The visual evolution of atopic dermatitis: from 18th- and 19th-century historical illustrations to photography and AI-generated images

Arq Asma Alerg Imunol. 2024;8(4):431-4.
http://dx.doi.org/10.5935/2526-5393.20240059-en

Dear editor,

The Roman historian Suetonius (born about 69 AD) provided an important historical account of the Roman emperor Augustus (63 BC - 14 AD), in which he described not only signs of atopic dermatitis but also conditions such as asthma and rhinitis. His description includes the following observations: *"His body is said to have been marred by … a number of hard, dry patches suggesting ringworm, caused by an itching of his skin and a too vigorous use of the scraper at the baths."* He further noted that Augustus was subject to *"certain seasonal disorders: in early spring a tightness of the diaphragm; and when the sirocco blew, catarrh."* There seems to be no doubt that the combination of lichenified skin lesions, asthmatic symptoms, and rhinitis indicates an atopic predisposition.

The earliest depictions of atopic dermatitis date back to the 18th century, with numerous historical images available. Examples include those found in Robert Willan's book "On cutaneous diseases," published in 1798, the photographic illustrations in George Henry Fox's book "Photographic Illustrations of Skin Diseases," and images from the first dermatology encyclopedia, "Pratique Dermatologique," published in 1900. Coauthored by the renowned French physicians Ernest Henri Besnier, Louis-Anne-Jean Brocq, and Lucien Jacquet, this work is a landmark in the history of dermatology because of its scientific rigor and visual richness. With an extensive collection of detailed clinical descriptions and meticulous illustrations of skin diseases, this treaty was consolidated due to its interdisciplinary approach, addressing dermatology with clinical and aesthetic accuracy. The high-quality illustrations faithfully captured the characteristics of skin lesions, making them an indispensable resource for physicians, researchers, and students. This work significantly influenced diagnostic standards and the understanding of skin diseases throughout the 20th century.

Many clinical descriptions of diseases similar to what we now call atopic dermatitis have been meticulously documented in earlier treaties, including Thomas Carrere's publication from 1740. Since then, prominent figures such as Alibert and Rayer in France, Hebra and Neumann in Vienna, and Duhring and Fox in the United States have greatly contributed to dermatology by creating illustrated atlases with striking images of adults and children suffering from atopic dermatitis and other conditions then considered manifestations of "infantile eczema." These visual atlases have deeply influenced medical practice, providing health care professionals with an essential visual reference for diagnosing and understanding dermatological conditions.

Robert Willan (1754-1812) was a British physician pioneer in the dermatology field and renowned for his innovative and systematic approach to the study of skin diseases. He was the first to systematically classify dermatological conditions based on the visual characteristics of skin lesions. His work contained detailed color illustrations, being one of the first works to include visual representations of skin diseases. While atopic dermatitis is not explicitly mentioned, we propose examining an image Willan labeled "Strophulus confertus" (Figure 1), which depicts lesions suggesting infantile atopic dermatitis. Images of pediatric dermatological conditions from the 18th century are rare, making this particular illustration highly valuable due to its striking similarity to atopic dermatitis.

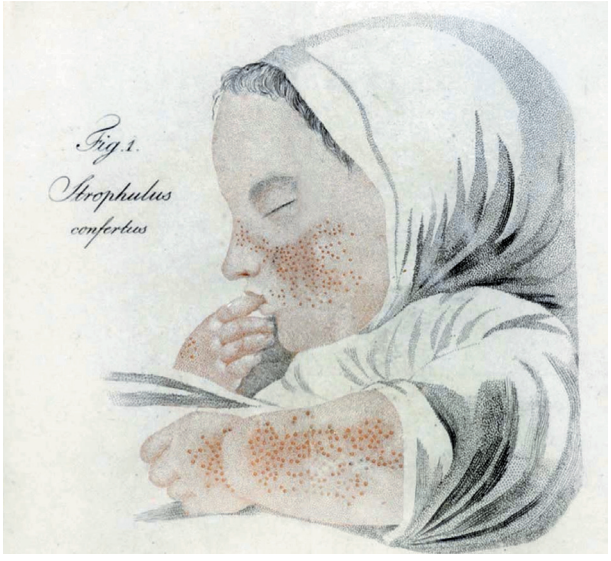

Figure 1
"Strophulus confertus", Robert Willan (1754-1812)

