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Perialar intertrigo in children and adolescents: A multicenter prospective study of 41 cases

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Abstract

Background/Objectives: We observed isolated cases of perialar intertrigo in children and teenagers that did not appear to correspond to any known clinical entity. The objective of this study was to describe the clinical features of this dermatosis and the clinical characteristics of the patients.

Methods: We conducted a prospective, multicenter cohort study in France from August 2017 to November 2019. All the patients under 18 years of age with chronic perinasal intertrigo were included. A standardized questionnaire detailing the clinical characteristics of the patients and the description of the intertrigo. If possible, a Wood's lamp examination of the intertrigo was done.

Results: Forty-one patients were included (25 boys and 16 girls, average age: 12.1 years). Intertrigo was bilateral in 38 patients (93%). The majority of patients had no symptoms (54%). Pruritus was present in 39% of cases. Orange red follicular fluorescence was present in the perialar region on Wood's light examination in 78% of cases with active fluorescence. The presumptive diagnoses suggested by the investigators were acne (24.4%), seborrheic dermatitis (19.5%), rosacea (9.8%), psoriasis (9.8%) and perioral dermatitis (7.3%). No diagnosis was proposed in 22% of the cases.

Conclusions: We describe a previously undescribed clinical sign which is characterized by a chronic bilateral erythematous intertrigo located in the perialar region. It can be isolated or associated with various facial dermatoses.

KEYWORDS
adolescents, children, facial dermatosis, perialar intertrigo

1 | INTRODUCTION

Facial dermatoses in children and adolescents are among the main reasons for consultation in pediatric dermatology.[1,2] Of these, acne, which affects 65.8% of European teenagers, is the most frequent[3] and often results in a request for therapy.[4] Other facial dermatoses observed in this age group are atopic dermatitis, rosacea, periorificial dermatitis, granulomatosis periorificial dermatitis, seborrheic dermatitis, and psoriasis.

We have observed cases of isolated erythema of the nasal folds in pediatric dermatology practice. To our knowledge, this has not been previously described in the literature. In our experience, this intertrigo was sometimes associated with a follicular orange-red fluorescence in the same perinasal area under Wood's lamp examination. This condition appeared refractory to various topical therapies. To better characterize this undescribed skin manifestation, we performed a prospective, observational, multicentre study. Herein, we describe the clinical characteristics of this dermatosis.

2 | MATERIALS AND METHODS

This observational study was prospectively conducted at 11 centers in France (see Acknowledgments) from August 2017 to November 2019 on behalf of the Groupe de Recherche de la Société Française de Dermatologie Pédiatrique. All children under 18 years of age with chronic intertrigo of the perialar region were enrolled, regardless of whether or not they had another dermatosis on the rest of the face or body, and regardless of the reason for consultation. Chronic perialar intertrigo was defined by the presence of erythema around the nasal alae for more than 1 month.

A standardized questionnaire detailing medical history, history of the lesion, epidemiological data, and previous treatments was completed by the investigators. It included a clinical description of the intertrigo and possible associated conditions. Wood's lamp examination was performed when possible. A microbiological sample was obtained at the discretion of the investigators. Finally, investigators indicated the most probable cause, if any, and the treatment they prescribed. Photographs of the intertrigo with and without Wood's lamp examination were taken. Parents gave their consent for the use of anonymous personal data and photographs. Standardized questionnaires and photographs were transmitted to two of the authors (AS and JPL) who pooled and analyzed the results.

The results were described in relative value and in percentage for each of the different items of the questionnaire.

3 | RESULTS

Seventy-one patients were enrolled from 11 participating centers. After review, 30 cases were excluded: 1 because the patient was over 18 years, and 29 because the perinasal erythema appeared to be part of a well characterized facial dermatosis (perioral dermatitis 12 cases, acne 7 cases, rosacea 6 cases, seborrheic dermatosis 4 cases). The remaining 41 patients (Table 1) (25 boys and 16 girls) had a mean age of 12.1 years (±2.9 standard deviation [SD]: range 7–18 years). The Fitzpatrick skin phototypes were 1 ($n = 3/41$; 7%), 2 ($n = 12/41$; 29%), 3 ($n = 19/41$; 46%), 4 ($n = 6/41$; 15%) and 6 ($n = 1/41$; 3%). Five patients (12%) had no relevant medical history. Concomitant disorders included asthma, psoriasis, atopic dermatitis, and rhinoconjunctivitis were found respectively in 9 (22%), 7 (17%), 7 (17%), and 6 (15%) patients. The majority of the patients had no treatment at enrolment ($n = 24$; 58.5%); 3 (7%) had used inhaled corticosteroids.

