

Concurrent Beau Lines, Onychomadesis, and Reironychia Following Scurvy

Dayoung Ko, BS; Shari R. Lipner, MD, PhD

PRACTICE POINTS

- Beau lines, onychomadesis, and reironychia are nail conditions with distinct clinical findings.
- Beau lines and onychomadesis may be seen concurrently following trauma, inflammatory diseases, systemic illnesses, hereditary conditions, and infections.
- Reironychia shares a common pathophysiology with Beau lines and onychomadesis, and all reflect slowing or cessation of nail plate production.

Beau lines, onychomadesis, and reironychia are nail conditions with their own characteristic clinical findings. It has been hypothesized that these 3 disorders may share a common pathophysiologic mechanism of slowing and/or halting nail plate production at the nail matrix. We report the case of a 41-year-old woman who presented with concurrent Beau lines, onychomadesis, and reironychia 6 months following a diagnosis of scurvy. Simultaneous presentation of these 3 nail conditions is not commonly reported, and our case supports a shared pathophysiologic basis.

Cutis. 2020;105:146-147, 149.

Beau lines are palpable transverse depressions on the dorsal aspect of the nail plate that result from a temporary slowing of nail plate production by the proximal nail matrix. Onychomadesis is a separation of

the proximal nail plate from the distal nail plate leading to shedding of the nail. It occurs due to a complete growth arrest in the nail matrix and is thought to be on a continuum with Beau lines. The etiologies of these 2 conditions overlap and include trauma, inflammatory diseases, systemic illnesses, hereditary conditions, and infections.¹⁻⁵ In almost all cases of both conditions, normal nail plate production ensues upon identification and removal of the inciting agent or recuperation from the causal illness.^{3,4,6} Beau lines will move distally as the nail grows out and can be clipped. In onychomadesis, the affected nails will be shed with time. Resolution of these nail defects can be estimated from average nail growth rates (1 mm/mo for fingernails and 2–3 mm/mo for toenails).⁷

Reironychia is defined as a proximal ingrowing of the nail plate into the ventral surface of the proximal nail fold.^{4,6} It is thought to occur via vertical progression of the nail plate into the proximal nail fold, repetitive nail matrix trauma, or shearing forces, resulting in inflammation that leads to nail plate stacking.^{8,9} Although conservative treatment using topical corticosteroids may be attempted, proximal nail plate avulsion typically is required for treatment.¹⁰

Braswell et al¹ suggested a unifying hypothesis for a common pathophysiologic basis for these 3 conditions; that is, nail matrix injury results in slowing and/or cessation of nail plate production, followed by recommencement of nail plate production by the nail matrix after removal of the insult. We report a case of a patient presenting with concurrent Beau lines, onychomadesis, and

Ms. Ko is from Duke University School of Medicine, Durham, North Carolina. Dr. Lipner is from the Department of Dermatology, Weill Cornell Medicine, New York, New York.

The authors report no conflict of interest.

Correspondence: Shari R. Lipner, MD, PhD, Weill Cornell Medicine, Department of Dermatology, 1305 York Ave, 9th Floor, New York, NY 10021 (shl9032@med.cornell.edu).

retronychia following scurvy, thus supporting the hypothesis that these 3 nail conditions lie on a continuum.

Case Report

A 41-year-old woman with a history of thyroiditis, gastroesophageal reflux disease, endometriosis, osteoarthritis, gastric ulcer, pancreatitis, fatty liver, and polycystic ovarian syndrome presented with lines on the toenails and no growth of the right second toenail of several months' duration. She denied any pain or prior trauma to the nails, participation in sports activities, or wearing tight or high-heeled shoes. She had presented 6 months prior for evaluation of perifollicular erythema on the posterior thighs, legs, and abdomen, as well as gingival bleeding.¹¹ At that time, one of the authors (S.R.L.) found that she was vitamin C deficient, and a diagnosis of scurvy was made. The rash and gingival bleeding resolved with vitamin C supplementation.¹¹

At the current presentation, physical examination revealed transverse grooves involving several fingernails but most evident on the left thumbnail (Figure, A). The grooves did not span the entire breadth of the nail, which was consistent with Beau lines. Several toenails had parallel transverse grooves spanning the entire width of the nail plate such that the proximal nail plate was discontinuous with the distal nail plate, which was consistent with onychomadesis (Figure, B). The right second toenail was yellow and thickened with layered nail plates, indicative of retronychia (Figure, B). Histopathology of a nail plate clipping from the right second toenail was negative for fungal hyphae, and a radiograph was negative for bony changes or exostosis.

Comment

The nail matrix is responsible for nail plate production, and the newly formed nail plate then moves outward over the nail bed. It is hypothesized that the pathophysiologic basis for Beau lines, onychomadesis, and retronychia lies on a continuum such that all 3 conditions are caused by an insult to the nail matrix that results in slowing and/or halting of nail plate growth. Beau lines result from slowing or disruption in cell growth from the nail matrix, whereas onychomadesis is associated with a complete halt in nail plate production.^{1,3} In retronychia, the new nail growing from the matrix pushes the old one upward, interrupting the longitudinal growth of the nail and leading to nail plate stacking.¹⁰

Our patient presented with concurrent Beau lines, onychomadesis, and retronychia. Although Beau lines and onychomadesis have been reported together in some instances,¹²⁻¹⁴ retronychia is not commonly reported with either of these conditions. The exact incidence of each condition has not been studied, but Beau lines are relatively common, onychomadesis is less common, and retronychia is seen infrequently; therefore, the concurrent presentation of these 3 conditions in the same patient is



A, Beau lines on the thumbnails presented as transverse depressions that did not span the width of the nail plate. B, Transverse lines spanning the width of the nail plate were noted on the right first, third, fourth, and fifth toenails, representing onychomadesis. Layered nail plates on the right second toenail were indicative of retronychia.

exceedingly rare. Thus, it was most likely that one etiology accounted for all 3 nail findings.

