

## A Study to Characterize Dermoscopic Features of TSDF and to Correlate Them with Potency and Duration of Application of the TCS-A Cross-Sectional Study

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### Abstract

**Aim:** This study was undertaken to characterize dermoscopic features of TSDF and to correlate them with potency and duration of application of the TCS.

**Methods:** The present study was conducted in the Department of Skin and VD, JLNMCB, Bhagalpur, Bihar, India for 1 year. Sample size of 100 cases was included in the study. Patients (18 years or above) with clinical symptoms and signs suggestive of TSDF (redness, itching, acne, burning, swelling, photosensitivity, pigmentation and atrophy).

**Results:** In the present study, Females (80, 80%) constituted the majority as compared to males. Most of the patients belonged to the age group of 18–30 years (50, 50%) with a mean age of  $32.8 \pm 8.2$  years. Seventy-Five (75%) patients had received some form of formal education, while 25 (25%) patients were illiterate. Presenting complaints of the patients were redness in 80 (80%), itching in 70 (70%), pigmentation in 60 (60%), burning in 64 (64%) and acne in 35 (35%) patients. Duration of TCS application ranged from one month to 25 years with 50 (50%) patients having applied TCS for over one year.

**Conclusion:** Dermoscopy in TSDF can help dermatologists in a multitude of ways from confirming the diagnosis to differentiating from other causes of red face and predicting the approximate duration of TCS abuse.

**Keywords:** Dermoscopy, Steroids, Face

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### Introduction

Topical steroid damaged/dependent face (TSDF) has been defined as a semi-permanent or permanent damage to the skin of the face precipitated by the irrational, indiscriminate, unsupervised, or prolonged use of topical corticosteroids (TC) resulting in a plethora of cutaneous signs and symptoms and psychological dependence on the drug. [1] Facial skin is

thinner, and hence, not only percutaneous absorption of drugs is increased but the side effects are also early and severe as compared to other sites like back and abdomen. [2] The clinical picture of TSDF appears due to a combination of dermal atrophy (TC inhibit collagen and hyaluronic acid synthesis by fibroblasts), [2] local immunosuppression, and inhibition of action of nitric oxide (NO).

[3,4] On withdrawal of TC, endothelial NO is released causing vasodilation and erythema. [3] On dermoscopy, dilated vessels as a result of vasodilation are observed. The tortuosity of these vessels is due to the lack of support to vasculature as a result of steroid induced dermal atrophy. Dermal atrophy is visible as white structureless areas. Yellowish areas may correspond with increased skin transparency due to epidermal atrophy.

One important differential of TSDF is erythematotelangiectatic rosacea (ER). Dermoscopic features of ER include polygonal vessels, superficial scales, follicular plugs, and features related to demodicidosis. [5] Steroids are indicated in management of diseases such as dermatitis, dry skin, insect bite, intertrigo, lichen planus, Polymorphic light eruptions, alopecia areata, discoid lupus erythematosus, psoriasis and eczema. These drugs are prescribed by the dermatologists for a specific required duration and frequency. The patients tend to continue application of steroids for longer periods due to rapid relief of symptoms. Due to easy availability over the counter and being available at nominal price, they tend to misuse/overuse the topical steroids. The most common reasons being for lightening of skin, melasma, sun tan and mild acne. [6,7]

Steroid induced small skin blood vessels dilation(telangiectasia) is due to stimulation of release of nitric oxide from endothelial cells of dermal blood vessels leading to abnormal dilatation of capillaries. Inhibition of keratinocyte proliferation, collagen I and III synthesis by steroids results in skin atrophy. [8] Topical steroids induced chronic immunosuppression results in profuse growth of micro-organisms, which acts as superantigen, resulting in superantigen induced inflammatory reaction (inflammatory pustules and papules). [7]

There is a need for early, identification of the signs of TSDF before they become

irreversible. Dermoscopy can act as the modern day instrument for early detection of subclinical signs of TSDF by delineating characteristic features such as polygonal vessels and telangiectasias, structureless white areas (atrophy), hypertrichosis, scales, and erythema. [9]

This study was undertaken to characterize dermoscopic features of TSDF and to correlate them with potency and duration of application of the TCS.

