



# Koilonychia in a Patient with Severe Iron Deficiency Anemia

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## Abstract

Koilonychia is a known sequela of chronic and severe iron deficiency anemia. The pathogenesis is not well understood but is postulated to be attributed to weakening of the underlying nail connective tissue secondary to poor oxygenation of the distal extremities. Because of the lower prevalence of koilonychia in developed nations, its clinical presentation in the U.S. is of particular significance. In the following case, a female patient presented with angina and heart palpitations of four months duration as well as severe anemia of unknown origin. Physical exam was notable for koilonychia, most prominent in the 1<sup>st</sup> - 4<sup>th</sup> digits of the right hand as well as the 1<sup>st</sup> and 2<sup>nd</sup> digits of the right foot.

**Keywords:** koilonychia, iron deficiency anemia, Plummer-Vinson syndrome, esophageal squamous cell carcinoma, esophageal adenocarcinoma.

## Introduction

Iron deficiency anemia is a common condition in North America, with a prevalence of 3.4% [1]. Causes include vegetarian diet, gastrointestinal cancer, celiac disease, benign hamartomatous polyps, erosive gastritis, gastric ulcers, chronic atrophic gastritis, *Helicobacter pylori* gastritis, autoimmune gastritis, hookworms and whipworms, celiac disease, and more. Iron deficiency anemia can cause many different signs and symptoms, such as fatigue, weakness, pallor of the skin and conjunctiva, pagophagia, atrophic glossitis, angular cheilitis, and a hyperdynamic state (e.g., tachycardia and heart palpitations). Another clinical manifestation of severe iron deficiency anemia is koilonychia (“spoon nails”), which are thin and brittle nails that

have a spoon-shaped divot on the dorsal surface. Because the most common cause of iron deficiency is malnutrition, koilonychia is found to be more prevalent in developing countries (36% of the population) in comparison to developed countries (8% of the population) [2]. The proposed pathomechanism of koilonychia is not well understood, but it is thought to be due to decreased oxygen delivery to the nail bed, resulting in weakening of the underlying nail connective tissue that causes an upward deviation of the distal portion of the nail [3].

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## Case presentation

The patient is a 43-year-old female presenting with angina, palpitations, chronic fatigue, weakness, pale skin, chest pain, shortness of breath, dizziness, cold extremities, brittle nails, and poor appetite for four months. She endorses left-sided chest pain and epigastric pain of cramping quality. Her chest pain occurs roughly three times per week, with a duration of up to fifteen minutes. Her heart palpitations occur daily, with associated dizziness during the episodes. The patient's social history is remarkable for tobacco smoking, one pack per day. She has a history of COVID-19 infection, once during the year 2019 and a recent episode in November 2022. On physical examination, the patient was noted to have koilonychia on the right upper and lower extremities, with visible longitudinal bands and flaking of the superficial layer of the nail.

## Discussion

Koilonychia is described as a “spoon-shaped” nail abnormality characterized by brittle, thin, concave nail dystrophy. It can be found in any age group, and it is often associated with severe, chronic iron deficiency that can be attributed to a myriad of causes, such as malnutrition, parasitic infections, malignancies, and more.

Treatment depends on the underlying source of the iron deficiency anemia and should resolve once the causative pathology is adequately addressed. With the relative rarity of koilonychia in developed nations, a thorough physical examination and clinical workup of patients is advised, as its presence may be an indication of a significant underlying pathology.



**Figure 1.** Top row of images illustrates central nail depression of the 1<sup>st</sup> - 4<sup>th</sup> digits of the right hand. Bottom row of images illustrates central nail depression in the 1<sup>st</sup> and 2<sup>nd</sup> digit of the right foot.

In the presented case, the patient endorsed frequent heartburn as well as difficulty with swallowing medications and food products, which warrants further workup for esophageal abnormalities. Barrett esophagus from chronic esophageal reflux can lead to esophageal adenocarcinoma with possible secondary achalasia as a potential explanation of both dysphagia and chronic occult bleeding. Another possible alternative may be Plummer-Vinson syndrome, which presents with iron deficiency anemia and esophageal webs that results in dysphagia. Coupled with the patient's history of tobacco smoking, esophageal squamous cell carcinoma could also serve as an alternative explanation for her symptom manifestation. Because koilonychia is significantly more prevalent in developing nations compared to developed nations, this patient's presentation is noteworthy both in its geographical location as well as its coincident symptomatology.

### Conclusion

Koilonychia is a concave nail dystrophy that occurs as a sequela of chronic, severe iron deficiency anemia. Manifestation of this disease is relatively infrequent in developed countries due to the accessibility and availability of iron in everyday dietary food options. Because of this, the presence of koilonychia in developed countries likely represents a more serious underlying pathology, warranting a more extensive and time-sensitive clinical evaluation.

### Teaching point

Patients presenting with koilonychia in developed nations should be evaluated for both nutritional and non-nutritional sources of chronic and severe iron deficiency

anemia.

### Next steps

The patient will undergo esophagogastroduodenoscopy and esophagogram to rule out Plummer-Vinson syndrome, esophageal squamous cell carcinoma, and esophageal adenocarcinoma.

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### References

1. Miller JL. Iron deficiency anemia: a common and curable disease. *Cold Spring Harb Perspect Med.* 2013;3(7):a011866. Published 2013 Jul 1. doi:10.1101/cshperspect.a011866
2. Rathod DG, Sonthalia S. Spoon Nails. [Updated 2023 Aug 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK559311/>
3. Moiz B. Spoon nails: still seen in today's world. *Clin Case Rep.* 2018;6(3):547-548. Published 2018 Jan 31. doi:10.1002/ccr3.1404