

ORIGINAL ARTICLE

Paediatric nail consultation in an academic centre in Belgium: a 10-year retrospective study

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Abstract

Background Very few studies have been conducted to establish the nature and prevalence of nail disorders in children.

Objectives To determine the frequency of various nail conditions in the paediatric setting and to report their management and follow-up.

Methods This was a retrospective study between 2007 and 2017 of children under 18. All the patients were evaluated in our paediatric nail clinic at the dermatology department of Queen Fabiola Children's University Hospital. The data were synthesized from information obtained through medical records as well as from photographs taken during consultation. Follow-up was completed by phone interview.

Results Three hundred and one patients were included. The majority of nail abnormalities involved the toenails (57.6%). The most common clinical signs were, in descending order, Beau's lines, pachyonychia, subungual hyperkeratosis and onycholysis. The most frequent diagnoses were fever-related Beau's lines or onychomadesis (9.7%), trachyonychia (8.4%), longitudinal melanonychia (8.1%) and congenital malalignment of the great toenail (8.1%). The main diagnoses by age group were as follows: congenital hypertrophy of the lateral nail folds (21.4%) [0–2 years old]; fever-related Beau's lines or onychomadesis (21%) [2–6 years old]; trachyonychia (22%) [6–12 years old]; and juvenile ingrown nail (21.4%) [12–18 years old]. Management included clinical observation for 119 patients and specific advices for 108 patients. A treatment was prescribed for 134 patients, topical in 76.5% of cases. Follow-up demonstrated complete healing in 50.6% of patients and improvement in 19.7%.

Conclusion The most frequent nail disorders are benign, and their distribution varies with age. Management mainly involves conservative care, and the prognosis is favourable in the majority.

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Conflicts of interest

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Introduction

Nail disorders in children can be classified into seven categories: physiologic, congenital and/or hereditary, infectious, inflammatory, traumatic or mechanical, neoplastic, systemic and/or iatrogenic.¹ Most paediatric nail conditions are benign. That being said, they may be a source of anxiety for parents or physicians inexperienced in onychology and may be cosmetically disturbing. Furthermore, they may cause functional impairment.^{1,2} While individual conditions have been described previously, no study has examined the prevalence of paediatric nail disorders at a centre with expertise specifically in paediatric onychology. The

aim of our study was to determine the prevalence of nail disorders encountered at a paediatric onychology referral centre and to describe their management and follow-up.

Methods

This retrospective study was conducted between 2007 and 2017 in the paediatric dermatology department of the Queen Fabiola Children's University Hospital in Brussels, Belgium. Patients were included if they were younger than 18 years and had a nail abnormality noted on examination at our monthly half-day paediatric onychology clinic. Each patient was examined at least

once by one of the authors (JA). The data were analysed from medical records and included the following variables: age, gender, physician previously consulted, clinical features, additional studies performed, diagnosis, treatment and follow-up. Patients were categorized by age as follows: [0 to <2 years old], [2 to <6 years old], [6 to <12 years old] and [12 to <18 years old]. If available, photographs taken during consultation were reviewed. Children's parents were called for follow-up and to supplement information that may have been missing. The study was approved by the ethics committee of the Children's Hospital.

Results

Three hundred and one patients were included in the analysis. Demographics are listed in Table 1. The toenails were affected in 57.6%, fingernails in 27% and both in 14.8% of cases. The location was not specified in two cases (0.6%). The first toe was most commonly involved among nail abnormalities on the feet but there was no predominantly involved fingernail. Children had one or more physical signs but most of these clinical presentations resulted in one unifying diagnosis. We were not able to make a diagnosis for 29 clinical presentations (Fig. 1). The most common clinical signs were Beau's lines, pachyonychia, subungual hyperkeratosis and onycholysis (Fig. 2). A total of 149 additional examinations were performed in 119 patients by the referring physician or the nail specialist. Most of them consisted of nail clippings for mycologic analysis. The three most common categories of diagnoses were trauma, congenital and/or hereditary disorders and infections (Table 2). The top 10 diagnoses are described in Table S1: fever-related Beau's lines or onychomadesis (9.7%), trachyonychia (8.4%), longitudinal melanonychia (8.1%) and congenital malalignment of the great toenail (8.1%) were the most frequent (Fig. 3).

