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# Dermoscopic and Histopathological Comparison of Palmoplantar Psoriasis and Eczema: A Clinico-Pathological Study

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**ABSTRACT**

Palmoplantar psoriasis (PPP) and palmoplantar eczema (PPE) are chronic dermatological conditions with overlapping clinical and histopathological features, making accurate diagnosis challenging. Dermoscopy is increasingly being used as a non-invasive tool to distinguish between these conditions. To compare the dermoscopic and histopathological findings of PPP and PPE and assess the correlation between clinical, dermoscopic and histopathological observations. This hospital-based, prospective, observational study included 54 patients (32 PPP and 22 PPE) aged 31-70 years. Clinical examination, dermoscopy using a 4th generation DermLite (DL4) and histopathological analysis were performed. Statistical analysis was conducted using SPSS version 25, with $p<0.05$ considered significant. The mean disease duration was 1.84±0.46 years for PPP and 2.21±0.64 years for PPE. Dermoscopic findings showed significant differences: dot vessels were more common in PPP (59%, $p=0.0209$), while yellow scales (54.5%, $p<0.0001$) and patchy scale distribution (86.3%, $p<0.0001$) were characteristic of PPE. Histopathologically, parakeratosis (78%), hypogranulosis (37.5%) and peri vascular infiltrates (60%) were predominant in PPP, whereas PPE demonstrated higher spongiosis (77%) and mixed inflammatory infiltration. Dermoscopic correlation was noted in 50% of PPP and 59% of PPE cases, with limitations in darker skin types and keratoderma. Dermoscopy, complemented by histopathology, is a valuable diagnostic tool for differentiating PPP and PPE. This study highlights specific dermoscopic and histopathological features that aid in accurate diagnosis and management.

## INTRODUCTION

Palmoplantar psoriasis (PPP) and palmoplantar eczema (PPE) are chronic inflammatory dermatome that primarily affect the palms and soles, often leading to diagnostic challenges due to overlapping clinical presentations[1]. PPP is a localized form of psoriasis characterized by sharply demarcated erythematous plaques with silvery scales, frequently accompanied by painful fissures[2]. In contrast, PPE typically presents with asymmetrical plaques, yellowish scales and a history of exudation, particularly in hyperkeratotic variants. Both conditions significantly impair daily activities and quality of life[3]. Histopathological features of PPP, such as parakeratosis, neutrophil micro abscesses and supra papillary thinning, can overlap with findings in PPE, which also displays spongiosis and psoriasiform hyperplasia[4]. As a result, histopathological examination, while helpful, may not always conclusively differentiate these conditions. Dermoscopy, a non-invasive diagnostic tool, has gained attention for its ability to visualize vascular and scaly patterns, providing additional clues for differentiating PPP and PPE. In PPP, dermoscopy often reveals regular dotted vessels on a light red background with diffuse white scales, while PPE typically exhibits irregular yellow scales and patchy vascular patterns[5]. This study aims to compare dermoscopic and histopathological findings in PPP and PPE, evaluate their diagnostic utility and assess the correlation between clinical, dermoscopic and histopathological observations. By elucidating these distinctions, the study seeks to enhance diagnostic accuracy and contribute to better clinical management of these conditions.

## MATERIALS AND METHODS

**Study Design:** This was a prospective, hospital-based, observational study conducted over 12 months (January 2021 to December 2021) in the Department of Dermatology, Venereology and Leprology at Maharajah's Institute of Medical Sciences, Vizianagaram.

**Participants:** A total of 54 patients were included in the study, comprising 32 cases of palmoplantar psoriasis (PPP) and 22 cases of palmoplantar eczema (PPE).

**Inclusion Criteria:** Patients aged 18-60 years diagnosed with plaque-type PPP or PPE.

**Exclusion Criteria:** Patients with pustular psoriasis, palmoplantar pastelists, use of systemic immunosuppressant (e.g., methotrexate, resinoid, biologicals) and those with acute or chronic infectious diseases.

**Study Procedure:**

**Ethical Approval and Consent:** Approval was obtained from the Institutional Ethics Committee and informed consent was secured from all participants.

**Data Collection:** Detailed clinical examination was performed, documenting the duration of the condition and presenting symptoms. Dermoscopic examination was conducted using a 4th generation DermLite (DL4) dermoscopy to evaluate vascular patterns, scale distribution, scale color and background features. Biopsy specimens were collected from representative lesions and analyzed for histopathological features, including parakeratosis, hypogranulosis, spongiosis and vascular morphology.

**Data Analysis:** Data were analyzed using SPSS version 25 and Microsoft Excel 2019.

**Qualitative Variables:** Assessed using the Chi-square test.

**Quantitative Variables:** Analyzed using the Independent Sample T-test. A p-value <0.05 was considered statistically significant.

**Outcome Measures:** The primary outcomes included distinguishing dermoscopic and histopathological features between PPP and PPE. Secondary outcomes included the correlation of dermoscopic findings with histopathological results to enhance diagnostic accuracy.

