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Clinical and Dermoscopic Features of Topical Steroid Damaged Face in an Indian Tertiary Care Centre - A Cross - Sectional Study

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Abstract

Background: Misuse of topical corticosteroids on the face is a growing public health concern in India, leading to topical steroid-damaged or dependent face (TSDF). Dermoscopy offers a non-invasive modality for early detection of steroid-induced changes.

Objective: To evaluate the clinical and Dermoscopic features of TSDF and assess their association with duration, potency, and patterns of topical corticosteroid use.

Methods: A cross-sectional observational study was conducted over 18 months in a tertiary care centre in North India. A total of 135 adult patients with a history of facial corticosteroid use for ≥30 days were included. Clinical examination and Dermoscopic evaluation using DermLite DL5 were performed. Data were analysed using SPSS version 26 with chi-square or Fisher's exact tests ($p < 0.05$).

Results: The majority were young females (88.1%), predominantly aged 21–30 years. Melasma was the most

common indication (43%), and class III corticosteroids, particularly betamethasone valerate (46.7%), were frequently misused. Hyper pigmentation (60.7%), white hair (54.1%), telangiectasia (50.4%), and hyper trichosis (50.4%) were common clinical findings. Dermoscopy revealed vascular changes in all cases (100%), diffuse red areas (97%), and brown globules (61.5%). Hyper pigmentation (p = 0.018), white hair (p = 0.022), and Dermoscopic brown globules (p = 0.011) were significantly associated with longer duration of use.

Conclusion: TSDF predominantly affects young women and is strongly associated with prolonged corticosteroid misuse. Dermoscopy enables early detection of subclinical changes, highlighting its role in routine evaluation and the need for stricter regulation and patient awareness.

Keywords: Topical Steroid Damaged Face, TSDF, Dermoscopy, Facial Corticosteroid misuse, Clinico dermoscopic correlation

Introduction

Topical corticosteroids remain one of the most important and commonly prescribed therapeutic agents in dermatology because of their strong anti-inflammatory, immunosuppressive, anti-pruritic, and vasoconstrictive actions.[1,3] Since their introduction in the early 1950s, they have transformed the management of many inflammatory skin diseases, but their benefits are closely balanced by the risk of adverse effects when used inappropriately, especially on the face[1,2].

The facial skin is particularly vulnerable to steroid induced damage because it is thin, highly vascular, and frequently exposed to repeated application of potent preparations[2,3]. Prolonged or unsupervised use may lead to a range of clinical changes including erythema, telangiectasia, acneiform eruptions, skin atrophy, hyper trichosis, pigmentary alteration, perioral dermatitis, and rosacea-like dermatitis[2,4].In many patients, these changes develop gradually after initial short - term cosmetic improvement, which encourages continued use and delayed diagnosis[3,4].

In India and other developing countries, misuse of topical corticosteroids is a growing public health concern due to easy over – the - counter availability, prescription by unqualified practitioners, self - medication, misleading advertisements, and use for cosmetic purposes such as fairness, melasma, and acne control[2,4].

Combination creams containing corticosteroids with antifungals, antibiotics, or depigmenting agents have further increased inappropriate use. This pattern of misuse has contributed to the emergence of topical steroid damaged face (TSDF), a condition that causes both physical disfigurement and psychological distress.

TSDF is clinically important not only because of its visible facial manifestations, but also because withdrawal of steroids may result in rebound erythema, burning, itching, and flare of symptoms, leading to dependence and resistance to discontinuation. Patients often experience embarrassment, reduced self-esteem, and impaired quality of life as a result of persistent facial changes. Early recognition is therefore essential to prevent progression and to guide appropriate counseling and treatment[2–4].

Dermoscopy has emerged as a valuable non-invasive tool for assessing TSDF because it can reveal vascular, pigmentary, and follicular changes that may not be obvious on routine examination. Reported dermoscopic findings include diffuse erythema, linear or branching vessels, white structure less areas, follicular prominence, scaling, and pigmentary alterations. This makes

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Dermoscopy useful not only for diagnosis, but also for documenting the extent of damage and differentiating TSDF from similar facial dermatoses[5,6].