Fever-related Beau's lines or onychomadesis ($n = 30$) mainly affected children in the [2 to <6 years old] age group (83.4%), with a mean age of 3 years. The oldest patient was 7 years old. There was a report of fever a few weeks or months earlier in 17 patients. In 11 patients, the mother reported onychoptosis. The clinical examination showed Beau's lines or onychomadesis on multiple finger- and/or toenails, and healthy regrowth of the nail plate in 15 patients. This condition spontaneously resolved in all cases. Reassurance was provided.

Table 1 Demographic data

Mean age	6.2 years (1 months–17 years)
Gender	
Male	161 (53.5%)
Female	140 (46.5%)
Age category	
0 to <2 years	61 (20.3%)
2 to <6 years	112 (37.2%)
6 to <12 years	86 (28.6%)
12 to <18 years	42 (13.9%)

Trachyonychia ($n = 26$) mainly affected children in the [6 to <12 years old] age group (76.9%), with a mean age of 8 years. Based on their personal/family history and/or associated dermatological features, the cause was determined to be idiopathic ($n = 15$), psoriatic ($n = 7$) or due to alopecia areata ($n = 4$). Only one nail biopsy was performed to rule out a nail lichen planus. Observation with conservative care was advised. This included cutting nails short and applying protective nail lacquer. When a treatment was prescribed ($n = 15$), it was most often topical such as corticosteroid with or without calcipotriol. Follow-up data were available for 24 patients, with favourable evolution in 75% of cases. Trachyonychia did not appear to regress faster in patients receiving treatment.

Longitudinal melanonychia ($n = 25$) mainly affected children in the [2 to <6 years old] and [6 to <12 years old] age groups (72% in total), with a mean age of 8 years old. They were classified into two groups based on clinical and dermatoscopic features: 16 benign melanocytic proliferations (naevus or lentigo) and nine melanocytic activations (frictional or ethnic origin). No subungual melanoma was suspected. Clinical observation was recommended in 72% of cases. Three patients underwent surgical removal of the lesion. Pathology identified a matrix naevus, a lentigo and one patient with melanocytic activation.

Congenital malalignment of the great toenail ($n = 25$) mainly affected children in the [0 to <2 years old] and [2 to <6 years old] age groups (88% in total), with an mean age of 3 years old. The malalignment was bilateral in 56% of cases. It was frequently accompanied by Beau's lines, pachyonychia and dyschromia. Clinical follow-up was recommended for 20 patients. In 58% of cases, a favourable evolution was observed without the need for surgical intervention. A hole nail unit rotation surgery was performed in four patients, with a marked improvement in nail appearance in three cases.

Some diagnoses were more frequently encountered depending on the age category. Infants in the [0 to <2 years old] age category mainly exhibited congenital hypertrophy of the lateral nail folds (21.4%) and congenital malalignment of the great toenail (19.6%). Fever-related Beau's lines were predominant in children in the [2 to <6 years old] age group (21%). Children in the [6 to <12 years old] age group mostly had trachyonychia (22%) and longitudinal melanonychia (11%). Between 12 and 18 years old, trauma was the prevalent diagnosis. The three main causes were juvenile ingrown nails (21.4%), followed by acute trauma or its consequences (14.3%) and chronic trauma related to podiatric disorders (14.3%). Longitudinal melanonychia was also more common in this age group (11.9%). Following the nail consultation, clinical observation was recommended for 119 patients. Conservative measures were suggested for 108 patients. This included square nail cutting, nail lacquer application, taping and massage of the nail folds. Fourteen patients were referred to an orthopaedist or podiatrist. One hundred and thirty-four patients received treatment. This involved topical (76.5%),