Louis Duhring (1845-1913) was a renowned American dermatologist and considered one of the founders of dermatology in the United States. A former professor at the University of Pennsylvania, Duhring is celebrated for his contributions to the study of skin diseases. His book "Atlas of Skin Diseases," published in 1876, features magnificent plates that are remarkable for their artistic quality and precise depiction of signs and symptoms. One particularly striking image portrays an infant with eczema, standing out as one of the most beautiful and medically accurate artistic representations of infantile eczema from the 19th century. The artist masterfully captured the elementary lesions typical of the disease, creating a portrait of impressive aesthetic beauty (Figure 2). Duhring referred to the condition as "Eczema rubrum," describing it as *"… male infant, one year of age. … the child was perfectly healthy at birth. The disease of the skin manifested itself during the second month, appearing as … reddish spots on either cheek. These became redder…. The disease now attacked the forehead…, likewise in the form of reddish patches…. The patches… were from the beginning accompanied by swelling, thickening of the skin, slight scaling, and considerable heat and itching. In the course of four of five weeks…, the patches becoming moist and discharging from day to day a sticky, honey-like, clear, pale-yellowish exudation which immediately dried, forming yellowish crusts. (…) The case before us may be viewed as representative of a large number of infantile eczemas. (…) The disease tends to become chronic, the process, as a rule, repeating itself from time to time in a more or less aggravated form. It may continue for months or for years. (…) The face may be the only region attacked, or, as often happens, other parts of the body may be involved at the same time. The causes of infantile eczema,…, are often obscure. (…), resulting very commonly from improper diet, …. In many instances, indeed, no cause can be assigned for the eruption beyond the existence of a predisposition to eczema, which may be either hereditary or acquired."* Another plate in the book illustrates eczema in an adult, capturing the subject's facial expression and gaze, which carry deep symbolism and convey the profound impact of the disease (Figure 3). The accompanying description reads: *"… an Irish laboring man, forty-five years of age. (…) The skin of the face is everywhere dry and has a harsh feel."*

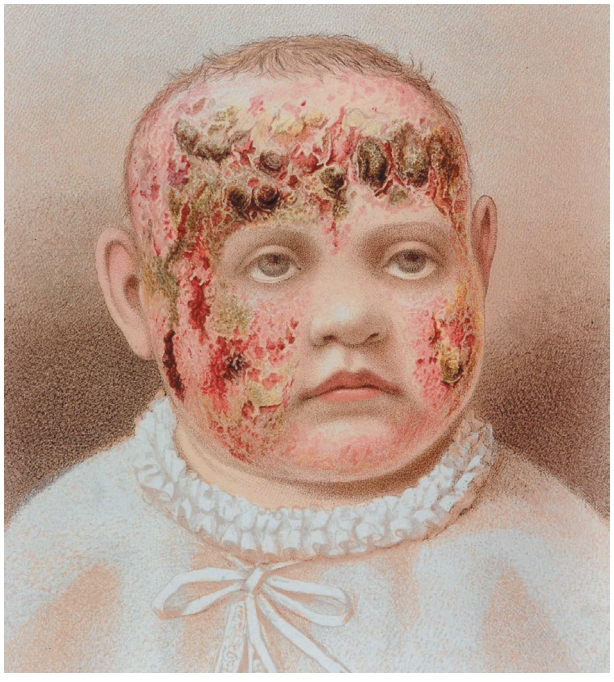

Figure 2
"Eczema rubrum", Louis Duhring (1845-1913)

