The European Journal of Psychiatry 36 (2022) 130—136

THE EUROPEAN JOURNAL OF PSYCHIATRY

www.elsevier.es/ejpsy

ORIGINAL ARTICLE

Facial emotion recognition difficulties may be specific to skin picking disorder, but could also be related to the presence of alexithymia in trichotillomania

Efruz Pirdogan Aydin[a,*], Hasan Demirci[b], Azra Gokovali Begenen[a], Julide Guler Kenar[a], Ilknur Kivanc Altunay[c], Omer Akil Ozer[a], Kayıhan Oguz Karamustafalioglu[a]

[a] *Department of Psychiatry, University of Health Sciences, Şişli Hamidiye Etfal Teaching and Research Hospital, Istanbul, Turkey*
[b] *Department of Psychology, University of Health Sciences, Istanbul, Turkey*
[c] *Department of Dermatology, University of Health Sciences, Şişli Hamidiye Etfal Teaching and Research Hospital, Istanbul, Turkey*

Received 30 August 2021; accepted 4 November 2021
Available online 23 March 2022

KEYWORDS
Alexithymia;
Trichotillomania;
Skin picking disorder;
Facial emotion recognition;
Social cognition

Abstract
Background and objectives: Previous research has shown high rates of alexithymia and emotion dysregulation in trichotillomania (TTM) and skin picking disorder (SPD). Unfortunately, there are no data on facial emotion recognition (FER) in TTM and SPD. The present study aimed to compare patients with TTM and SPD and a healthy control group for the severity of alexithymia and rates of FER.
Methods: Forty patients with SPD, 30 patients with TTM, and 30 healthy controls were enrolled in this study. The Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), Clinical Global Impression (CGI), Toronto Alexithymia Scale (TAS-20), and the Facial Emotion Recognition Test were applied to the participants.
Results: Patients with TTM and SPD had less FER accuracy and higher alexithymia scores compared with healthy controls. According to ANCOVA analysis, when anxiety, depression, and alexithymia were fixed as covariates, disgusted facial expressions and total facial emotion recognition were still significantly lower in patients with SPD compared with the control group, but there was no difference between the TTM and control groups and TTM and SPD groups.
Conclusion: Alexithymia rates were high in patients with TTM and SPD. Interestingly, difficulty in recognizing disgusted facial expressions may be a distinctive sign in SPD. Future neuroimaging studies are needed to support possible FER impairment in patients with TTM/SPD.

Introduction

Trichotillomania (TTM) and skin picking disorder (SPD), which are included in the category of "Obsessive-Compulsive and Related Disorders" in the Diagnostic and Statistical

* Corresponding author.
E-mail address: efruzpirdogan@gmail.com (E.P. Aydin).

https://doi.org/10.1016/j.ejpsy.2021.11.001

Manual of Mental Disorders, Fifth Edition (DSM-5), are psychiatric disorders characterized by repetitive and compulsive pulling/picking of hair/skin, respectively.[1] Hair loss or skin injuries lead to shame and reduced self-esteem, resulting in avoidance of social activities and difficulties in professional and academic life.[2,3] These disorders tend to have a chronic course, and the severity of picking/pulling behavior can reduce or increase from time to time.[4] Although habit reversal training (HRT) is recommended as the first-line therapy, effective treatment methods are still investigated because some patients show inadequate treatment response or symptom recurrence.[5]

A significant proportion of patients have pulling/picking behavior triggers that initiate symptom provocation or exacerbation. These may be considered as negative emotions (tension, boredom, and anxiety) resulting from emotional (conflicts in interpersonal relationships) and perceptual (skin irregularities) conditions, or increased bodily sensations (e.g. itching) resulting from over-repression of emotions within the context of alexithymia.[6–8]

Alexithymia is a personality trait that shows impairment in emotional processing,[9] manifested by difficulties in identifying, differentiating, and describing feelings, and the lack of an imaginative capacity. It was suggested that individuals with alexithymia could not make the connection between thoughts and feelings; instead, they used maladaptive emotion regulation methods such as suppression.[10] Alexithymia is also a risk factor for the occurrence of psychiatric disorders.[11] Moreover, the presence of alexithymia in patients is believed to affect the treatment response negatively.[12]

Although there are limited studies, rates of alexithymia in SPD[13,14] and TTM[15] were reported to be higher compared with healthy controls. Rufer et al. (2014) stated that the severity of alexithymia predicted the severity of the disease in patients with TTM.

On the other hand, understanding one's and other people's emotional reactions are part of social interaction. Other people's emotions are understood through the mirror neuron system.[16] Healthy connections can be made in interpersonal relationships by correctly interpreting others' behaviors and emotions, and adjusting behaviors accordingly using clues from their facial expressions.[17] Ekman suggested six basic emotions by defining happiness as a positive emotion, and fear, sadness, anger, and disgust as negative emotions, and surprise as neither a negative nor positive emotion.[18] Notably, there are studies about the lesser recognition of disgusted facial expression in patients with obsessive-compulsive disorder (OCD) compared with healthy controls.[19–21] However, some studies found no difference between OCD and healthy control groups.[22–24] Finally, it was found that patients with OCD had difficulty recognizing angry and disgusted faces in a meta-analysis study.[25]

Unfortunately, there are no data on facial emotion recognition (FER) in TTM and SPD. However, we believe that the processes of FER should be investigated in SPD and TTM, given the high rates of alexithymia, poor emotion regulation ability. Accordingly, this study aimed to compare patients with TTM and SPD and a healthy control group for the severity of alexithymia and rates of FER.

