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Contact dermatitis: a historical perspective

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Summary Contact dermatitis is a common skin condition that can have a considerable impact on patient quality of life and function. Historically, contact dermatitis has played a significant role in the evolution of dermatology as the understanding of a relationship between environmental exposure and specific skin disease became more widely accepted. Reports about this relationship can be found throughout the history of humanity, thousands of years ago. The Egyptians were perhaps the first to document this relationship in ancient history, and documentation has also been found in several other cultures and nations such as the Chinese, Indians, Europeans, and American colonizers. The patch test emerged over a century ago and has remained a powerful tool for diagnosing and directing patients. This paper provides historical and curious facts about contact dermatitis.

Keywords Inflammation · Eczema · Hypersensitivity · Patch test · Skin

Contact dermatitis is a common skin condition that can be characterized by both acute and chronic inflammatory reactions following exposure to a particular substance. Typically, this condition has been designated as either allergic or irritant related; however, in this article it will be referred to collectively as contact dermatitis. Symptoms may include pruritus, redness, cracks and dryness, edema, vesicles and bullae, and pain. If symptoms persist chronically, lichenification and scaling may be present. The lifetime weighted average prevalence of contact dermatitis is 19.5% [1], and it can have a significant impact on the quality and functionality of life of patients. Not surprisingly, this common skin condition has been identified and discussed throughout history. The first recorded reports of skin disease related to external agents date to ancient history, most likely by the Egyptians [2, 3], although other cultures have also reported this association. In more recent history, several physicians

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have described the association between occupation and environmental exposures to skin disease. In addition, much has been studied about its diagnosis and treatment, thus, leading to the development of the patch test, which remains a useful diagnostic tool in modern medicine. This article presents a brief review of the history and curiosities of contact dermatitis.

Contact dermatitis is an eczematous disorder caused by direct skin contact with environmental agents, which is classified as allergic or irritant contact dermatitis. It has been described throughout the history of humanity and remains a burden for many patients worldwide. The first written accounts of what most likely was contact dermatitis were found in the papyri of ancient Egypt [2], in which accounts of skin conditions were described and categorized along with interventions of the time. This link between environmental exposure and skin disease can be backtracked thousands of years. Around 3000 years ago, the Egyptians, as already mentioned, associated the exposure to plants such as the bishop's weed (Ammi visnaga) and sunlight to skin problems [4]. In addition, it was reported in India in 1400 BCE that direct contact with some plants such as croton (Codiaeum species) and scurf pea (Bhavachee) was associated with dermatitis. During the first century, Cayo Plinio Cecilio Segundo related the work with pine trees to itching [5, 6], giving a historical perspective of environmental agents causing skin disease. However, it was not until the era of Hippocrates (460–377 BCE) that a documented hypothesis linked environmental exposure and skin disease [2]. Centuries later, a major contribution to medicine and surgery was made by Aulus Cornelius Celsus in his work *De Medicina* [7]. Regarded as a literary and a medical treasure *De Medicina* (or *De Re Medica*) also made great contributions to what would become the field of dermatology, particularly Book VI. He described multiple skin diseases and emphasized the varying appearances of each. The attention to detail given was thought to have helped to attribute a more natural etiology (i. e., cause and effect) versus a supernatural one [2], perhaps providing a glimpse of the emotional impact of the cutaneous disease. In the 17th and 18th centuries the Italian scientist Bernardo Ramazzini identified an important correlation with the occupation of a patient and the pattern of their disease [2, 5], which is an important concept that holds true today. The following years saw many reports of eczema-inducing materials (e.g., sugar, lime, flour) such that Charles Turner Thackrah, a physician in England, compiled the book *The effects of arts, trades and professions on health and longevity*. Also during the colonization of North America in the 17th century, a great contribution to this field was made by the Captain John Smith, who described a plant, which by direct contact with the skin caused signs and symptoms similar to what nowadays encompasses allergic contact dermatitis [4]. He was the first to describe this poisoned weed as "poison ivy", a name which is use currently to describe the plant Toxicodendron radicans. This plant and its effects on the skin were also described by other doctors such as the Dutch physician J.P. Cornut (17th century) or the Spanish explorer F.X. Clavijero in the book *Historia de la California* from 1789 [4, 8].

The English physicians Robert Willan and Thomas Bateman made a significant contribution to this field by attempting to morphologically describe contact dermatitis and reported cases of contact dermatitis in shoe makers due to wax and hand dermatitis due to laundry [2]. Other European physicians such as the French Pierre Louis Alphee Cazenave made a significant contribution by first trying to classify contact dermatitis as acute or chronic [9]. Attempts to find diagnostic methods were made by the chemist Städeler who described in 1847 the well-known Städeler blotting-paper strip test [5, 6].

With greater knowledge of the prevalence of what we now refer to generally as contact dermatitis, the Austrian scientist Ferdinand von Hebra embarked into etiologic research and demonstrated that croton oil applied to normal skin caused eczematous dermatitis. Stemming from this work, the German dermatologist Josef Jadassohn developed the patch test and presented his results in 1895, a major milestone in the field [2].

The patch test continues to be an essential diagnostic tool and has changed how dermatologists approach contact dermatitis. Despite this fact, there are many aspects of contact dermatitis that are not fully understood. The central debate pertains to the patch test and, more specifically, on who should be tested [10]; other questions involve criteria for referral, scoring, and variability among operator use. Another aspect to consider is that the number of known allergens or irritants tallies in the thousands, and as a result approaching the work-up may be daunting for some [11]. Standard options for patch testing exist, such as the United States Food and Drug Administration's Thin-Layer Rapid Use Epicutaneous Test (TRUE Test); however, although convenient, the number and selection of allergens has been criticized as it is a set standard, highlighting the importance of history taking and tailoring patch tests to the individual [11].

Beyond the patch test, there are curiosities surrounding specific irritants and allergens. For example, the sensitizer of balsam of Peru, a common allergen with multiple components, has yet to be determined. Identifying the inciting component has proven a challenge, as multiple studies have demonstrated varying results with little explanation for the discrepancies [12]. Some materials blend the line of skin irritant and contact allergen, such as benzalkonium chloride, while others have been debated as to their true allergenicity, for example, cocamidopropyl betaine (found in cosmetics and personal hygiene) or lanolin (used in medicinal and skin care) [12].

Conclusion

Contact dermatitis remains one of the most common skin conditions and represents the most common cause of occupational skin diseases. An excellent diagnostic tool (i. e., the patch test) exists and has remained relevant for over 100 years. Furthermore, contact dermatitis has a rich history, ranging from papyri of ancient Egypt to modern medicine, and is tied to the evolution of the field of dermatology. Investigations into contact dermatitis will continue to shape the field of dermatology.

Conflict of interest C. Enos, M. Fioranelli, K. França, D. Castillo, T. Lotti, U. Wollina, and M.G. Roccia declare that they have no competing interests.

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