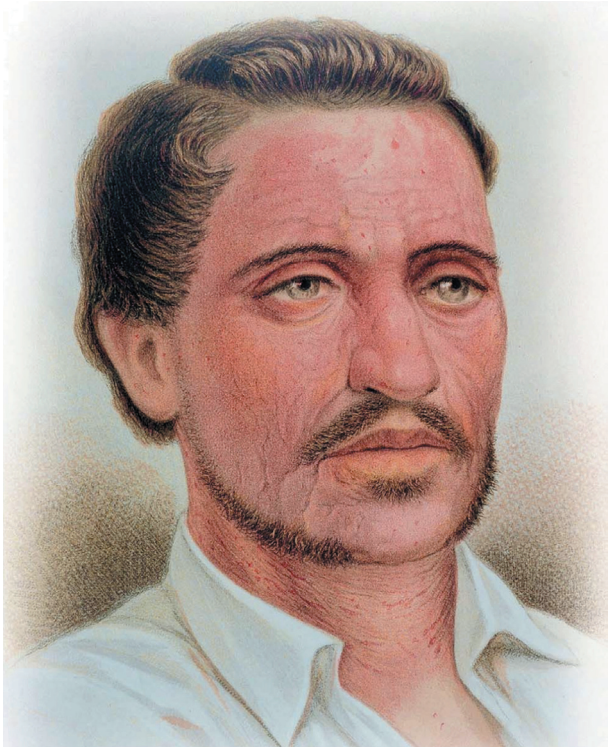

Figure 3
45-year-old man presenting with dry, harsh skin in all facial areas, Louis Duhring (1845-1913)

George Henry Fox (1846-1937) was a prominent American dermatologist who published "Photographic Illustrations of Skin Diseases" in 1880. This work was among the first to use actual photographs to document

and illustrate skin diseases, a significant innovation at the time. The book features detailed images of several dermatological conditions, capturing the visual characteristics of lesions more accurately than the drawings and illustrations previously used. This marked an advance in the study and diagnosis of skin diseases, making their representations more accessible and faithful to clinical reality. One particularly striking image in the book is a photograph of a sleeping baby. Although originally black and white, Fox painted the child's face red to highlight crusts and wounds, making the intense inflammatory process more evident. This image captures a rare moment of lightness and rest for the baby, who was likely suffering intensely from the disease (Figure 4).

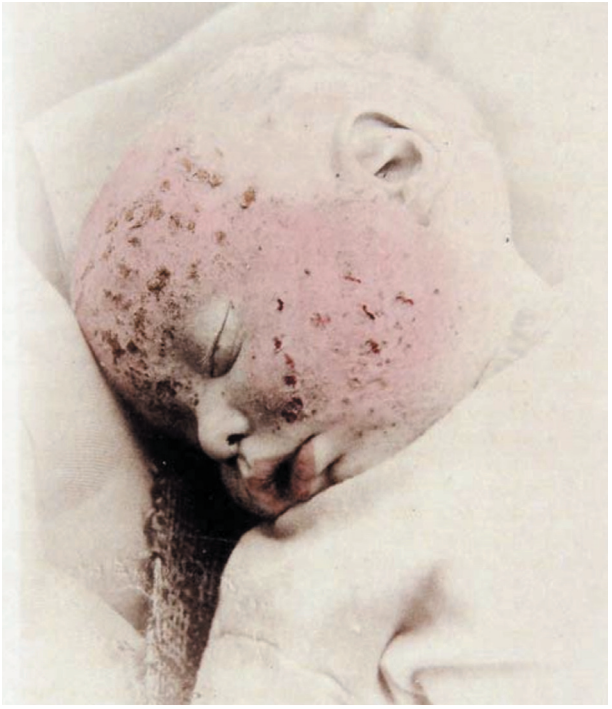

Figure 4
"Photographic Illustrations of Skin Diseases", George Henry Fox (1846-1937)

Historically, a series of color illustrations, lithographs, and black and white photographs have depicted the signs and symptoms of atopic dermatitis with increasing accuracy, often within high-quality artistic representations. By the early 20th century, the clinical presentation, progression, and heredity of the disease were well established, paving the way for a new era of research into its pathophysiology and treatment in the following decades.