## Methods

The present study was conducted in the Department of Skin and VD, JLNMC, Bhagalpur, Bihar, India for 1 year. Sample size of 100 cases was included in the study. Patients (18 years or above) with clinical symptoms and signs suggestive of TSDF (redness, itching, acne, burning, swelling, photosensitivity, pigmentation and atrophy)

History of rosacea, pre-existing comorbidities (e.g., Cushing's syndrome, polycystic ovaries, and thyroid disorders), pregnancy, and ongoing treatment with oral corticosteroids were the exclusion criteria.

## Methodology

Sample size of 100 cases was included in the study. A patient was labeled literate if he was able to read and write with understanding in any language. In patients with a history of using multiple topical steroids of various potencies, the preparation with the highest potency used was considered for statistical analysis. However, when a more potent steroid was applied for less than one month, the preparation used beyond one month was considered for analysis. Patients were subjected to dermoscopic evaluation with both polarized and non-polarized modes. Dermoscopic images were captured with iPhone X (12-megapixel camera; Apple Inc., Cupertino, California) attached to DermLite DL200 hybrid,  $\times 10$  magnification (3Gen, San Juan Capistrano,

California). Patients were later counseled about the harmful effects of TCS abuse.

Statistical analysis was carried out using statistical package for social sciences version 20. Comparison of dermoscopic findings with clinical examination, gender, and potency of TCS was done using Chi-

square test and Fisher's exact test with a "P" < 0.05 considered significant. Comparison of dermoscopic findings on the basis of duration of TCS applied was done using one-tailed Z-test for sample proportion.

## Results

**Table 1: Demographic characteristics of study subjects (n=100)**

Characteristic	Number (%)
<b>Age group (years)</b>	
18–30	50 (50)
31–40	35 (35)
>40	15 (15)
<b>Gender</b>	
Male	20 (20)
Female	80 (80)
<b>Education</b>	
Illiterate	25 (25)
Literate	75 (75)
<b>Duration of TCS application (years)</b>	
≤1	46 (46)
1–10	46 (46)
>10	8 (8)

Females (80, 80%) constituted the majority as compared to males. Most of the patients belonged to the age group of 18–30 years (50, 50%) with a mean age of  $32.8 \pm 8.2$  years. Seventy Five (75%) patients had received some form of formal education, while 25 (25%) patients were illiterate. Presenting complaints of the

patients were redness in 80 (80%), itching in 70 (70%), pigmentation in 60 (60%), burning in 64 (64%) and acne in 35 (35%) patients. Duration of TCS application ranged from one month to 25 years with 50 (50%) patients having applied TCS for over one year.

**Table 2: Comparison of clinical and dermoscopic findings in patients using topical steroids (n=100)**

Clinical findings	Number of patients (%)	Dermoscopy findings	Number of patients (%)	P-value
Erythema	80 (80)	Red diffuse areas	90 (90)	0.40
Telangiectasia	45 (45)	Vessels (Linear, serpentine, polygonal, fine, branched, Y-shaped)	85 (85)	0.001
Hypertrichosis	65 (65)	Hypertrichosis	80 (80)	0.001
Hyperpigmentation	80 (80)	Brown globules	95 (95)	0.030
Atrophy	1 (1)	White structureless areas	80 (80)	0.007
White hair	15 (15)	White hair	60 (60)	0.001

Scaling	18 (18)	Desquamation	35 (35)	0.001
Pustules	4 (4)	Pustules	30 (20)	0.001
<b>Other findings</b>				
Wrinkles	35 (35)	Demodex tails	25 (25)	
Hypopigmentation	10 (10)	Breaking of pseudoreticular network	75 (75)	
		Follicular plugging	12 (12)	
		Comedones	10 (10)	

Clinical findings noted in the patients were erythema in 80 (80%), hyperpigmentation in 80 (80%), and hypertrichosis in 65 (65%) followed by telangiectasia in 45 (45%) and wrinkles in 35 (35%). Polygonal and Y-shaped vessels, though, are categorized under linear vessels with branches, the term Y-shaped vessel was used when only one lateral branch was visible and polygonal vessel was used if multiple branches forming a network were seen. Comparison of dermoscopy findings with their corresponding clinical finding revealed that red diffuse areas, vessels, brown globules, white structureless areas, desquamation, hypertrichosis and white hair were observed in a statistically higher proportion of cases dermoscopically.