Despite increasing awareness of the problem, clinicodermoscopic studies on TSDF remain limited, particularly in Indian settings. The present study was therefore undertaken to evaluate the clinical manifestations of TSDF, assess its Dermoscopic features, and study the relationship between clinical and Dermoscopic findings. This may help improve early diagnosis, strengthen patient counseling, and reduce the burden of topical steroid misuse.

Methodology, Sample Size, Recruitment

Study design and setting: This was a cross-sectional observational study conducted in the Department of Dermatology, Venereology and Leprosy in a tertiary healthcare centre in North India. The study period spanned 18 months.

Study population and sample size: The study included patients attending the dermatology outpatient department with clinical features suggestive of TSDF and a history of facial topical corticosteroid application for at least 30 days. Sample size was calculated using the proportion of erythema (75%) as the most common clinical finding among TSDF cases in a previous clinicodermoscopic study, assuming 95% confidence level, 10% allowable error and 10% data loss, yielding a minimum sample size of 135, which was achieved[7].

Inclusion criteria were: Age ≥ 18 years, history of applying any topical corticosteroid preparation on the face for ≥ 30 days, and presence of clinical features compatible with TSDF (erythema, telangiectasia, a cneiform eruptions, pigmentary changes, hyper trichosis, atrophy, perioral dermatitis or rosacea-like features). Exclusion criteria included age < 18 years; known rosacea or endocrine disorders that can mimic TSDF; concurrent systemic corticosteroid or immunosuppressive therapy; and unwillingness to participate.

Ethical considerations

The study protocol was approved by the Institutional Ethics Committee. Written informed consent was obtained from all participants, and confidentiality of personal data was maintained.

Data collection

A structured, self-designed questionnaire was used to collect sociodemographic data (age, sex, education), details of steroid use (indication, potency class, molecule, frequency, duration), source of recommendation (dermatologist, non - dermatologist practitioner, pharmacist, relative, friend, social media, self) and associated symptoms. A thorough facial cutaneous examination was performed to document erythema, telangiectasia, papules, pustules, pigmentary changes, hyper trichosis, wrinkles, scaling and atrophy.

Dermoscopic examination: Dermoscopy was performed for all patients using a DermLite DL5 dermatoscope, providing 10x magnification in polarised and non-polarised modes. Representative facial sites were examined after cleaning the skin surface. Non-polariseddermoscopy with immersion fluid was used primarily for superficial features such as scaling, comedones and milia-like cysts, whereas polarized dermoscopy was used to assess deeper vascular patterns, pigmentary networks, white structure less areas and follicular alterations.

Dermoscopic features systematically recorded included background erythema, vascular patterns (linear, serpentine, polygonal, branched, Y-shaped), diffuse red areas, brown globules, white structure less areas,

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desquamation, follicular prominence and plugging, pustules, come dones, Demodex tails and hyper trichosis.

Operational definitions

TSDF was defined as facial dermatosis resulting from prolonged, inappropriate or unsupervised use of TCS on the face, characterised clinically by erythema, telangiectasia, acne iform eruptions, rosacea-like changes, pigmentary alterations, hyper trichosisand skin atrophy. Steroid potency class (I–VII) was assigned according to standard pharmacological classification.

Statistical analysis

Data wereentered in Microsoft Excel and analysed using SPSS version 26.0. Categorical variables were summarised as frequencies and percentages, and continuous variables as mean ± standard deviation. Associations between clinical and Dermoscopic features, and between Dermoscopic findings and duration, potency or frequency of steroid use, were assessed using chi-square test or Fisher's exact test as appropriate. A p-value < 0.05 was considered statistically significant.