TABLE 1 Clinical characteristics of patients included with peri alar intertrigo

Clinicals characteristics of patients included $n = 41$ (%)	
Boys	25 (61)
Girls	16 (39)
Mean age (year)	12.1
Phototype	
1	3 (7)
2	12 (29)
3	19 (46)
4	6 (15)
5	0
6	1 (3)
Personal antecedents	
No medical history	5 (12)
Asthma	9 (22)
Psoriasis	7 (17)
Atopic dermatitis	7 (17)
Rhino conjunctivitis	6 (15)
Treatment at enrolment	
Yes	17 (41.5)
No	24 (58.5)
Use of inhaled corticosteroids	
Yes	3 (7)
No	38 (93)
Treatment received for the intertrigo before inclusion	
Topical corticosteroid	9 (22)
Topical antifungal	8 (19.5)
Topical antibiotic	5 (12.2)
Topical ivermectin	5 (12.2)
Topical metronidazole	3 (7)
Topical tacrolimus	1 (2)

The intertrigo was bilateral in 38 patients (93%) and located in the fold around the nasal ala and under the nostrils (Figure 1A,B and Table 2). Marked erythema and mild desquamation were present in all of the cases.

No symptoms were found in the majority of patients ($n = 22$; 54%), but pruritus, tingling or burning were reported in 16 (39%),

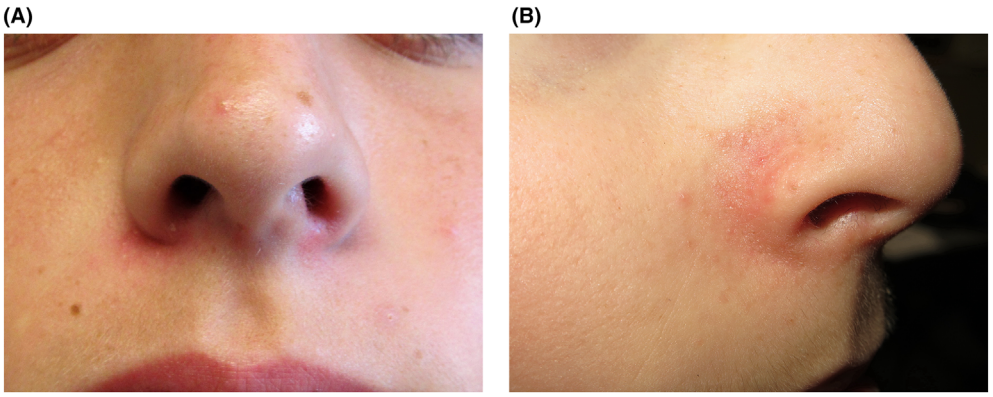

FIGURE 1 (A, B) Perialar intertrigo in two young boys: clinical presentation

TABLE 2 Clinical characteristics, causes and treatments prescribed for the perialar intertrigo

Clinical characteristics of the perinasal intertrigo $n = 41$ (%)	
Location	
Unilateral	3 (7)
Bilateral	38 (93)
Symptoms	
None	22 (54)
Pruritus	16 (39)
Tingling	6 (14.6)
Burning	4 (9.8)
Mean duration (months)	13.4
Evolution	
Flare	9 (22)
Permanent	32 (78)
Dermatoses presenting concomitantly	
Mild acne	20 (48.8)
Extrafacial psoriasis	6 (14.6)
Mild seborrheic dermatitis of the Face	6 (14.6)
Mild seborrheic dermatitis of the scalp	5 (12.2)
Mild perioral dermatitis	5 (12.2)
Wood's lamp examination	
Performed	
Yes	29 (70.7)
No	12 (29.3)
Fluorescence ($n = 29$)	
Yes	9 (31)
No	20 (69)
Orange red color ($n = 9$)	
Yes	7 (78)
No	2 (22)
Possibles causes suggested	
No hypothesis	9 (22)
Acne	10 (24.4)
Seborrheic dermatitis	8 (19.5)
Rosacea	4 (9.8)

TABLE 2 (Continued)

Clinical characteristics of the perinasal intertrigo $n = 41$ (%)	
Psoriasis	4 (9.8)
Perioral dermatitis	3 (7.3)
Skin dryness	2 (4.9)
Eczema	1 (2.3)
Treatment prescribed for the intertrigo at the inclusion	
None	5 (12.2)
Topical antifungal	8 (19.5)
Topical ivermectin	6 (14.6)
Topical corticosteroids	5 (12.2)
Topical metronidazole	4 (9.8)
Topical retinoids	4 (9.8)
Benzoyl peroxyde	2 (4.9)
Emollient cream	2 (4.9)
Topical tacrolimus	1 (2.4)
Chlorhexidine	1 (2.4)
Cyclosporine	2 (4.9)
Isotretinoin	1 (2.4)
Effectiveness of the treatment	
Yes	5 (12.2)
No	36 (87.8)