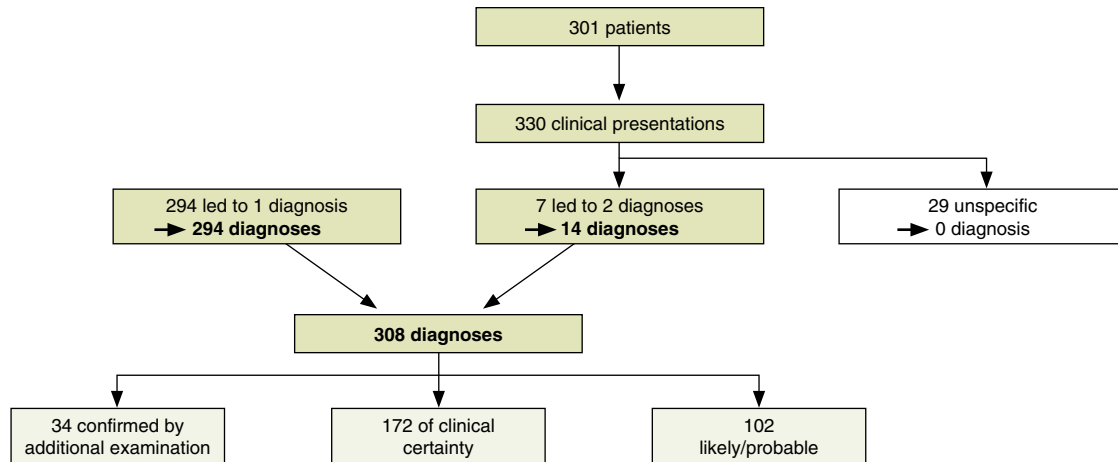


Figure 1 Number of diagnoses and their degree of certainty.

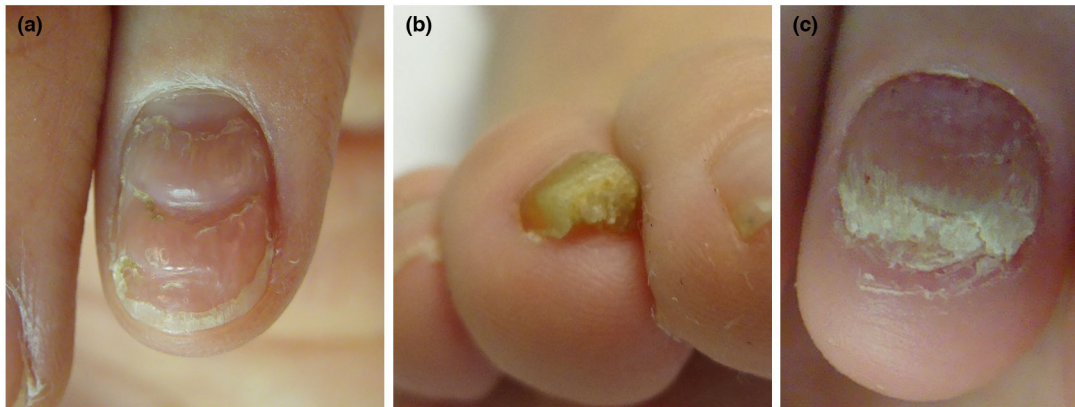


Figure 2 Main nail alterations. (a) Beau's lines. (b) Pachyonychia. (c) Subungual hyperkeratosis.

systemic (15%) and surgical (8.5%) therapy. Follow-up was possible for 243 patients in consultation or by phone: complete healing was reported in 50.6% of cases, improvement in 19.7% and no change in 27.2% of cases. Worsening was observed in 2.5% of cases.

Discussion

To date, very few studies have been conducted to determine the prevalence of nail disorders in children.^{3–5} This prevalence has been estimated at 11.1% and 6.8% in two studies, one in children aged zero to 17 years old in a paediatric dermatology department,³ the other in infants in dermatology and paediatric departments.⁴ Neither of these studies focused on children in a specialized onychology referral centre. Another study, from Le

Bidre *et al.*,⁶ was designed to determine the most common reasons to see a nail specialist in patients aged 8–92, but it offered little information on the paediatric population. As for the study of Chinazzo *et al.*,⁷ it only concerned physiological nail features in healthy newborns. Our study analysed a large cohort of children with a wide age range and diagnoses. This is the first study that examines the breadth of nail conditions at a dedicated paediatric onychology centre. Nail disorders affected children of all ages, with no clear predominance of sex. The [12 to <18 years old] age group was the least represented (13.9%), probably because adolescents are less likely to visit a tertiary paediatric centre. In addition, parental anxiety is often the main reason for consultation² and tends to be greater when children are younger. Nail abnormalities were restricted to toenails in 57.6% of cases,