Results

Table 1: Baseline characteristics and pattern of facial topical corticosteroid use in patients with TSDF (N = 135)

Variable	Category	N (%)
Age group (years)	< 20	15 (11.1)
	21–30	66 (48.9)
	31–40	42 (31.1)
	41–50	10 (7.4)
	≥ 50	2 (1.5)
Gender	Female	119 (88.1)
	Male	16 (11.9)
Educational status	Literate	106 (78.5)
	Illiterate	29 (21.5)
Indication for use	Melasma	58 (43.0)
	Acne	20 (14.8)
	Freckles	15 (11.1)
	Tinea	14 (10.4)
	Fairness	13 (9.6)
	Others	15 (11.1)
Potency class	Class III	89 (65.9)
	Class I	37 (27.4)
	Class IV	4 (3.0)
	Class VI	5 (3.7)
Duration of use	< 6 months	30 (22.2)
	6–12 months	44 (32.6)
	13–24 months	55 (40.7)
	> 24 months	6 (4.4)
Frequency of application	Once daily	105 (77.8)
	Twice daily	30 (22.2)

A total of 135 patients with TSDF were enrolled. Nearly half belonged to the 21–30-year age group (48.9%), followed by 31–40 years (31.1%); only 1.5% were older than 50 years. Females constituted 88.1% of the cohort, indicating a marked female predominance.

Most participants were literate (78.5%). Melasma was the most common indication for TCS application (43.0%), followed by acne, freckles, tine a and fairness, highlighting predominant cosmetic and pigmentary drivers of misuse.

Class III steroids were most frequently used (65.9%), and beta methasone valerate and clobetasol propionate were the common estmolecules.

The most common duration of use was 13–24 months (40.7%), and most patients applied steroids once daily (77.8%).

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Table 2: Distribution of clinical and Dermoscopic features in topical steroid-damaged face (N = 135)

Feature type	Parameter	n (%)
Clinical	Hyper pigmentation	82 (60.7)
	White hair	73 (54.1)
	Telangiectasia	68 (50.4)
	Hyper trichosis	68 (50.4)
	Pustules	65 (48.1)
	Erythema	64 (47.4)
	Wrinkles	61 (45.2)
	Scaling	60 (44.4)
	Atrophy	7 (5.2)
	Hypo pigmentation	6 (4.4)
Dermoscopic	Vascular areas	135 (100.0)
	Diffuse red areas	131 (97.0)
	Brown globules	83 (61.5)
	Hyper trichosis	70 (51.9)
	Come dones	66 (48.9)
	Pustules	65 (48.1)
	Desquamation	64 (47.4)
	Demodex tail	10 (7.4)
	White structure less areas	7 (5.2)

Hyper pigmentation (60.7%) was the dominant pigmentary change, whereas hypo pigmentation was rare (4.4%). White hair (54.1%), telangiectasia (50.4%) and hyper trichosis (50.4%) were also frequent, along with pustules and erythema in nearly half of the cohort. Chronic structural changes such as wrinkles (45.2%) and scaling (44.4%) were commonly noted, while overt atrophy was present in only 5.2% of patients.

Dermoscopy revealed vascular areas in all patients (100%), making vascular alteration the most constant Dermoscopic hallmark of TSDF. Diffuse red areas were present in 97.0% and brown globules in 61.5%. Hyper trichosis, comedons, pustules, and desquamation were observed in approximately half of the cohort, while Demodex tails and white structure less areas were less frequent but characteristic in advanced cases.

Figure 1: Clinical spectrum of topical steroid-damaged face (TSDF)

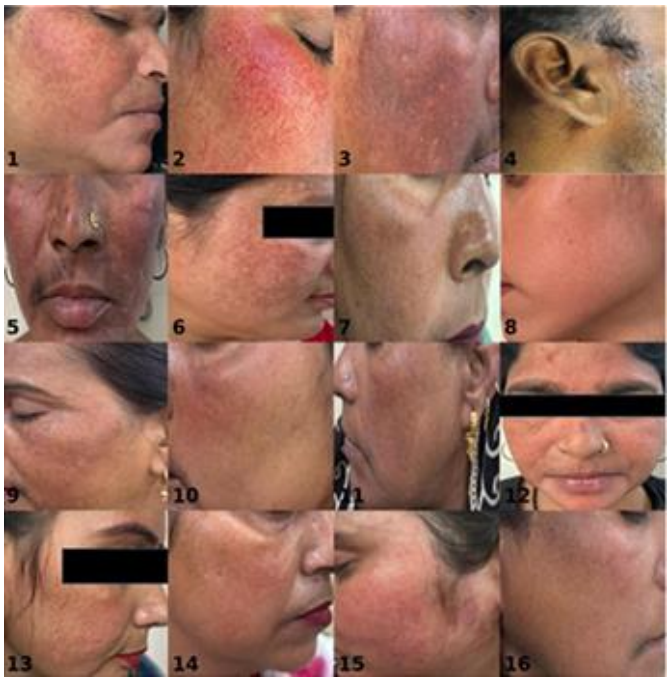

Figure 1 (1-16: Demonstrate the spectrum of clinical manifestations in TSDF including