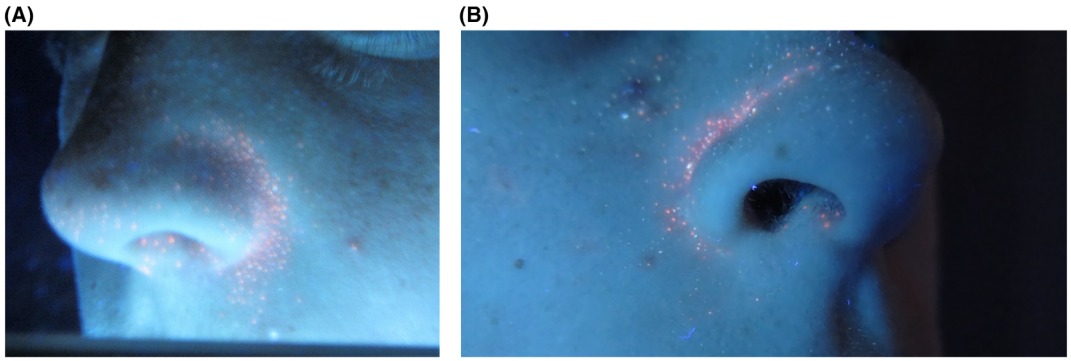

FIGURE 2 (A, B) Perialar intertrigo: orange-red follicular fluorescence under Wood's lamp examination

6 (14.6%) and 4 (9.8%) cases, respectively. When present, symptoms were intermittent in 15/19 (79%), and mild to moderate. The intertrigo had a mean duration of 13.4 months (range 1–72 months). It was permanent in 32 (78%) cases. Mild acne, extrafacial psoriasis, mild seborrheic dermatitis of the face, seborrheic dermatitis of the scalp and mild perioral dermatitis were concomitantly present in 20 (48.8%), 6 (14.6%), 6 (14.6%), 5 (12.2%) and 5 (12.2%) respectively. Wood's lamp examination was performed in 29 patients (70.7%). Fluorescence was present in 9/29 (31%) cases; which was follicular in all cases, with an orange-red color in 7/9 (78%) of cases (Figure 2A,B).

A microbiological sample had been performed before the enrollment visit in 2 (4.9%) patients and was sterile.

Regarding previous treatments, 23 (53.5%) patients had received at least one treatment for the intertrigo before study inclusion. Topical corticosteroids, antifungals, antibiotics, ivermectin, metronidazole, and tacrolimus had respectively been used in 9 (22%), 8 (19.5%), 5 (12.2%), 5 (12.2%), 3 (7%), and 1 (2%) case.

The possible causes suggested by the investigators were acne ($n = 10/41$; 24.4%), seborrheic dermatitis ($n = 8/41$; 19.5%), rosacea ($n = 4/41$; 9.8%), psoriasis ($n = 4/41$; 9.8%), perioral dermatitis ($n = 3/41$; 7.3%), skin dryness ($n = 2/41$; 4.9%) and eczema ($n = 1/41$; 2.3%). No diagnosis was proposed in 9/41 (22%) cases. A topical treatment for the intertrigo was prescribed to 80.5% ($n = 33$). Topical treatments included antifungal ($n = 8/33$; 19.5%), ivermectin ($n = 6/33$; 14.6%), corticosteroids ($n = 5/33$; 12.2%), metronidazole ($n = 4/33$; 9.8%), topical retinoids ($n = 4/33$; 9.8%), benzoyl peroxide ($n = 2/33$; 4.9%), emollient cream ($n = 2/33$; 4.9%), tacrolimus ($n = 1/33$; 2.4%) and chlorhexidine ($n = 1/33$; 2.4%). Some patients received systemic

treatments to treat the intertrigo in the context of severe skin disease outside the perialar region in the hypothesis that the intertrigo was part of the other dermatosis. Systemic treatments were prescribed to 3 patients (7.3%): cyclosporine for severe generalized psoriasis (2 patients) and isotretinoin (1 patient) for a diagnosis of possible recurrent acne after a previous course of isotretinoin before inclusion into this study. Five patients (12.2%) did not receive any treatment.

Effectiveness of treatments prescribed was obtained for only 5 patients (12%). The treatments reported as effective were topical corticosteroids ($n = 2$), topical metronidazole ($n = 1$), topical ivermectin ($n = 1$), and emollient cream ($n = 1$). No long-term follow-up was performed.

4 | DISCUSSION

We describe a central facial cutaneous manifestation that has not been previously reported to our knowledge. We propose the term "perialar intertrigo of children and adolescents". It occurs in preadolescence (mean age in our cohort 12.1 years old) and affects boys (61%) more frequently than girls. It is characterized by a chronic, bilateral, desquamative erythema of the nasal folds. It is usually asymptomatic or pauci-symptomatic, occasionally causing an intermittent and mild pruritus.