Materials and methods

Study population

This study comprised patients with SPD (n = 40) and TTM (n = 30) who were diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria by at least two psychiatrists. The comorbidities of the patients were determined according to the Structured Clinical Interview for DSM-IV (SCID-I). The exclusion criteria were as follows: (i) intellectual disability, bipolar disorder, psychotic disorder and dementia, (ii) illiteracy, (iii) alcohol and/or substance dependence/abuse, and (iv) suicide risk. After the selection of the patient groups was made according to the purposeful sampling method, the control group without any psychiatric disease was matched by providing for similar sex, age group, and educational status as the patients. Our control group did not meet the criteria for any Axis I disorders as assessed using SCID-I. Sociodemographic data, the Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), Clinical Global Impression (CGI), Toronto Alexithymia Scale (TAS-20), and Facial Emotion Recognition Test were applied to all participants. The participants were instructed on the purpose and design of the study and informed consent was obtained from each. The trial was approved by the ethics committee of Sisli Hamidiye Etfal Teaching and Research Hospital.

Clinical assessments

Sociodemographic data form

A data form was designed for the study, which included questions about the patients' age, sex, educational status, employment status, family history of psychiatric disorders, age of onset for the disorder, duration of the disorder, sites of picking/pulling, and time spent hair pulling per day. Ascertainment of family history of psychiatric disorders was provided by the system registers and patient declarations. Some questions about picking/pulling behavior on the form were: What areas are you picking/pulling? (e.g. hair, eyebrows, eyelashes, scalp, face, ear, finger, back, arm, trunk, pubic area, leg, foot). How long do episodes last in total on an average day? (a) 1–15 min, b) 16–30 min, c) 31–60 min, d) 1–3 h, e) ≥4 h). How many times do you pick/pull your skin/hair per day? (a) 1–3, b) 4–6, c) 7–10, d) 11–20, e) <20).

Beck depression inventory (BDI)

The scale consists of 21 items and the Turkish version was used in this study.[26] The BDI measures the severity of depressive symptoms in adults. The total score ranges between 0 and 63.

Beck anxiety inventory (BAI)

The scale consists of 21 items that measure anxiety severity.[27] The total score ranges between 0 and 63.

Clinic global impressions-severity

(CGI-S): The CGI-S is a single-term physician-rated scale, scored from 1 to 7 points based on the severity of disorder: 1=normal, not at all ill; 2=borderline mentally ill; 3=mildly ill; 4=moderately ill; 5=markedly ill; 6=severely

ill; 7=among the most extremely ill patients.[28] Scores of 1 and 2 are defined respectively as the absence of TTM/SPD diagnosis or mild picking/pulling behavior symptoms, and all high scores show significant TTM/SPD symptoms. Based on the study conducted by Houghton et al. (2015), illness was rated and the CGI score was determined by considering the factors such as the picking/pulling frequency, distress and impaired functionality caused by the illness, and need for social support.[29]

Toronto alexithymia scale (TAS-20)
The validity and reliability study of the Turkish version of the form was performed by Güleç et al. (2009).[30] It consists of three subscales: "difficulty identifying feelings (DIF)," "difficulty describing feelings (DDF)," and "externally oriented thinking (EOT)."

Facial emotion recognition test
The test contained the photos of four male and four female models (totally 56 mixed photos) with happy, surprised, fearful, sad, angry, disgusted, and neutral facial expressions from Ekman and Friesen's series.[31] All photos were printed on A4-sized (210 × 297 mm) white paper and the participants were asked to recognize facial emotion expressions within a distance of 45—60 cm. The test was performed on the participants by the same psychologist. At first, we had a trial section, which consisted of the first seven photos including each emotional facial expression (i.e., angry, sad, happy, neutral, fearful, disgusted, and surprised) that were shown in the same set for each participant. In total, 49 photos were used for the data analyses in the study. In these 49 photos, numbers of happy, sad, surprised, fearful, disgusted, angry, and neutral expressions were equal. All participants were tested separately in a silent room. The participants were informed that a stopwatch would be started during the test and that they should state the first emotion that came to mind in the first 10 seconds when they saw the photos. The stopwatch was restarted for each photo and ended when the participants responded. The reaction time and response were noted for each facial emotion. No comment was given related to the correctness or inaccuracy of individual responses.[32—34]

Statistical analysis

The data were analyzed using the SPSS 20 software. All data were first analyzed for the normality of data distribution using the Kolmogorov—Smirnov test. Categorical variables were compared using Pearson's Chi-square test and Fisher's exact test. In the comparison of three independent groups, analysis of variance (ANOVA) was applied using Bonferroni corrected pair-wise group comparisons under normal distribution conditions, and the Kruskal-Wallis test was used with Mann-Whitney U test corrected pair-wise group comparisons when data were not normally disturbed. Analysis of covariance (ANCOVA) was performed by selecting alexithymia, depression, and anxiety scores as covariates in comparisons of the three groups in terms of recognizing facial emotion expressions. Post-hoc tests were interpreted using Bonferroni correction ($p < 0.017$). Pearson's correlation analysis was used under normal distribution conditions, and Spearman's correlation analysis was used when normal distribution was not achieved. The statistical significance level of alpha was defined as $p < 0.05$.