1. Erythema with telangiectasia and patchy hyper pigmentation. 2. Prominent Telangiectatic vessels over erythematous facial skin. 3. Diffuse hyper pigmentation with superimposed erythema, follicular prominence, hyper trichosis and at ropy. 4. Wrinkling and thinning of skin. 5. Centro facial erythema with mild scaling and dryness with hyper pigmentation 5. Diffuse erythema with follicular papules 6. Ill-defined hyper pigmentation and early atrophic shine 7. Mild erythema with subtle telangiectasia and early skin thinning 8. Diffuse speckled hyperpigmentation 9. Erythema along with telangiectasia and atrophic changes 10. Hyper pigmentation with erythema and scattered papules 11. Centro-facial erythema with prominent telangiectasia 12. Erythema,

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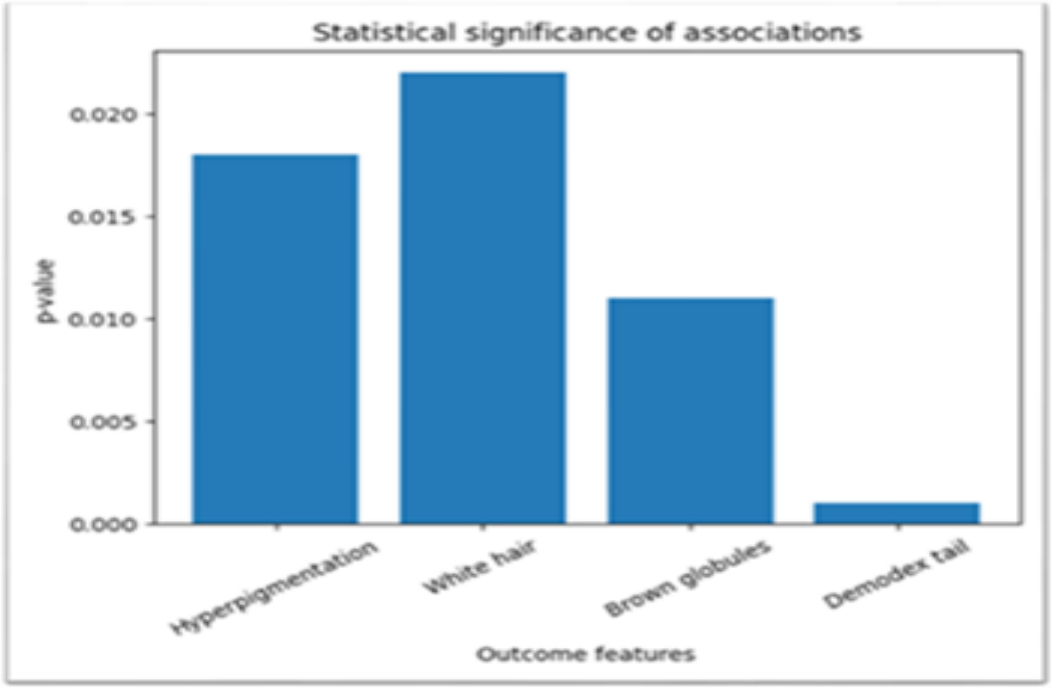
telangiectasia with atrophy and hyper trichosis 13. Erythema with telangiectasia and smooth shiny skin 14. Diffuse erythema with multiple Telangiectatic vessels forming a branching pattern and acne iform eruption 15. Diffuse hyper pigmentation and scaling over the malarregion.

