

LETTERS TO THE EDITORS

Research Letter

Dear Editor,

'Home-school toes' – a case series of paediatric perniosis presentations

Coronavirus disease (COVID-19) has been associated with varying cutaneous manifestations in children, ranging from viral exanthema to cutaneous vasculitis.¹ Among such dermatologic presentations are 'COVID toes', a chilblain-like phenomenon described in some COVID-positive patients who may be otherwise asymptomatic for infection.² This entity remains controversial, as most patients reported in a series of 'COVID toes' did not have microbiologically confirmed infection.^{3–5} Reports of SARS-CoV2 viral particles on electron microscopy of perniosis specimens have been disputed.⁶

Perniosis, or chilblain, is a common inflammatory dermatosis usually affecting the dorsal feet or hands following exposure to damp, cold, nonfreezing conditions, manifesting clinically as purpuric plaques and histologically characterised by a lymphocytic vasculitis.⁷ Exposure to cold environments may cause persistent vasoconstriction in predisposed patients, resulting in hypoxaemia and a secondary cutaneous inflammatory reaction.⁸

We present a retrospective case series of children and adolescents who presented to the Emergency Department at Sydney Children's Hospital, Randwick, New South Wales (NSW), Australia, with skin manifestations of perniosis in the setting of COVID-19 'remote-learning' in winter 2021.

Patients were identified through interrogation of the Sydney Children's Hospital Emergency Department database, including a review of all presentations related to hands and feet. Medical records of patients under 18 years of age who presented with signs and symptoms of perniosis during the winter months of 2021 (June–August) were included, corresponding to the NSW school term three period of 'remote-learning', which commenced on 12 July 2021. In total, eleven patients (five male and six female) were identified. Their clinical data are summarised in Table 1. Ethics approval was granted by the Sydney Children's Hospitals Network Human

Research Ethics Committee (CCR2021/31). Written consent was obtained from all patients prior to study inclusion.

The mean age of presenting patients was 11 years (range, 5–15 years), and the mean duration of symptoms prior to presentation was fifteen days. There were no perniosis presentations in June, with three cases in July and eight in August. Of the eleven patients included, seven reported only plantar involvement, while four had both hands and feet affected. Two patients had experienced previous episodes of perniosis. A known family history of perniosis was reported in two patients. Discolouration was the most common sign experienced, with 55% of patients reporting, followed by pain, swelling, pruritus and blistering (Figs 1 and 2). Three patients had concomitant systemic symptoms (fever, fatigue, vomiting or coryzal symptoms). Initial diagnosis in emergency was variable, with multiple children undergoing extensive investigations, including two children having X-rays, five children having blood investigations for vasculitis and one child undergoing biopsy, which confirmed lymphocytic vasculitis with overlying epidermal necrosis, consistent with perniosis.

Although a SARS-CoV-2 PCR test was not performed on four patients, seven patients returned negative results. Two referring general practitioners and two families expressed concerns regarding 'COVID toes'; however, no patient tested positive for SARS-CoV-2 at the time of presentation.

All patients were home-schooled during winter 2021. Most patients reported a reduced level of activity compared to their normal baseline (63%). Although heating at home was present for all patients, most patients (7/11) reported not wearing shoes or socks during the home-school period. Four patients recognised the association with their symptoms and cold exposure.

Since the start of the COVID-19 pandemic, practitioners have noted an increase in perniosis presentations. Patients are now presenting to health professionals, concerned that acraly-distributed dermatoses may be a COVID-19 manifestation.⁹ A prospective study by Neri *et al.*¹⁰ suggested that a cluster of eight paediatric primary perniosis presentations observed in March–April 2020 was attributed to increased cold exposure affecting predisposed patients.¹⁰ Behavioural and environmental changes due to lockdowns, including contact with cold floors (87%), unheated apartments (62%) and walking barefoot (100%), may have contributed to increased cold exposure.¹⁰ Similarly, a survey of predominantly adolescent and adult patients who presented with perniosis demonstrated that most patients reported reduced physical activity (61.3%) and shoe-wearing during lockdown (87.1%).⁴

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Table 1 Clinical characteristics of eleven paediatric patients with perniosis

Month of presentation in 2021	Ethnicity	Age (years)	Gender	Chilblain localisation	SARS-CoV-2 PCR test	Level of activity (Same/more/less than usual)	Home-schooled	Regular shoe/sock/glove wearing
July	Asian	3	F	Feet	No	Same	Yes	Yes
July	Asian	15	F	Hands and feet	No	Same	Yes	Yes
July	Caucasian	11	F	Feet	Negative	Less than usual	Yes	No
August	Mixed race (Caucasian/Asian)	11	F	Hands and feet	Negative	Same	Yes	Yes
August	Caucasian	10	M	Feet	Negative	Less than usual	Yes	No
August	Caucasian	14	F	Hands and feet	Negative	Same	Yes	No
August	Caucasian	15	M	Hands and feet	Negative	Less than usual	Yes	Yes
August	Caucasian	14	M	Feet	No	Less than usual	Yes	Yes
August	Asian	12	M	Feet	Negative	Less than usual	Yes	No
August	Mixed race (Caucasian/Asian)	9	F	Feet	No	Less than usual	Yes	No
August	Caucasian	15	M	Feet	Negative	Less than usual	Yes	No



Figure 1 Acral perniosis in patient 4. Clinical photographs of the plantar aspects of the left (panel a) and right (panel b) feet illustrate multifocal erythematous nodules with central vesiculation, and clinical photographs of the dorsal aspects of the right foot (panel c) and left foot (panel d) illustrate violaceous discoloration and swelling of all digits.

Our series demonstrates increasing numbers of perniosis presentations from July through August 2021, paralleling the remote-learning in greater Sydney commencing on 12 July. It is unclear whether the presentations are related to lifestyle changes during home-schooling or heightened community perception of perniosis as a possible COVID-19 manifestation.

Given the lack of laboratory-confirmed SARS-CoV-2 19 infection and the presence of social, environmental and behavioural risk factors, we propose that the increased presentations of paediatric perniosis over the winter

months may represent ‘home-school toes’ resulting from lifestyle changes associated with lockdowns and home-schooling during the pandemic. Our data support no evidence of a causal relationship between COVID-19 and perniosis.

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Figure 2 Multifocal purpuric nodules on weight-bearing areas of toes (panel a) (patient 7). Reticulate erythema and urticated papules on the dorsal aspect of the right hand and fingers (panel b).

CONFLICT OF INTEREST

This manuscript has no conflict of interest.

ETHICAL APPROVAL

Ethics approval for the study was granted by the Sydney Children's Hospitals Network Human Research Ethics Committee (CCR2021/31).

PATIENT CONSENT FOR PUBLICATION STATEMENT

All patients provided written consent for the publication of this manuscript.

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Research Letter

Dear Editor,

Recurrence of vesicular stage lesions in an adult female patient with incontinentia pigmenti-including molecular analysis

Incontinentia pigmenti (IP) is a rare X-linked dominant genetic disorder caused by mutations in *IKBKG* gene with multisystemic anomalies including cutaneous, dental, ocular and neurological.¹ Skin is the most commonly affected organ in IP, presenting at birth or in the first few weeks of life with a vesicobullous eruption.¹ The vesicobullous stage, after evolving through verrucous and hyperpigmented phases during infancy, may leave subtle hypopigmented/atrophic patches and usually remains quiescent

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