Results

Participants characteristics and clinical assessments

There were no statistical differences in age, sex, and educational status between the SPD, TTM, and control groups ($p>0.05$). There were no significant differences in age of onset of the disorder, duration of the disorder, known family history of psychiatric disorders, CGI-S severity, and comorbidities between patients with SPD and TTM ($p > 0.05$). At least one psychiatric comorbidity was noted in 75% of patients with SPD and 86.7% of patients with TTM. The number of sites of skin picking in patients with SPD was higher compared with the number of sites of hair pulling in patients with TTM (Z = -2.491, p = 0.013). Scores for BDI ($p < 0.001$), BAI ($p < 0.001$), and TAS-20 subscales of DIF (F = 15.073 $p < 0.001$), DDF (F = 9.898 $p < 0.001$), and TAS-20 total scores (F = 11.574, $p < 0.001$) were statistically significantly higher in the SPD and TTM groups compared with the control group, but no statistically significant differences were found in scores for the TAS-20 subscale of EOT (F = 0.437, $p > 0.647$). Patients with TTM and SPD were not different from each other in terms of BDI, BAI, DIF, and DDF scores according to the post-hoc tests ($p > 0.05$). Socio-demographic and psychometric data of the patients with SPD and TTM and healthy controls are shown in Table 1.

Facial emotion recognition in patient and control groups

The mean accuracy of FER in the groups are shown in Figure 1. In the ANCOVA analysis performed by fixing depression, anxiety, and alexithymia scores, there was no significant difference in terms of the recognition of happy, angry, and surprised facial expressions ($p > 0.05$), but recognition of sadness and disgusted and total facial expression was significantly different between the groups ($p < 0.05$). However, when performed with post-hoc analysis, there was no significant difference between the two groups in terms of the recognition of sadness facial expressions with Bonferroni correction ($p > 0.017$). There was no significant difference in any recognition facial emotion expressions between the TTM and the control group ($p > 0.017$). There was no significant difference between FER rates between the TTM and SPD groups. Besides, recognition of disgusted ($p < 0.002$) and total ($p < 0.003$) facial expressions was significantly lower in patients with SPD compared with the control group (Table 2). A statistically significant negative correlation was found between total rates of FER and scores for BDI (r = -0.273, p = 0.004), BAI (r = -0.252, p = 0.012), DDF (r = -0.319, p = 0.001), and TAS total scores (r = -0.283, p = 0.004) among the participants. No significant correlation was found between total rates of FER and scores of CGI, DIF, and EOT ($p > 0.05$).

Table 1 Comparison of demographic characteristics and clinical scores between the groups.

	SPD (n = 40)	TTM (n = 30)	HC (n = 30)	p	p^{1}*	p^{2}*	p^{3}*
Age	31.9 ± 11.46	27 ± 11.3	28.83 ± 8.77	0.106			
Sex (Female/Male)	33/7	26/4	25/5	0.889			
Education (Years)	10.35 ± 3.84	10.53 ± 3.61	11.77 ± 2.83	0.458			
Age of onset	20.4 ± 13.23	18.83 ± 9.86	–	0.91			
Duration of disorder (Years)	7.39 ± 6.76	7.68 ± 7.46	–	0.905			
Number of sites picked/pulled	2.5 ± 1.6	1.6 ± 0.8	–	0.013			
Comorbidity, n (%)	30 (75)	26 (86.7)	–	0.227			
CGI	4.2 ± 0.82	4.57 ± 1.22	–	0.345			
BDI	21.05 ± 11.47	20.43 ± 11.19	6.3 ± 4.59	<0.001	0.994	<0.001	<0.001
BAI	20.93 ± 13.65	20.07 ± 11.46	8.9 ± 5.97	<0.001	0.989	<0.001	<0.001
TAS-20 DIF	15 ± 3.98	14.87 ± 4.37	11.33 ± 2.41	<0.001	0.999	<0.001	0.001
TAS-20 DDF	21.53 ± 5.09	21.43 ± 5.77	15.2 ± 4.88	<0.001	0.999	<0.001	<0.001
TAS-20 EOT	22.28 ± 4.12	21.47 ± 3.84	21.67 ± 3.28	0.647			
TAS-20 Total	58.8 ± 10.18	57.73 ± 10.7	48.2 ± 7.85	<0.001	0.999	<0.001	0.001

p^{1}=TTM&SPD; p^{2}=SPD&HC; p^{3}=TTM&HC, *Bonferroni correction, a p-value < 0.017 indicated statistical significance
Abbreviations= BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; DDF: Difficulty describing feelings; DIF: Difficulty identifying feelings; EOT: externally oriented thinking; HC: Healthy control; SPD: Skin picking disorder; TAS-20: Toronto Alexithymia Scale TTM: Trichotillomania