Patients with nasal fold erythema associated with an obvious well-characterized prominent facial dermatosis were excluded from this study because its aim was to describe this dermatosis when isolated or associated with different skin disease located outside the perialar region. These 29 cases included perioral dermatitis (12 cases), acne (7 cases), rosacea (6 cases), and seborrheic dermatosis (4 cases). However, by excluding typical dermatoses with perialar involvement, we might have described mild cases of these dermatoses, limited to the perinasal folds.

The etiology of this intertrigo is unknown. Three main hypotheses were proposed by the investigators: rosacea/perioral dermatitis, acne, and seborrheic dermatitis. 17.1% of the investigators thought that this entity could belong to the spectrum of rosacea and perioral dermatitis.[5] However, lack of efficacy of classical rosacea treatments argues against this hypothesis. A role for *Demodex folliculorum* (*D. folliculorum*) in the genesis of this intertrigo could also be suspected. The density of *D. folliculorum* is very low in children and rises during puberty due to the increase in sebaceous secretion.[6] The distribution and kinetics of colonization of pilosebaceous appendages in adolescents are not fully understood and the perinasal region might be a preferential location at this age. This perialar intertrigo could be a manifestation of early colonization in children. In our study, skin scrapings to find colonization of *D. folliculorum* were not done. However, several children had received treatments likely to be effective against *D. folliculorum* before their inclusion, without improvement. On the other hand, it is possible that the duration of these treatments was not sufficient, knowing the difficulty of treating facial demodicosis. While demodicosis and rosacea can be side effects of inhaled steroids,[7] our questionnaire explored the use of inhaled corticosteroids, and 93% of the patients did not use them.

A quarter of the investigators thought that this intertrigo could be due to acne because of the association in 48.8% of the cases with early acne lesions and the orange-red follicular fluorescence observed in the perinasal folds in some cases. Indeed, some studies have demonstrated the direct relationship between the presence of *Cutibacterium acnes* (*C. acnes*) and the intensity of orange-red follicular fluorescence.[8–10] The production of coproporphyrin III by the bacteria has been directly implicated in this fluorescence[8,9] and the population with the highest prevalence of *C. acnes* on the face is the 11–15 year-old age group.[10–12] A true case-control study with a systematic examination under Wood's lamp would help to better assess the possible role of *C. acnes*.

In our study, the prevalence of psoriasis was higher than the usual prevalence in children (personal history in 17% of children, concomitant psoriasis at inclusion in 14.6%). A potential explanation is that the center with the highest number of cases (Argenteuil) has a high number of children with psoriasis. It is also possible that this entity has several etiologies, including childhood facial psoriasis, seborrheic dermatitis and sebopsoriasis. Seborrheic dermatitis occurs on the scalp and in the face in children[13] but not specifically in the perinasal region. It should be noted that a short letter published in 2002 in the French literature, reported a clinical case similar to that described in our study.[14] The author considered this a clinical form of childhood seborrheic dermatitis and reported the absence of response to antifungals for seborrheic dermatitis, as in our study.

No diagnosis was suggested in 22% of cases. This entity could be an isolated variant of different known facial dermatoses or a specific dermatosis of preadolescence. Changes in microbiota composition during this period of life could induce such an inflammatory skin reaction. A case-control study of skin microbiota in this location could help answer this question.

The most prescribed treatments by the investigators of this study logically corresponded to the pathogenic hypotheses they raised, namely, metronidazole and topical ivermectin for rosacea, topical retinoids, and benzoyl peroxide for acne and antifungals or topical steroids for seborrheic dermatitis. The design of our study did not include the follow-up of patients, which prevents evaluation of the effectiveness of the prescribed therapies.

In addition to the ones already mentioned, our study has potential biases and limitations. A center bias is possible since the majority of patients (71%) were recruited from two hospital centres (15 in Argenteuil and 14 in Nice). Wood's lamp examination was not performed in 29% of cases, resulting in a failure to assess the exact frequency of follicular fluorescence. Moreover, the assessment of treatment responses for the intertrigo was only performed in 5 patients and the effectiveness of treatment tried for this dermatosis could not be evaluated. Finally, this entity is probably underestimated in the general pediatric population. Indeed, we can imagine that most children and adolescents do not consult for this intertrigo because of its mild and paucisymptomatic characteristics.

To summarize, perialar intertrigo occurring in preadolescence seems to be a clinical entity that still needs further clarification. It appears to be a previously undescribed isolated manifestation that

could belong to various facial dermatoses (acne, rosacea, seborrheic dermatitis, and psoriasis). or may be a marker of age-related skin dysbiosis, but further studies are needed to investigate it.

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None.

CONFLICT OF INTEREST

None.

DATA AVAILABILITY STATEMENT

We declare that all the data presented in our study are available.

CONSENT STATEMENT

The patients in this manuscript have given written informed consent to publication of their case details.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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