Table 3: Association between exposure variables and clinical/Dermoscopic outcomes in TSDF

Exposure variable	Outcome feature	Direction of association	p-value
Duration of steroid use	Hyper pigmentation (clinical)	More frequent with longer duration (≥ 6–12 months)	0.018
Duration of steroid use	White hair (clinical)	Increases with longer duration; highest in > 24 months group	0.022
Duration of steroid use	Brown globules (Dermoscopy)	Progressive increase with duration; most frequent beyond 12 months	0.011
Potency class (higher potency)	Demodex tail (Dermoscopy)	Significantly more frequent with higher-potency use	0.001

Figure 2



The graph shows statistically significant associations between steroid exposure and key clinico Dermoscopic features. Demodex tail had the strongest association with higher potency use (p = 0.001). Brown globules (p = 0.011), hyper pigmentation (p = 0.018), and white hair (p = 0.022) increased significantly with longer duration. Overall, duration influences pigmentary changes, while potency is linked to follicular (Demodex) changes.

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Figure 3: Dermoscopic features of topical steroid-damaged face (TSDF)

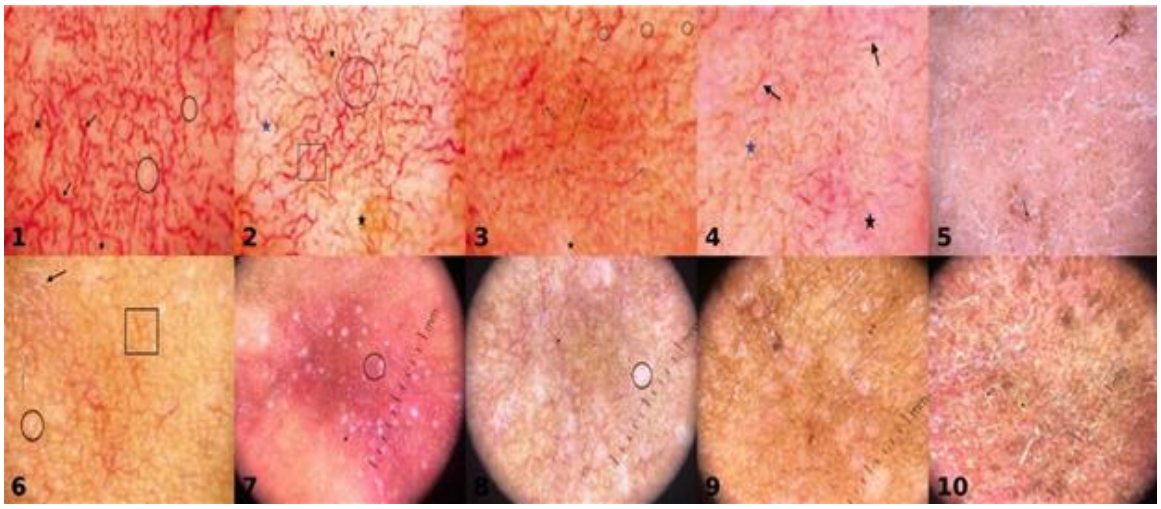

Figure 3 (1-10): Serpentine vessels (black arrow), brown globules (black star), white structure less areas (black circle), and breaking of pseudo-reticular network 2. Branched and polygonal vessels (black circle), Y-shaped vessels (black square), brown globules (black star), and white structure less areas (blue star). 3. Demodex tails (black circle), white structure less areas (black star), serpentine vessels (black arrow), and white areas (blue arrows). 4. Linear vessels without branches (black arrow), red diffuse areas (black star), and brown globules (blue star). 5. Diffuse desquamation and brown globules (black arrow). 6. Follicular plugging (black circle), Y-shaped vessels (black square), hyper trichosis (blue arrow), and desquamation (black arrow). 7. Dermoscopic image showing pustules (black circle) and diffuse red areas (black arrow). 8. Dermoscopic image showing white structure less areas (black circle) and telangiectasia (black arrow). 9. Dermoscopic image showing Demodex tails (black circle), white structure less areas (black star), and brown globules (red circle).10. Dermoscopic image showing scaling (black arrow) and telangiectasia (blue arrow).

Longer duration of TCS use was significantly associated with hyper pigmentation, white hair, and Dermoscopic brown globules, supporting a cumulative dose-response relationship. Patients who had used steroids for 13 months or more often exhibited hyper pigmentation and hair whitening than those with shorter exposure, and brown globules increased with duration.