## Discussion

Corticosteroids are a type of anti-inflammatory drug that can be prescribed in a systemic or topical form. In 1951, topical corticosteroids (TCs) were used for the first time by American dermatologist Marion Baldur Sulzberger. [9] In modern dermatological practice, TCs have become one of the most widely used treatment methods. [10]

Regarding the prevalence of using facial TCs among the Saudi population, this study shows that 279 (45%) participants used facial topical steroids, while 332 (54%) did not use facial topical steroids. Topical steroids usage is more popular among females than the male population, which is similar to what was reported in previous studies. [11,12]

At first, patients may initiate using TCS for some minor dermatosis such as acne or melasma upon suggestion by friends and relatives. [13] Ab initio, the anti-inflammatory and vasoconstrictive effects of steroids result in what appears to be from redness, itching, photosensitivity to pigmentation, and acne. Mechanisms such as rebound dilatation of blood vessels, cytokine release, and nitric oxide accumulation are considered responsible for the development of pruritus, erythema, and burning sensation. [14]

Many of our patients used double or triple combination creams containing an antibiotic, antifungal, and TCS. These so-called cocktail creams pose the greatest challenge due to their low cost and easy availability. Most reported indications for TCS abuse include melasma and acne. Another prevalent reason appears to be the false belief of TCS being a fairness product. Many consider TCS to be a panacea and use them for any rash on skin without consultation. This may be due to the cost-effective accessibility of creams containing such formulations. Erythema, dyspigmentation, and papulopustular lesions are the common clinical signs seen in patients with TSDF. [11,14,15] We, in addition, also observed hypertrichosis (65%) in a high percentage of patients.

Dermoscopy has emerged as an excellent tool to evaluate the subtle changes in skin and can be especially useful in patients of TSDF. It can help in identifying various findings suggestive of TCS abuse that cannot be appreciated with naked eye

examination. Studies on dermoscopy in TSDF are scarce, with most being anecdotal case reports. Dermoscopy may aid in early identification of features suggestive of TSDF before their clinical appearance. In the present study, significantly higher number of patients dermoscopically revealed white structureless areas ( $P = 0.007$ ), vessels ( $P = 0.001$ ), desquamation ( $P = 0.001$ ), white hair ( $P = 0.001$ ), and hypertrichosis ( $P = 0.001$ ). Jakhar and Kaur also appreciated irregularly dilated, branched serpentine vessels, almost interconnecting, giving a polygonal pattern along with white structureless areas and hypertrichosis in a young female. [16]

Appearance of fine vessels and pustules were significantly associated with male gender, and branched vessels with female gender. Androgens in males stimulate sebaceous gland proliferation, especially over face, chest, and upper back. Production of sebum is significantly higher among males, mainly influenced by androgens which can dilute the TCS effect, whereas estrogens exert opposing effect through down-regulation of sebaceous gland function. [17] Older term of "steroid dermatitis resembling rosacea" suggests that TSDF can mimic rosacea with or without demodicidosis, especially in the absence of a supportive history of TCS application. However, the absence of hypertrichosis, white hair, and atrophy favors TSDF over rosacea. Dermoscopy not only non-invasively confirms the suspicion but also aids in patient's understanding of the seriousness of topical steroid abuse through the demonstration of pictures explained in patient-friendly language. This also can prevent further steroid abuse and improves treatment compliance. [18]

## Conclusion

Thus, dermoscopy in TSDF can help in a multitude of ways, from confirming the diagnosis to differentiating from other causes of red face and predicting the

approximate duration of TCS abuse. Further, it can also help in predicting disease severity and prognosis. An additional advantage could be in counseling the patients and monitoring response to treatment. With effective treatment, a decrease in vessels, scaling, hypertrichosis, white hair, and red diffuse areas is expected; however, future research supporting the same is warranted.

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