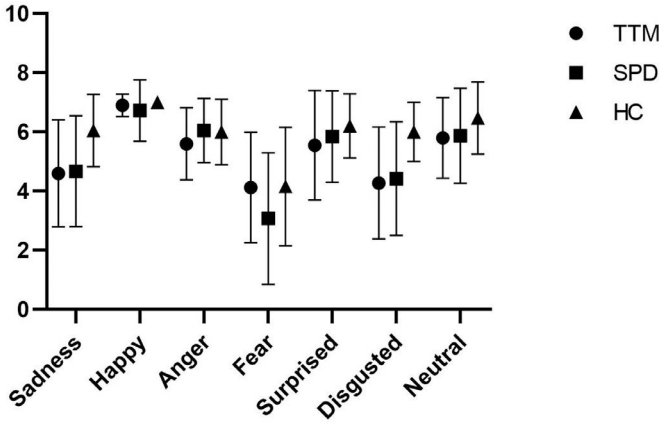

Fig. 1 Mean accuracy of the facial emotion recognition test in the TTM, SPD, and healthy control groups.

Discussion

Our study showed that patients with TTM and SPD had less FER accuracy and higher alexithymia scores compared with healthy controls. According to the post-hoc analysis, disgusted facial expressions and total facial emotion recognition were still significantly lower in patients with SPD compared with the control group when anxiety, depression, and alexithymia were fixed as covariates. However, there was no difference between the TTM and control groups and TTM and SPD groups. To our knowledge, our study is unprecedented in the literature.

Recently, studies conducted to understand the etiology in body-focused repetitive behavior disorders (BFRBDs) (e.g. trichotillomania, skin picking disorder, pathologic nail-biting) suggested increased emotional reactivity and poor emotion regulation ability.[35–37] One study found difficulty in

Table 2 Comparison of accurate responses to each facial emotion recognition task between the groups.

	SPD (n = 40)	TTM (n = 30)	Healty Control (n = 30)	p*	$p1$*	$p2$*	$p3$*
Sadness	4.75 ± 1.73	4.27 ± 1.87	5.77 ± 1.52	0.018	0.999	0.128	0.017
Sadness-Time (sec)	2.2 ± 0.9	2.5 ± 1.2	2 ± 0.8	0.194			
Happy	6.7 ± 1.04	6.97 ± 0.18	6.93 ± 0.36	0.353			
Happy-Time (sec)	1 ± 0.7	1 ± 0.5	1 ± 0.5	0.348			
Angry	5.88 ± 1.18	5.57 ± 1.19	6.1 ± 1.02	0.403			
Angry-Time (sec)	2.2 ± 1.3	2.5 ± 1.3	2.3 ± 0.6	0.22			
Fear	3 ± 2.34	4.27 ± 1.55	4.13 ± 1.96	0.07	0.069	0.609	0.999
Fear-Time (sec)	2.1 ± 1.2	2.2 ± 1	2.1 ± 0.4	0.762			
Surprised	5.8 ± 1.57	5.47 ± 1.94	6.17 ± 1.2	0.283			
Surprised-Time (sec)	1.7 ± 1.1	1.7 ± 1	1.6 ± 0.8	0.746			
Disgusted	3.98 ± 2.03	4.43 ± 1.79	5.87 ± 0.97	0.003	0.999	0.002	0.048
Disgusted-Time (sec)	2.1 ± 1.1	1.9 ± 0.9	2 ± 1.1	0.654			
Neutral	5.75 ± 1.61	5.7 ± 1.51	6.43 ± 1.01	0.351			
Neutral-Time (sec)	1.6 ± 1.2	3.5 ± 10.3	1.6 ± 5.7	0.398			
FER-Total	35.8 ± 5.8	36.7 ± 5.5	41.4 ± 2.8	0.004	0.999	0.003	0.02

ANCOVA analysis: BDI, BAI, TAS-20 total scores as covariances,p < 0.017
p^{1}: TTM&SPD; p^{2}: SPD&HC; p^{3}: TTM&HC

emotion regulation even after controlling for depression in patients with TTM, emphasizing that emotional dysregulation could be a core sign for TTM (especially for focused subtype).[38] In our study, DIF and DDF and total alexithymia scores were found to be higher in the SPD and TTM groups compared with the control group. Similarly, Calikusu et al. (2002) suggested that internally oriented anger and alexithymia scores were higher in patients with psychogenic excoriation compared with patients with chronic urticaria and that these patients might have impaired affect regulation.[39] Curley et al. (2016) reported that repressed anger was an important factor in predicting hair pulling severity in patients with TTM.[40]

Rufer et al. (2014) reported that the alexithymia scores of patients with TTM were higher than those of the control group and suggested that the score of DDF might be a predictive factor of the severity of the disorder.[15] Moreover, the same study emphasized that monitoring the lack of emotion regulation and the presence of alexithymia at the beginning of the therapeutic interventions might be important. Alexandar et al. (2018) reported that their BFRBD group had difficulty in emotion regulation compared with the BFRBD and control groups, but did not document any differences in alexithymia scores between these groups.[13] The same study suggested that patients with SPD might be more alexithymic compared with patients with TTM and pathologic nail-biting. However, we found no differences in alexithymia scores between the TTM and SPD groups.