Table 2 Categories of diagnoses (the 10 most frequent diagnoses appear in bold)

Categories	Diagnoses	n
Traumatism N = 77 25%	Podiatric-related chronic trauma	23
	Acute trauma and sequelae	19
	Juvenile ingrown nail	15
	Traumatism of unknown origin	7
	Onychotillomania	7
Congenital and/or hereditary disorders N = 53 17.2%	Congenital malalignment of the great toenail	25
	Congenital hypertrophy of the lateral nail folds	18
	Other genetic syndrome	5
	Congenital pachyonychia	2
	Ectodermal dysplasia	1
	Periungual congenital naevus	1
	Supernumerary nail	1
	Infections N = 47 15.3%	Onychomycosis
Acute paronychia		17
Periungual wart		6
Inflammatory disorders N = 40 13%	Trachyonychia	26
	Nail psoriasis	8
	Nail lichen planus	3
	Psoriasiform acral dermatitis	1
	Juvenile plantar dermatosis	1
Tumours N = 31 10%	Longitudinal melanonychia	25
	Subungual exostosis	4
	Inclusion body fibromatosis	1
	Onychopapilloma	1
Systemic disorders N = 30 9.7%	Fever-related Beau's lines or onychomadesis	30
Physiological alterations N = 15 4.9%	Physiological koilonychia	12
	Postdelivery Beau's Lines or onychomadesis	2
	Herringbone nails	1
Others diagnoses N = 15 4.9%	Idiopathic pincer nail	8
	Nail fragility	6
	Calcinosis	1
Total		308

in accordance with the study performed by Iglesias *et al.*,³ where 54% of nail alterations were located on toenails. In our study, great toenails were the most commonly affected, probably because many nail diseases preferentially affect the hallux: congenital hypertrophy of the nail folds,⁸ congenital malalignment of the great toenail,⁹ onychomycosis but also the podiatric nail conditions.¹⁰ Beau's lines, pachyonychia, subungual hyperkeratosis and onycholysis were the most frequently observed clinical signs. Those abnormalities are not specific and confirm that the

nail has a limited reservoir of clinical expressions. Fever-related Beau's lines or onychomadesis (9.7%), trachyonychia (8.4%), longitudinal melanonychia (8.1%) and congenital malalignment of the great toenail (8.1%) were the four most frequent diagnoses. These results are partly consistent with S. Goettmann's data (oral communication at the European Nail Society Meeting, EADV congress, London 2005). In a cohort of 520 children seen in her nail clinic in Paris, longitudinal melanonychia, juvenile ingrown nails and congenital malalignment were the most commonly observed diagnoses. On the other hand, fever-related onychomadesis was unusual. This discrepancy could be explained by a different recruitment of patients. Our series shows that the main pathologies differ in each age group, as suggested by Goettmann.¹¹ Fever-related Beau's lines or onychomadesis were the most frequent reason for consultation because this condition is worrying for both parents and inexperienced practitioners. It is linked to a temporary cessation in matrix growth because of a systemic shock like a thermal peak. In children, it is often associated with hand, foot and mouth disease.¹² In our series, this condition was observed especially in the [2 to <6 years old] age group. This could be explained by the nail matrix being more sensitive in young children. Trachyonychia, which is a diagnosis made clinically, was mainly observed in the [6 to <12 years old] age group. Biopsies for diagnostic purposes are not recommended because whatever the diagnosis, trachyonychia does not lead to nail destruction.¹³ Annual follow-up is usually suggested to reassure parents and their child. Our study found improvement or cure in 75% of cases, confirming the good prognosis previously published, regardless of treatment.¹³⁻¹⁶ Park *et al.*¹⁷ reported significant nail improvement in 98.6% of cases with calcipotriol/betamethasone ointment applied once daily for 6 months. By contrast, we did not find that topical treatment was effective. This could have been related to poor adherence to therapy. Longitudinal melanonychia was associated with lentigo-naevus or melanocytic activation. We did not observe any cases of subungual melanoma, consistent with the extreme rarity of this disease in children. Only about 10 cases of nail melanomas in children, presenting as longitudinal or total melanonychia, have been described in the literature, without any deaths reported to date.^{18,19} In our series, three patients underwent excision of the pigmented lesion. In all cases, these were stable single-digit longitudinal melanonychia with a suspected diagnosis of lentigo-naevus. The expected surgical outcome was good. By excising the lesion, there was no longer a need for long-term follow-up which is often a source of anxiety for parents.²⁰ Congenital malalignment of the great toenail spontaneously improved in 58% of our cases, similar to the 50% quoted in the literature.²¹ Clinical observation and podiatric care are therefore the treatment of choice. For severe forms, or those that do not resolve spontaneously, surgical realignment may be considered to avoid unsightly and persistent nail dystrophy.²¹⁻²³ Four patients underwent a hole nail unit rotation surgery, with