Because the patient had been diagnosed with scurvy 6 months prior to presentation, we hypothesized that the associated vitamin C deficiency caused a systemic insult to the nail matrix, which resulted in cessation of nail growth. The mechanism of nail matrix arrest in the setting of systemic disease is thought to be due to inhibition of cellular proliferation or a change in the quality of the newly manufactured nail plate, which becomes thinner and more dystrophic.¹⁵ Vitamin C (ascorbic acid) deficiency causes scurvy, which is characterized by cutaneous signs such as perifollicular hemorrhage and purpura, corkscrew hairs, bruising, gingivitis, arthralgia, and impaired wound healing.¹⁶ These clinical manifestations are due to impaired collagen synthesis and disordered connective tissue. Ascorbic acid also is involved in fatty acid transport, neurotransmitter synthesis, prostaglandin metabolism, and nitric oxide synthesis.¹⁷ Ascorbic acid has not been studied for its role in nail plate synthesis¹⁸; however, given the role that ascorbic acid plays in a myriad of biologic processes, the deficiency associated

CONTINUED ON PAGE 149

CONTINUED FROM PAGE 147

with scurvy likely had a considerable systemic effect in our patient that halted nail plate synthesis and resulted in the concurrent presentation of Beau lines, onychomadesis, and retronychia.

REFERENCES

1. Braswell MA, Daniel CR III, Brodell RT. Beau lines, onychomadesis, and retronychia: a unifying hypothesis. *J Am Acad Dermatol*. 2015;73:849-855.
2. Lipner SR. Onychomadesis following a fish pedicure. *JAMA Dermatol*. 2018;154:1091-1092.
3. Bettoli V, Zauli S, Toni G, et al. Onychomadesis following hand, foot, and mouth disease: a case report from Italy and review of the literature. *Int J Dermatol*. 2013;52:728-730.
4. Lawry M, Daniel CR III. Nails in systemic disease. In: Scher RK, Daniel CR III, eds. *Nails: Diagnosis, Therapy, Surgery*. 3rd ed. Oxford, England: Elsevier Saunders; 2005:147-176.
5. Lipner SR, Scher RK. Evaluation of nail lines: color and shape hold clues. *Cleve Clin J Med*. 2016;83:385.
6. Rich P. Nail signs and symptoms. In: Scher RK, Daniel CR III, eds. *Nails: Diagnosis, Therapy, Surgery*. 3rd ed. Oxford, England: Elsevier Saunders; 2005:1-6.
7. Lipner SR, Scher RK. Nail growth evaluation and factors affecting nail growth. In: Humbert P, Fanian F, Maibach H, et al, eds. *Agache's Measuring the Skin*. Cham, Switzerland: Springer; 2017:1-15.
8. de Berker DA, Richert B, Duhard E, et al. Retronychia: proximal ingrowing of the nail plate. *J Am Acad Dermatol*. 2008;58:978-983.
9. Wortsman X, Wortsman J, Guerrero R, et al. Anatomical changes in retronychia and onychomadesis detected using ultrasound. *Dermatol Surg*. 2010;36:1615-1620.
10. Piraccini BM, Richert B, de Berker DA, et al. Retronychia in children, adolescents, and young adults: a case series. *J Am Acad Dermatol*. 2014;70:388-390.
11. Lipner S. A classic case of scurvy. *Lancet*. 2018;392:431.
12. Jacobsen L, Zimmerman S, Lohr J. Nail findings in hand-foot-and-mouth disease. *Pediatr Infect Dis J*. 2015;34:449-450.
13. Damevska K, Gocev G, Pollozhani N, et al. Onychomadesis following cutaneous vasculitis. *Acta Dermatovenerol Croat*. 2017;25:77-79.
14. Clementz GC, Mancini AJ. Nail matrix arrest following hand-foot-mouth disease: a report of five children. *Pediatr Dermatol*. 2000;17:7-11.
15. Weismann K. J.H.S Beau and his descriptions of transverse depressions on nails. *Br J Dermatol*. 1977;97:571-572.
16. Abdullah M, Jamil RT, Attia FN. Vitamin C (ascorbic acid). Treasure Island, FL: StatPearls Publishing; 2019. <https://www.ncbi.nlm.nih.gov/books/NBK499877/>. Updated October 21, 2019. Accessed February 24, 2020.
17. Pazirandeh S, Burns DL. Overview of water-soluble vitamins. *UpToDate*. <https://www.uptodate.com/contents/overview-of-water-soluble-vitamins>. Updated January 29, 2020. Accessed February 24, 2020.
18. Scheinfeld N, Dahdah MJ, Scher RK. Vitamins and minerals: their role in nail health and disease. *J Drugs Dermatol*. 2007;6:782-787.