Another primary finding of our study was that the patients with SPD and TTM were worse than the healthy control group in FER. When depression, anxiety, and alexithymia were fixed, patients with SPD were still significantly less accurate with disgusted facial expressions and total FER than the healthy control group, but there was no difference in FER between the TTM and the control groups. No FER study has been conducted on patients with SPD and TTM in the literature. Similar to our study, studies are reporting that there are difficulties in the recognition of disgusted facial expressions in OCD.[19–21,41,42,] However, some studies detected no difficulty in recognizing disgusted facial expressions among patients with OCD when compared with controls.[22–24] It has been reported that there may be a variation in recognizing disgusted facial expressions among patients with OCD according to the symptom severity,[24] presence of the symptom dimension of dirtiness/contamination,[23] and responsiveness to cognitive-behavioral therapy.[42]

Disgust, an evolutionary adaptation mechanism to avoid diseases, results in cleaning or grooming behavior aimed at the removal of pathogens on the skin.[43] Also, skin picking and hair pulling have been conceptualized as grooming behaviors.[44] Thus, studies showing differences in the perception of disgust in SPD have become the focus of recent interest.[45,46] One study reported that emotional dysregulation and a propensity for disgust predicted the focused subtype of SPD.[43] In a study where patients with SPD were given photos of skin irregularities, feelings of disgust led to increased activity in the putamen and anterior insula as shown on functional magnetic resonance imaging (fMRI).[47] It is known that recognition of disgusted facial expression is impaired early in Huntington's disease and thus the putamen, which is a portion of the basal ganglia, was suggested to be the responsible region.[48] Also, the anterior insula is responsible for the recognition of expression of disgust as the area where sensory experiences turn into emotional situations.[49,50]

SPD and TTM have been classified as OCD and related disorders and reported to share common phenomenologic characteristics, but with some differences. Previous studies reported differences in characteristics such as the prevalence of subtypes,[51] triggers of behavior,[52] and neurocognitive functions.[53] Hence, it can be deduced that SPD is closer to OCD because its compulsive (focused) subtype is more common[54] and responds better to serotonin reuptake inhibitors (SRIs)[5] than TTM.[8] From these points, it can be said that the difficulty in recognizing disgusted facial expressions, similar to OCD, may be specific to SPD. Future research is needed to understand whether FER difficulties relate to a specific symptom of SPD.

In our study, it was found that the difficulty in recognizing facial emotion in patients with TTM was due to co-occurring alexithymia, depression, and anxiety. Recent studies suggested that impairment in FER in patients with somatoform disorders,[55,56] eating disorders,[57] autism,[58] and healthy controls[59] might be caused by the presence of alexithymia. Till now, there has been no information about FER related to TTM. However, it can be argued that there is no FER difficulty due to the psychopathology of TTM. In particular, individuals with high alexithymic features were reported to show decreased activity in the same brain regions (prefrontal cortex and limbic regions) that are responsible for emotional processing during FER.[59,60,] Consistently, in our study, rates of FER were decreased with an increase in the severity of depression and anxiety, as well as the scores for alexithymia.

Our study has some limitations. First, the frequency of comorbidities and severity of depression and anxiety were also high in patients with SPD and TTM in our study. We believe that the rates of comorbidity and severity of depression and anxiety were high because our study included patients who presented to the outpatient clinic seeking treatment. Additionally, due to the nature of SPD and TTM, comorbidities are common. Therefore, we did not exclude comorbidity states in our study. The high severity of depression or anxiety in our patients might have affected the FER processes as a limitation of our study. Impairment in FER has been reported in depression and anxiety disorders.[61] It may be based on depressed individuals negatively perceiving external stimulati because of negative cognitions (worthlessness, hopelessness, and self-criticism).[62] Nevertheless, in our study, it could be said that patients with SPD, unlike those with TTM, had impaired FER, especially with disgust. Secondly, in our study, disorder severity was determined only using the CGI-S because the validity and reliability studies of the self-report scales based on picking/pulling behavior are not yet standardized for the Turkish population. It may not have reflected current characteristics of picking/pulling urges and behaviors because the CGI-S was scored by assessing the need for support, picking/pulling frequency, and impairment in functionality. In our study, no correlation was found between CGI-S and FER, but it should be investigated using self-rating scales (e.g. the Massachusetts General Hospital Scale, the Skin Picking Scale) in further studies. Thirdly, neuroimaging was not performed in our study. Future neuroimaging studies are needed to support possible FER impairment in patients with TTM/SPD.