Currently, artificial intelligence (AI) is playing an increasingly crucial role in medicine. Especially in dermatology, it provides innovative tools for the diagnosis, treatment, and investigation of skin diseases. AI can analyze vast amounts of clinical data and images, identifying patterns that might go unnoticed by the human eye. This technology not only improves the accuracy of dermatological diagnoses but also enables the generation of illustrations and photographs that simulate various skin diseases, such as atopic dermatitis. The ability of AI to reproduce realistic images has significant implications for several areas, including clinical research, medical education, and the training of health care professionals. For example, creating detailed visual representations of diseases allows students and professionals to learn how to identify clinical characteristics more effectively, thereby improving their diagnostic skills. Furthermore, AI can be used to develop predictive models, which are helpful in assessing prognosis and personalizing treatment.

Figure 5 displays an AI-generated image created in ChatGPT, based on a prompt to reproduce severe atopic dermatitis in a child. This representation is a valuable educational resource, allowing physicians and researchers to visualize and discuss the clinical and aesthetic aspects of the disease, which promotes a better understanding of patients' experience. With the continuous advancement of AI, this technology is

Figure 5
Artificial intelligence-generated image: severe atopic dermatitis in a child

expected to transform medicine by facilitating access to faster and more accurate diagnoses, enhancing medical education, and ultimately improving patient outcomes. Despite these benefits, close attention must be given to the correctness and reliability of the skin lesions represented. It is crucial to remember that a careful clinical examination and a detailed medical history remain our essential working tools and should never be undervalued, even with the introduction of these powerful technologies in medical practice.

The visual evolution of atopic dermatitis, from early medical illustrations to current AI-generated images, demonstrates a significant shift in both available techniques/technologies and our understanding of the disease over time. Historically, illustrations and photographs have effectively captured patients' experience and contributed to our knowledge, while current innovative visual tools offer new perspectives for diagnosis and treatment. This journey in visual representation not only chronicles the historical advancements in medicine but also reflects our ongoing commitment to empathy and to better understanding the conditions that impact patients' quality of life.

References

1. Willan R. On cutaneous diseases. London: J Johnson; 1808. [The first part was published in 1798, and the 1808 edition unites the first 4 parts].
2. Cribier B. Dermatite atopique: images historiques. Ann Dermatol Venereol. 2017;144:S2-S13.
3. Duhring LA. Atlas of Skin Diseases. Philadelphia: Lippincott; 1876.
4. Fox GH. Photographic Illustrations of Skin Diseases. New York: EB Treat; 1880.
5. Liopyris K, Gregoriou S, Dias J, Stratigos AJ. Artificial intelligence in dermatology: challenges and perspectives. Dermatol Ther. 2022 Oct 28;12(12).
6. Mier PD. Earliest description of the atopic syndrome? Br J Dermatol. 1975 Mar 1;92(3):359-69.
7. Wallach D, Coste J, Tilles G, Alain Taïeb. The first images of atopic dermatitis: an attempt at retrospective diagnosis in dermatology. J Am Acad Dermatol. 2005 Oct 1;53(4):684-9.
8. OpenAI. ChatGPT [Internet]. San Francisco: OpenAI; 2024. Available from: https://chat.openai.com/. Accessed on Oct 26 2024.

No conflicts of interest declared concerning the publication of this letter.

Bruno Emanuel Carvalho Oliveira
Instituto de Alergia de Natal, Alergia e Imunologia Clínica - Natal, RN, Brazil.