## RESULTS AND DISCUSSIONS

This study included 54 patients, with 32 cases of palmoplantar psoriasis (PPP) and 22 cases of palmoplantar eczema (PPE). The participants were aged 31-70 years, with the majority in the 31-40 age group for both conditions. The mean age was 43.9±8.9 years for PPP and 42.7±10 years for PPE, showing no significant age-related difference (p>0.05) (Table 1).

**Table 1: Age and Disease Duration**

| Parameter | PPP (n=32) | PPE (n=22) | p-value |
|---|---|---|---|
| Mean Age (years) | 43.9±8.9 | 42.7±10 | > 0.05 |
| Mean Disease Duration (years) | 1.84±0.46 | 2.21±0.64 | > 0.05 |

**Clinical Characteristics:** The mean disease duration was 1.84±0.46 years in PPP and 2.21±0.64 years in PPE (p>0.05). In PPP, the most common clinical presentations were scaling and painful fissures (87% each), followed by erythema (53%) and itching (46%). In contrast, PPE commonly presented with scaling (90%), erythema (59%), itching (54%) and painful fissures (45%) (Table 2, Fig. No:1-4 ).

**Table 2: Clinical Presentation**

| Clinical Symptoms | PPP (n=32) | PPE (n=22) |
|---|---|---|
| Scaling | 28 (87%) | 20 (90%) |
| Painful Fissures | 28 (87%) | 10 (45%) |
| Erythema | 17 (53%) | 13 (59%) |
| Itching | 15 (46%) | 12 (54%) |

Fig. 1: Clinical Images of Palmoplantar Psoriasis


Fig. 2: Dermoscopic Images of Palmoplantar Psoriasis

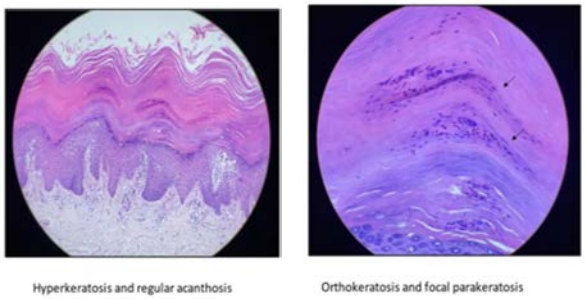


Fig. 3: Histopathology of Palmoplantar Psoriasis

Fig. 4: Clinical Images of Palmoplantar Eczema

**Dermoscopic Findings:** Key dermoscopic differences were observed between PPP and PPE (Table 3, Fig. 5).

**Table 3: Dermoscopic Findings**

| Feature | PPP (n=32) | PPE (n=22) | p-value |
|---|---|---|---|
| **Vessel Pattern** | | | |
| Dot | 19 (59%) | 6 (27%) | 0.0209 |
| Linear | 2 (6.25%) | 4 (18.2%) | 0.1798 |
| Undifferentiated | 10 (31.2%) | 5 (22.7%) | > 0.05 |
| **Scale Color** | | | |
| White | 25 (78%) | 3 (13.6%) | < 0.0001 |
| Yellow | 1 (3.12%) | 12 (54.5%) | < 0.0001 |
| **Scale Distribution** | | | |
| Diffuse | 22 (68.7%) | 2 (9%) | < 0.0001 |
| Patchy | 8 (25%) | 19 (86.3%) | < 0.0001 |
| **Background Color** | | | |
| Light Red | 18 (56%) | 6 (27.3%) | 0.0381 |
| Dull Red | 5 (15.6%) | 12 (54.5%) | 0.0070 |

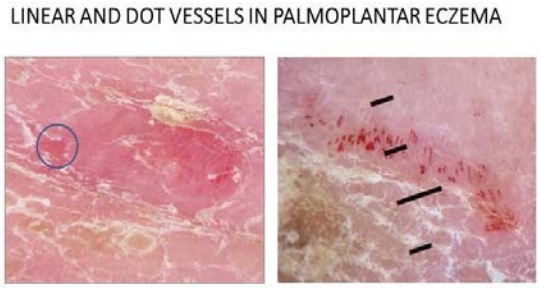


Fig. 5: Dermoscopic Images of Palmoplantar Eczema

**Vessel Patterns:** Dot vessels predominated in PPP (59%) compared to PPE (27%), with a statistically significant difference (p=0.0209).

**Scale Color:** White scales were prevalent in PPP (78%), while yellow scales were significant in PPE (54.5%) (p<0.0001).

**Scale Distribution:** Diffuse scales were characteristic of PPP (68.7%), whereas patchy scales were prominent in PPE (86.3%) (p<0.0001).

**Background Color:** PPP lesions exhibited a light red background in 56% of cases, whereas PPE lesions showed a dull red background in 54.5% of cases (p<0.05) .

**Histopathological Findings:** Histopathological analysis supported the clinical and dermoscopic findings (Table 4, Fig. 6).