In conclusion, our study showed that the rates of alexithymia were high and FER was impaired in patients with SPD

and TTM. However, the FER impairment in patients with TTM was explained by co-occurring anxiety, depression, and alexithymia. Interestingly, patients with SPD had less recognition of disgusted facial expressions compared with the healthy controls. Moreover, it can be said that difficulty with disgusted facial expressions may be a specific symptom of SPD. Determination of the severity of alexithymia and the level of social cognition can be important in the selection of treatment and therapeutic interventions in these patients. Our study may be pioneering in revealing the relationship between FER and SPD/TTM.

Ethical considerations

The participants were instructed on the purpose and design of the study and informed consent was obtained from each. The trial was approved by the ethics committee of Sisli Hamidiye Etfal Teaching and Research Hospital (No:2456).

Role of funding

None.

Contributors

First author: methodology, clinical diagnosis, formal analysis, writing - original draft, review, and editing). Second author: methodology, FER test application. Third author: clinical diagnosis, FER test analysis, and data collecting. Fourth author: clinical diagnosis, review. Fifth author: clinical diagnosis, review. Sixth and seventh author: supervision, review, editing.

Conflict of interest

None.

Acknowledgements

None.

References

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders (DSM-5®). 5th ed. Washington: American Psychiatric Pub; 2013.
2. Flessner CA, Woods DW. Phenomenological characteristics, social problems, and the economic impact associated with chronic skin picking. Behav Modif. 2006;30(6):944—63. https://doi.org/10.1177/0145445506294083. 2006.
3. Franklin ME, Flessner CA, Woods DW, Keuthen NJ, Piacentini JC, Moore P, et al. The child and adolescent trichotillomania impact project: descriptive psychopathology, comorbidity, functional impairment, and treatment utilization. J Dev Behav Pediatr. 2008;29(6):493—500. https://doi.org/10.1097/DBP.0b013e31818d4328.
4. Wilhelm S, Keuthen NJ, Deckersbach T, Engelhard IM, Forker AE, Baer L, et al. Self-injurious skin picking: clinical characteristics and comorbidity. J Clin Psychiatry. 1999;60(7):454—9. https://doi.org/10.4088/jcp.v60n0707.
5. Jones G, Keuthen N, Greenberg E. Assessment and treatment of trichotillomania (hair pulling disorder) and excoriation (skin picking) disorder. Clin Dermatol. 2018;36(6):728—36. https://doi.org/10.1016/j.clindermatol.2018.08.008.
6. Calikusu C, Kucukgoncu S, Tecer Ö, Bestepe E. Skin picking in Turkish students: prevalence, characteristics, and gender differences. Behav Modif. 2012;36(1):49—66. https://doi.org/10.1177/0145445511420282.
7. Neziroglu F, Rabinowitz D, Breytman A, Jacofsky M. Skin picking phenomenology and severity comparison. Prim Care Companion J Clin Psychiatry. 2008;10(4):306—12. https://doi.org/10.4088/pcc.v10n0406.
8. Aydin EP, Kenar JG, Altunay İK, et al. Clinical characteristics and comorbidities of patients with trichotillomania and skin picking disorder who admitted to a psychodermatology outpatient clinic: a comparative study. Turk Psikiyatri Derg. 2020. https://doi.org/10.5080/u25437. In Press.
9. Taylor GJ, Bagby RM, Parker JD. Disorders of Affect Regulation: Alexithymia in Medical and Psychiatric Illness. 1st ed. Cambridge: Cambridge University Press; 1999.
10. Swart M, Kortekaas R, Aleman A. Dealing with feelings: characterization of trait alexithymia on emotion regulation strategies and cognitive-emotional processing. PLoS One. 2009;4(6):e5751. https://doi.org/10.1371/journal.pone.0005751.
11. van der Velde J, Servaas MN, Goerlich KS, Bruggeman R, Horton P, Costafreda SG, et al. Neural correlates of alexithymia: a meta-analysis of emotion processing studies. Neurosci Biobehav Rev. 2013;37(8):1774—85. https://doi.org/10.1016/j.neubiorev.2013.07.008.
12. Rufer M, Albrecht R, Zaum J, Schnyder U, Mueller-Pfeiffer C, Hand I, et al. Impact of alexithymia on treatment outcome: a naturalistic study of short-term cognitive-behavioral group therapy for panic disorder. Psychopathology. 2010;43(3):170—9. https://doi.org/10.1159/000288639.
13. Alexander JR, Houghton DC, Bauer CC, Lench HC, Woods DW. Emotion regulation deficits in persons with body-focused repetitive behavior disorders. J Affect Disord. 2018;227:463—70. https://doi.org/10.1016/j.jad.2017.11.035.
14. Çalikuşu C, Yücel B, Polat A, Baykal C. Expression of anger and alexithymia in patients with psychogenic excoriation: a preliminary report. Int J Psychiatry Med. 2002;32(4):345—52. https://doi.org/10.2190/22LB-HL0U-CPJP-WN6A.
15. Rufer M, Bamert T, Klaghofer R, Moritz S, Schilling L, Weidt S. Trichotillomania and emotion regulation: is symptom severity related to alexithymia? Psychiatry Res. 2014;218(1—2):161—5. https://doi.org/10.1016/j.psychres.2014.03.029.
16. van der Gaag C, Minderaa RB, Keysers C. Facial expressions: what the mirror neuron system can and cannot tell us. Soc Neurosci. 2007;2(3—4):179—222. https://doi.org/10.1080/17470910701376878.
17. Frigerio E, Burt DM, Montagne B, Murray LK, Perrett DI. Facial affect perception in alcoholics. Psychiatry Res. 2002;113(1—2):161—71. https://doi.org/10.1016/s0165-1781(02)00244-5.
18. Ekman P. An argument for basic emotions. Cogn Emot. 1992;6:169—200.
19. Amiri A, Ghasempour A, Fahimi S, et al. Recognition of facial expression of emotion in patients with obsessive-compulsive disorder and average people. Armaghane Danesh. 2012;17:30—9.
20. Lochner C, Simmons C, Kidd M, Chamberlain SR, Fineberg NA, van Honk J, et al. Differential effects of escitalopram challenge on disgust processing in obsessive—compulsive disorder. Behav Brain Res. 2012;226(1):274—80. https://doi.org/10.1016/j.bbr.2011.09.029.
21. Sprengelmeyer R, Young AW, Pundt I, Sprengelmeyer A, Calder AJ, Berrios G, et al. Disgust implicated in obsessive—compulsive disorder. Proc R Soc Lond B Biol Sci. 1997;264(1389):1767—73. https://doi.org/10.1098/rspb.1997.0245.