Most Dermoscopic parameters did not differ significantly across potency classes, except Demodex tails, which were more frequent with higher-potency steroids, suggesting that stronger immunosuppression promotes mite overgrowth. Frequency of application (once versus twice daily) showed no significant association with any Dermoscopic feature, reinforcing that cumulative duration rather than daily frequency is the principal driver of damage.

Discussion

The present study adds to the growing evidence that topical steroid damaged face (TSDF) is a clinically important and preventable iatrogenic dermatosis caused by irrational, prolonged, and unsupervised use of topical corticosteroids on facial skin. The findings from the study align closely with published Indian and regional literature showing that TSDF is driven by easy access to steroid-containing preparations, use for cosmetically

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sensitive conditions, and delayed recognition of steroid-related cutaneous damage [1, 3, 4, 8–10.]

A major strength of the present work is that it captures both the clinical spectrum and the Dermoscopic correlates of TSDF in a real-world tertiary-care setting. In the study cohort, TSDF predominantly affected young adults, with the highest burden in the 21-30-year age group and showed a marked female preponderance. This pattern is consistent with earlier studies reporting that misuse on the face is especially common among young women because of concerns related to Melasma, pigmentation, acne, fairness, and general facial appearance[2, 3, 10–12].

The high proportion of female participants in the present study deserves specific comment. Previous multicentric and hospital-based studies from India have similarly reported strong female predominance in patients with topical corticosteroid misuse on the face[11, 12]. This likely reflects greater use of facial topical agents for pigmentary conditions and fairness enhancement rather than a sex - specific biological predisposition to steroid damage. Another notable finding in the study is that misuse was common even among literate individuals. This is an important observation because it shows that educational attainment alone does not protect against irrational steroid use when non-prescription access, aggressive marketing, and informal therapeutic advice remain widespread [4, 10, 13, 14].

Earlier Indian studies have made similar observations, emphasizing that topical corticosteroid abuse is often mediated by pharmacists, beauticians, peers, and unqualified prescribers rather than by lack of schooling alone [13, 14].

With respect to indications, the study found Melasma to be the most common reason for steroid application, followed by acne, freckles, tine a, and fairness-related use. This pattern is strongly supported by prior literature showing that corticosteroids are frequently misused for pigmentary disorders and cosmetic lightening because they produce transient improvement through anti - inflammatory and melanopenic effects. However, such benefit is temporary and often followed by a more complex facial dermatosis characterized by erythema, telangiectasia, dyspigmentation, hyper trichosis, sensitivity, and dependency phenomena [8, 13, 14] .

The current study also reinforces the view that TSDF is fundamentally linked to misuse patterns rather than to corticosteroid therapy per se. Topical corticosteroids remain essential dermatologic drugs when used appropriately, but facial skin is especially prone to adverse effects because of its thin epidermis, enhanced permeability, and cosmetic visibility of even subtle vascular and atrophic change. Earlier pharmacologic and clinical reviews have shown that prolonged facial application can result in dermal atrophy, telangiectasia, acneiform eruptions, periorificial dermatitis, rosacea-like dermatitis, dyschromia, and hypertrichosis[15, 16].

Clinically, the study documents that pigmentary changes, telangiectasia, erythema, and hypertrichosis formed a major part of the disease spectrum. This is in line with studies that describe TSDF as a heterogeneous facial eruption where erythema and telangiectasia coexist with acneiform lesions, dryness, hypertrichosis, and dyspigmentation[17]. In darker skin types, pigmentary change may assume even greater clinical importance, both because it is highly visible and because it often persists after inflammatory activity has subsided.

A particularly important contribution of the study is its detailed Dermoscopic analysis. Dermoscopy identified vascular changes in all patients, making these the most

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consistent findings in the cohort. Such observations closely parallel published dermoscopic studies, which have repeatedly shown diffuse red areas, linear vessels, branching or polygonal telangiectasia, and related vascular structures to be core features of TSDF [17–21].

The study also found frequent pigmentary dermoscopic findings, especially brown globules, along with follicular abnormalities and white structure less areas.