**Table 4: Histopathological Findings**

| Histopathological Feature | PPP (n=32) | PPE (n=22) |
|---|---|---|
| Parakeratosis | 25 (78%) | 14 (63.6%) |
| Hypogranulosis | 12 (37.5%) | 2 (9%) |
| Spongiosis | 20 (62.5%) | 17 (77%) |
| Peri vascular Infiltrate | 19 (60%) | 10 (45%) |
| Interstitial Infiltrate | 8 (42%) | 11 (50%) |

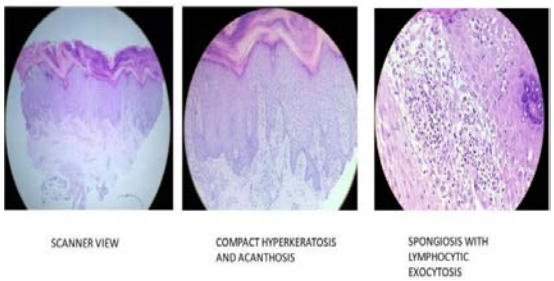


Fig. 6: Histopathology of Hyperkeratotic Eczema

**Parakeratosis:** Seen in 78% of PPP and 63.6% of PPE.

**Hypogranulosis:** Observed in 37.5% of PPP and 9% of PPE.

**Spongiosis:** Present in 62.5% of PPP and 77% of PPE.

**Inflammatory Infiltrate:** Peri vascular infiltration was prominent in PPP (60%), while PPE showed both peri vascular and interstitial infiltration in 45% and 50% of cases, respectively.

**Diagnostic Correlation:** Histopathological confirmation was achieved in 87.5% of PPP and 86.3% of PPE cases. Dermoscopic correlation was observed in 50% of PPP and 59% of PPE cases. Limitations in dermoscopic visualization were noted in patients with darker skin types (Fitzpatrick types IV and V) and thick keratoderma(Table 5).

**Table 5: Diagnostic Correlation**

| Diagnostic Method | PPP (n=32) | PPE (n=22) |
|---|---|---|
| Histopathological Confirmation | 28 (87.5%) | 19 (86.3%) |
| Dermoscopic Correlation | 16 (50%) | 13 (59%) |

The differentiation between palmoplantar psoriasis (PPP) and palmoplantar eczema (PPE) remains a diagnostic challenge due to overlapping clinical and histopathological features. This study emphasizes the utility of dermoscopy and histopathology in distinguishing these conditions, aligning with prior research and contributing novel insights specific to the rural Indian population.

**Clinical Findings:** Both PPP and PPE were most common in patients aged 31-50 years, consistent with previous studies by Chauhan[12] and Khandpur[10]. The most frequent clinical presentations in PPP included scaling and painful fissures, while PPE was characterized by scaling and erythema. Although PPE showed a slightly longer mean disease duration compared to PPP, this difference was not statistically significant, echoing findings from Chauhan[12].

**Dermoscopic Insights**: Dermoscopy revealed significant differences between PPP and PPE.

**Vessel Morphology:** Dot vessels were more prevalent in PPP (59.4%) than in PPE (27.2%), as observed in Çetinarslan[8].

**Scale Distribution and Color:** Diffuse white scales and patchy yellow scales were diagnostic indicators of PPP and PPE, respectively, consistent with the findings of Lallas[9].

**Background Color:** PPP lesions commonly displayed a light red background, while PPE exhibited a dull red background, aligning with studies by Errichetti[11].

**Histopathological Correlation**: Histopathological findings supported dermoscopic observations: Parakeratosis, hypogranulosis and peri vascular inflammation were more frequent in PPP, as described by Murphy[6]. Spongiosis and mixed inflammatory infiltrates were predominant in PPE, correlating with findings by Nair[7].

**Diagnostic Correlation**: Histopathological confirmation was achieved in 87.5% of PPP cases and 86.3% of PPE cases. Dermoscopic correlation was noted in 50% of PPP and 59% of PPE cases, underscoring its diagnostic value. However, limitations in dermoscopic visualization, particularly in darker skin types and hyperkeratotic lesions, were consistent with observations by Bhat[13]. This study demonstrates that dermoscopy, combined with histopathology, is a valuable tool for distinguishing PPP and PPE. These findings align with the existing body of research and highlight the need for further multi centric studies to validate these observations and address challenges posed by skin pigmentation and keratoderma.

**Limitations:** Challenges in dermoscopic visualization arose due to: Thick Hyperkeratotic and occupational keratoderma in agricultural workers. Application of indigenous topical preparations, such as turmeric and neem. Fitzpatrick skin types IV and V, which obscured vascular patterns.

## CONCLUSION

This study demonstrates that dermoscopy and histopathology effectively distinguish palmoplantar psoriasis (PPP) and palmoplantar eczema (PPE). Significant findings include dot vessels, diffuse white scales and light red backgrounds in PPP, compared to patchy yellow scales, dull red backgrounds and yellow crusts in PPE. Histopathologically, parakeratosis and hypogranulosis were more frequent in PPP, while spongiosis and mixed inflammatory infiltrates characterized PPE. Dermoscopic correlation was observed in 50% of PPP and 59% of PPE cases, highlighting its utility despite challenges in darker skin types and hyperkeratotic lesions. These findings support integrating dermoscopy and histopathology for enhanced diagnostic precision.

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