22. Buhlmann U, McNally RJ, Etcoff NL, Tuschen-Caffier B, Wilhelm S. Emotion recognition deficits in body dysmorphic disorder. J Psychiatr Res. 2004;38(2):201—6. https://doi.org/10.1016/s0022-3956(03)00107-9.
23. Jhung K, Namkoong K, Kang JI, et al. Perception bias of disgust in ambiguous facial expressions in obsessive—compulsive disorder. Psychiatry Res. 2010;178:126—31.
24. Parker HA, McNally RJ, Nakayama K, Wilhelm S. No disgust recognition deficit in obsessive—compulsive disorder. J Behav Ther Exp Psychiatry. 2004;35(2):183—92. https://doi.org/10.1016/j.jbtep.2004.04.008.
25. Daros AR, Zakzanis KK, Rector NA. A quantitative analysis of facial emotion recognition in obsessive—compulsive disorder. Psychiatry Res. 2014;215:514—21.
26. Hisli N. Validity and reliability of Beck Depression Inventory for university student's. Turk Psikol Derg. 1989;23:3—13.
27. Ulusoy M, Şahin N, Erkman H. Turkish version of the beck anxiety inventory: psychometric properties. J Cognit Psychother. 1998;12:28—35.
28. Guy W. Clinical global impressions. ECDEU Assessment Manual for Psychopharmacology. Rockville: NIMH; 1976. p. 218—22.
29. Houghton DC, Capriotti MR, De Nadai AS, Compton SN, Twohig MP, Neal-Barnett AM, et al. Defining treatment response in trichotillomania: a signal detection analysis. J Anxiety Disord. 2015;36:44—51. https://doi.org/10.1016/j.janxdis.2015.09.008.
30. Güleç H, Köse S, Güleç MY, Çitak S, Evren C, Borckardt J, et al. Reliability and factorial validity of the Turkish version of the 20-item Toronto alexithymia scale (TAS-20). J Clin Psychopharmacol. 2019;19:214—20.
31. Ekman P, Friesen WV. Pictures of Facial Affect. 1976. Palo Alto.
32. Dalkıran M, Gultekin G, Yuksek E, Varsak N, Gul H, Kıncır Z. Facial emotion recognition in psychiatrists and influences of their therapeutic identification on that ability. Compr Psychiatry. 2016;69:30—5.
33. Dalkıran M, Tasdemir A, Salihoglu T, et al. The change in facial emotion recognition ability in inpatients with treatment resistant schizophrenia after Electroconvulsive therapy. Psychiatr Q. 2017;88:535—43.
34. Gultekin G, Kincir Z, Kurt M, et al. Facial emotion recognition ability: psychiatry nurses versus nurses from other departments. Clin Investig Med. 2016;39:61—5.
35. Roberts S, O'Connor K, Bélanger C. Emotion regulation and other psychological models for body-focused repetitive behaviors. Clin Psychol Rev. 2013;33(6):745—62. https://doi.org/10.1016/j.cpr.2013.05.004.
36. Roberts S, O'Connor K, Aardema F, Bélanger C, Courchesne C. The role of emotion regulation in body-focused repetitive behaviours. Cogn Behav Ther. 2016;9:e7.
37. Snorrason I, Smari J, Olafsson RP. Emotion regulation in pathological skin picking: findings from a non-treatment seeking sample. J Behav Ther Exp Psychiatry. 2010;41(3):238—45. https://doi.org/10.1016/j.jbtep.2010.01.009.
38. Arabatzoudis T, Rehm IC, Nedeljkovic M, Moulding R. Emotion regulation in individuals with and without trichotillomania. J Obsessive Compuls Relat Disord. 2017;12:87—94.
39. Çalikuşu C, Yücel B, Polat A, Baykal C. Expression of anger and alexithymia in patients with psychogenic excoriation: a preliminary report. Int J Psychiatry Med. 2002;32:345—52.
40. Curley EE, Tung ES, Keuthen NJ. Trait anger, anger expression, and anger control in trichotillomania: evidence for the emotion regulation model. J Obsessive Compuls Relat Disord. 2016;9:77—81.
41. Corcoran KM, Woody SR, Tolin DF. Recognition of facial expressions in obsessive—compulsive disorder. J Anxiety Disord. 2008;22:56—66.
42. Rector NA, Daros AR, Bradbury CL, Richter MA. Disgust recognition in obsessive-compulsive disorder: diagnostic comparisons and posttreatment effects. Can J Psychiatry. 2012;57:177—83.
