamotrigine) and inactive control conditions (waitlist and placebo) demonstrated significant improvement over time for Skin Picking Disorder.

Figure 4. Forest Plot: Efficacy of Interventions for Skin Picking Disorder Compared to Inactive Control Conditions
Only Behavioral therapy demonstrated significant benefit compared to Inactive Control Conditions in the treatment of Skin Picking Disorder. There is no evidence from randomized, placebo-controlled trials supporting the efficacy of any pharmacological intervention.

Table 1

Characteristics of Included Studies

Study	Design	Intervention	Comparison	N	Duration	Primary Outcome Measure
Behavioral Therapy						
Teng 2006(24)	RCT	HRT	Waitlist	19	3 sessions	Self-monitoring cards
Schuck 2011(22)	RCT	CBT	Waitlist	34	4 sessions	SPS
Moritz 2012(19)	RCT	HRT (self-help)	DC	70	4 weeks	M-SPS ⁵
Flessner 2007(7)	uncontrolled	CBT (self-help)	NONE	151	11.7 weeks	SPS ⁴
Selective Serotonin Reuptake Inhibitors						
Simeon 1997(24)	RCT	Fluoxetine	Placebo	17	10 weeks	SPTS ³
Arabi 2008(1)	RCT	Citalopram	Placebo	45	4 weeks	VAS ¹
Arnold 1999(2)	uncontrolled	Fluvoxamine	NONE	14	12 weeks	NE-YBOCS ²
Bloch 2001(4)	uncontrolled	Fluoxetine	NONE	15	6 weeks	NE-YBOCS
Keuthen 2007(16)	uncontrolled	Escitalopram	NONE	29	18 weeks	MGH-SPS
Lamotrigine						
Grant 2010(11)	RCT	Lamotrigine	Placebo	32	12 weeks	NE-YBOCS
Grant 2007(12)	uncontrolled	Lamotrigine	NONE	24	12 weeks	NE-YBOCS

Abbreviations: N/A, data was not reported; RCT, Randomized Controlled Trial; CBT, Cognitive Behavioral Therapy; HRT, Habit Reversal Therapy; DC, Decoupling;

¹Visual Analogue Scale;

²The Yale-Brown Obsessive Compulsive Scale for Neurotic Excoriation;

³Skin Picking Treatment Scale;

⁴Skin Picking Scale;

⁵Modified Skin Picking Scale