These observations are again in agreement with published clinico dermoscopic work, where brown globules, unpatterned pigmentation, follicular plugging, hypertrichosis, scaling, micro pustules, and white atrophic areas have been commonly reported[20, 21].Brown globules and diffuse pigmentation likely represent post-inflammatory or steroid-modulated melanin alteration, whereas white structure less areas are thought to reflect epidermal thinning and early atrophic change.

One of the more meaningful observations in the study is that the duration of topical steroid use emerged as a stronger determinant of damage than potency or frequency for many features. Significant associations of longer duration with hyper pigmentation, white hair, and brown globules suggest that cumulative exposure plays a central role in the evolution of chronic TSDF [3, 17, 19]. This interpretation is clinically plausible because patients often switch between products, use combination creams intermittently, or apply agents of uncertain potency, making duration a more reliable proxy for cumulative biological injury than nominal potency alone.

At the same time, the study found limited associations between steroid potency and most Dermoscopic findings, though higher potency steroids showed a significant association with Demodex tail. This is an interesting and biologically credible observation. Potent corticosteroids can suppress local immune function, alter follicular micro environment, and contribute to inflammatory facial reactions that mimic rosacea or exacerbate mite-associated changes [12, 18].

Another valuable conclusion from the study is that lack of statistically significant clinico Dermoscopic correlation for some variables does not diminish the role of Dermoscopy. Rather, it underscores its greater sensitivity in identifying subclinical changes. Several Dermoscopic features may precede obvious clinical atrophy, telangiectasia, or pigmentary alteration, allowing earlier detection than naked-eye examination alone [5, 16, 18, 22].

The study findings also resonate with the concept of topical steroid dependence, which has been discussed in earlier literature as a pattern of repeated steroid use driven by rebound worsening after attempted withdrawal [22, 23]. Patients may experience transient relief during use, followed by erythema, burning, itching, or flare once the medication is stopped, prompting reapplication and perpetuating a cycle of dependency.

From a broader practice perspective, the study supports the incorporation of Dermoscopy into routine evaluation of suspected TSDF. Because Dermoscopy is non-invasive, rapid, and repeatable, it can aid diagnosis, monitor improvement after steroid withdrawal, and improve patient counseling by visually demonstrating the extent of steroid-related damage [24, 25].

The public health implications of the study are substantial. The pattern of misuse observed here, together with prior Indian data, indicates that TSDF is sustained by unregulated access to topical steroids, irrational fixed - dose combinations, poor public awareness, and inadequate pharmacist and non - dermatologist training [24, 24, 26, 27]. The multicenter Indian

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study by Sara swat and colleagues remains particularly important in this regard, as it demonstrated both the scale of facial steroid misuse and the fact that the majority of such use was inappropriate in indication, potency, duration, or diagnosis [9].

The study has several strengths. It is focused on a clinically important but still under recognized dermatosis, includes a relatively robust sample size, and combines detailed clinical evaluation with Dermoscopic analysis and clinico Dermoscopic correlation. By examining the relationships of findings with duration, potency, and frequency of use, it also adds nuance beyond simple descriptive reporting.

Some limitations should also be acknowledged. The study was cross-sectional and hospital-based, which limits assessment of temporal progression and may reduce generalizability to community populations. Recall bias is possible, particularly in relation to duration, potency, and product details, because many patients use multiple creams or are unaware of the active ingredients. Nevertheless, these limitations do not detract from the key message that Dermoscopy substantially enhances evaluation of TSDF and that cumulative steroid exposure remains central to disease expression.

In summary, the present study confirms that TSDF is a significant, preventable, and increasingly relevant facial dermatosis in Indian dermatology practice. The predominance in young women, the common use for Melasma and cosmetic indications, and the strong role of prolonged unsupervised exposure are all highly consistent with prior evidence. Dermoscopy emerged as a particularly valuable adjunct, revealing vascular, pigmentary, and follicular abnormalities with greater sensitivity than clinical examination alone. These findings support a clinical approach centered on early recognition, Dermoscopic evaluation, strict with drawal of inappropriate steroids, patient education, and stronger regulatory control of steroid-containing facial creams.

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