43. Schienle A, Zorjan S, Übel S, Wabnegger A. Prediction of automatic and focused skin picking based on trait disgust and emotion dysregulation. J Obsessive Compuls Relat Disord. 2018;16:1—5.
44. Bienvenu OJ, Samuels JF, Riddle MA, Hoehn-Saric R, Liang KY, Cullen BA, et al. The relationship of obsessive—compulsive disorder to possible spectrum disorders: results from a family study. Biol Psychiatry. 2000;48(4):287—93. https://doi.org/10.1016/s0006-3223(00)00831-3.
45. Anderson S, Clarke V. Disgust, shame and the psychosocial impact of skin picking: evidence from an online support forum. J Health Psychol. 2019;24:1773—84.
46. Wabnegger A, Übel S, Suchar G, Schienle A. Increased emotional reactivity to affective pictures in patients with skin-picking disorder: evidence from functional magnetic resonance imaging. Behav Brain Res. 2018;336:151—5.
47. Schienle A, Übel S, Wabnegger A. Visual symptom provocation in skin picking disorder: an fMRI study. Brain Imaging Behav. 2018;12:1504—12.
48. Hayes CJ, Stevenson RJ, Coltheart M. Disgust and Huntington's disease. Neuropsychologia. 2007;45:1135—51.
49. Phillips ML, Young AW, Senior C, et al. A specific neural substrate for perceiving facial expressions of disgust. Nature. 1997;389:495—8.
50. Fusar-Poli P, Placentino A, Carletti F, et al. Functional atlas of emotional faces processing: a voxel-based meta-analysis of 105 functional magnetic resonance imaging studies. J Psychiatry Neurosci. 2009;34:418—32.
51. Lochner C, Simeon D, Niehaus DJ, Stein DJ. Trichotillomania and skin-picking: a phenomenological comparison. Depress Anxiety. 2002;15:83—6.
52. Odlaug BL, Grant JE. Trichotillomania and pathologic skin picking: clinical comparison with an examination of comorbidity. Ann Clin Psychiatry. 2008;20:57—63.
53. Grant JE, Odlaug BL, Chamberlain SR. A cognitive comparison of pathological skin picking and trichotillomania. J Psychiatr Res. 2011;45:1634—8.
54. Grant JE, Stein DJ, Woods DW, Keuthen NJ. Trichotillomania, Skin Picking, and Other Body-Focused Repetitive Behaviors. 1st ed. London: American Psychiatric Pub; 2012.
55. Pedrosa GF, Ridout N, Kessler H, et al. Facial emotion recognition and alexithymia in adults with somatoform disorders. Depress Anxiety. 2009;26:E26—33.
56. Öztürk A, Kiliç A, Deveci E, Kirpinar İ. Investigation of facial emotion recognition, alexithymia, and levels of anxiety and depression in patients with somatic symptoms and related disorders. Neuropsychiatr Dis Treat. 2016;12:1047—53.
57. Brewer R, Cook R, Cardi V, Treasure J, Bird G. Emotion recognition deficits in eating disorders are explained by co-occurring alexithymia. R Soc Open Sci. 2015;2(1):140382. https://doi.org/10.1098/rsos.140382.
58. Cook R, Brewer R, Shah P, Bird G. Alexithymia, not autism, predicts poor recognition of emotional facial expressions. Psychol Sci. 2013;24:723—32.
59. Jongen S, Axmacher N, Kremers NA, Hoffmann H, Limbrecht-Ecklundt K, Traue HC, et al. An investigation of facial emotion recognition impairments in alexithymia and its neural correlates. Behav Brain Res. 2014;271:129—39. https://doi.org/10.1016/j.bbr.2014.05.069.
60. Kano M, Fukudo S. The alexithymic brain: the neural pathways linking alexithymia to physical disorders. BioPsychoSoc Med. 2013;7:1.
61. Demenescu LR, Kortekaas R, den Boer JA, Aleman A. Impaired attribution of emotion to facial expressions in anxiety and major depression. PLoS One. 2010;5(12):e15058. https://doi.org/10.1371/journal.pone.0015058.
62. Zwick JC, Wolkenstein L. Facial emotion recognition, theory of mind and the role of facial mimicry in depression. J Affect Disord. 2017;210:90—9. https://doi.org/10.1016/j.jad.2016.12.022.