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COVID toes in stay-at-home adolescents: An epiphenomenon?

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## MAIN DOCUMENT

### TITLE

CoVID toes in stay-at-home adolescents: an epiphenomenon?

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## **CONFLICT OF INTEREST**

Nil

## **ETHICS**

This study was approved by Western Health Research Ethics.

## **CONSENT**

Documented informed consent was obtained from all parents/carers.

## **KEYWORDS**

Coronavirus, chilblains, adolescents, paediatric emergency medicine

## **INTRODUCTION**

Coronavirus (SARS-CoV-2) was first reported in Wuhan (Hubei Province, China) in December 2019 and was subsequently declared a global pandemic. The most prominent clinical features of coronavirus disease (CoVID-19) are pyrexia, respiratory tract infection, gastrointestinal symptoms, myalgia and fatigue<sup>1</sup>. A new cutaneous phenomenon has been observed globally in children and adolescents; lesions similar in appearance to chilblains (or pernio), characterised by erythematous, swollen, pruritic and/or painful digits<sup>2-5</sup>. The temporal relationship with the coronavirus pandemic is difficult to ignore, hence the labelling of this phenomenon as 'CoVID-toes'.

We describe an unprecedented cluster of chilblain-like presentations seen in Sunshine Hospital Paediatric Emergency Department (ED) in May 2020. At this time, Victoria was under level 3 restrictions, during which individuals were only allowed to leave the house for essential services; healthcare, exercise, grocery shopping and work or education if unable to do from home. CoVID-19 infection rates in May were relatively low, with a total of 1656 confirmed cases in Victoria by the end of the month<sup>6</sup>.

## CASES

TABLE 1: Demographics, symptoms, investigations and images of chilblain-like lesion presentations

## DISCUSSION

Our paediatric ED had no documented presentations of chilblains in May in the past three years. However, in 2020, we observed a cluster of five presentations, amidst the coronavirus pandemic. All patients were previously fit and well, without prior or family history of chilblains or related health conditions. All patients denied exposure to unusually cold environments or temperature changes, which is the typical context of chilblains. Most of our patients did not have any of the prominent clinical features of CoVID-19, nor did they have contact with a known positive CoVID-19 case. Two of the patients tested for SARS-CoV-2 by PCR on a nasopharyngeal swab were negative and three patients were not tested as they were asymptomatic.

An increase in chilblain-like lesions has been observed globally with SARS-CoV-2 being the suspected aetiology. Of the 116 cases of chilblain-like lesions identified in prior studies, 42 were tested with nasopharyngeal swab PCR or serology, with only 5 of those having a confirmed SARS-CoV-2 infection.<sup>2-5</sup> It is possible that more of these patients were infected with SARS-CoV-2 however the limitations in current testing methods meant that it was not identified. Factors affecting test positivity include<sup>2-5</sup> :

- young people with robust immune systems exhibit an early Type 1 Interferon (IFN1) response leading to a lower viral load
- delayed immune mediated response of the virus, with lesions appearing several days after prominent CoVID-19 symptoms
- low sensitivity and specificity of the nasopharyngeal PCR test

The lack of confirmatory testing means a definitive correlation cannot yet be made.

The United States, Spain and Italy, where 'CoVID-toes' have also been observed, have high rates of recorded CoVID-19, with 4973, 6030 and 3781 cases per million of population respectively<sup>6</sup>. By comparison, at the time of this observation, Australia had a total of 7,000 reported infections (279 cases per million)<sup>6</sup>. Despite low infection rates, Australian authorities enforced strong social isolation regulations. We question whether CoVID-19 is the true aetiology of this phenomena or if it is merely a by-product of the lifestyle change the pandemic mandated globally. Perhaps 'CoVID-toes' are a consequence of children spending lengths of time inside in cold homes with reduced activity, alterations in peripheral circulation and inappropriate coverage of hands and feet. Additionally, parents/caregivers and children in isolation may have had greater opportunity to observe these cutaneous changes than if normal work and education activity were permitted. Such diagnostic bias may also have contributed to these findings.



Our observation questions the notion that chilblain-like lesions alone are a manifestation of a CoVID-19 infection, especially in countries with a low burden of this illness such as Australia. The lack of confirmatory testing make confirmation of the role of SARS-CoV-2 in this phenomenon difficult to define. Further research is required to better characterise this link.


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TABLE 1: Demographics, symptoms and investigations of chilblain-like lesion presentations

	<b>Age gender-comorbidities</b>	<b>Chilblain location-symptoms-duration</b>	<b>CoVID-19 symptoms</b>	<b>CoVID-19 contact</b>	<b>CoVID-19 investigations</b>	<b>Chilblain images</b>
<b>1</b>	16y M – ADHD <sup>†</sup>	Bilateral feet 2 <sup>nd</sup> to 5 <sup>th</sup> toes – erythema - 3 weeks	Afebrile Dry cough 3 weeks No gastro-intestinal symptoms	No positive contacts No symptomatic contacts	Naso-pharyngeal swab negative	
<b>2</b>	13y F – no comorbidities	R) hand all digits – erythema, swelling, pruritus – 3 days	Afebrile No respiratory or gastro-intestinal symptoms	No positive contacts No symptomatic contacts	Naso-pharyngeal swab negative	

3	14y F - no comorbidities	R) hand 4 <sup>th</sup> and 5 <sup>th</sup> digit + bilateral feet all toes– erythema, swelling, pruritus – 3 weeks	Afebrile No respiratory or gastro-intestinal symptoms	No positive contacts No symptomatic contacts	Nil	
4	22y F – no comorbidities	R) hand 1 <sup>st</sup> -4 <sup>th</sup> digits and R) foot all toes – erythema, swelling, pruritus- 1 week	Afebrile No respiratory or gastro-intestinal symptoms	No positive contacts No symptomatic contacts	Nil	Nil
5	14y F – no comorbidities	L) hand 5 <sup>th</sup> digit and L) foot 2 <sup>nd</sup> toe – erythema, swelling, pain – 3.5 weeks	Afebrile No respiratory or gastro-intestinal symptoms	No positive contacts No symptomatic contacts	Nil	Nil

† ADHD = Attention deficit hyperactivity disorder

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