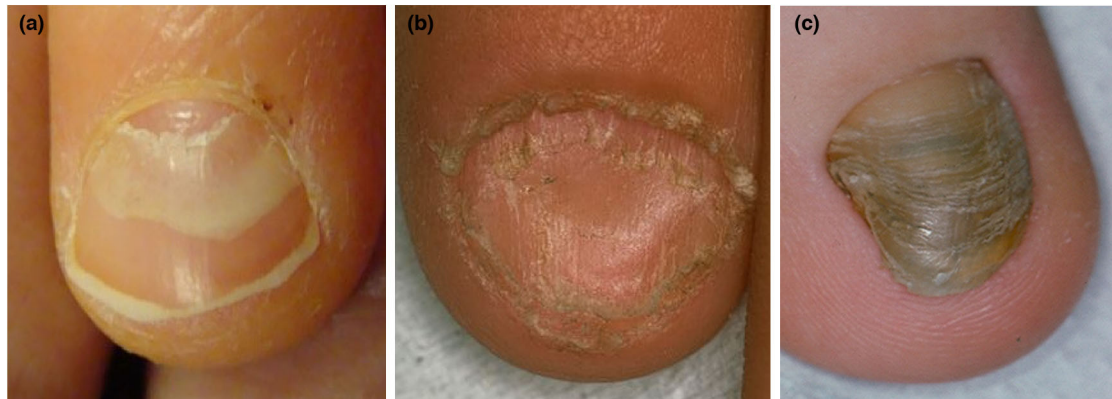


Figure 3 Main diagnoses. (a) Fever-related onychomadesis (Beau's lines). (b) Trachyonychia. (c) Congenital malalignment of the great toenail.

an improvement of the nail dystrophy in three cases. Some disorders were rarely observed. Physiological alterations were hardly encountered and never constituted the main reason for consultation. These benign lesions are often subtle and not bothersome so do not prompt consultation. Some conditions were not observed at all including the 'nail–patella syndrome' and congenital dyskeratosis, though these rare diseases are regularly cited in the literature. Similarly, postchemotherapy iatrogenic nail alterations were not seen as these are well known and managed by paediatric oncologists. Finally, the nail consultation is not an emergency consultation, which implies that some disorders were only seen at the end of their course, such as acute paronychia or trauma. Treatments were predominantly conservative, and the evolution of the lesions was usually favourable. This confirms the benign nature of the common nail disorders in children. No malignant pathology was observed. Our study has limitations. This is a 10-year retrospective study, which possibly implicates data collection and recall bias. Onychology is a discipline where diagnoses are primarily clinical and examiner-dependent, especially in children where nail biopsies are rarely performed. As a result, an accurate diagnosis could be made in 67% of cases. There is also recruitment bias since our study was conducted in a referral centre specifically for paediatric onychology. Our results cannot be generalized to the greater paediatric population. In conclusion, our study is the first to report the prevalence of nail disorders at a referral centre for paediatric onychology. The most frequent nail disorders are benign, vary according to the age category and are managed conservatively in most cases. Prognosis is favourable in 70.3% of cases.

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Supporting information

Additional Supporting Information may be found in the online version of this article:

Table S1. Main features of the ten most frequent diagnoses.