

# Erupting tattoos: a case report

## Abstract

Koebner phenomenon is the development of isomorphic, pathologic lesions to traumatized skin of patients with a history of psoriasis. Heinrich Koebner, a German dermatologist, first described this phenomenon in 1872. With the evolving popularity of tattoos, which causes mechanical injury to the skin, much discussion will be required to disseminate relevant information, regarding Koebner phenomenon in obtaining an accurate clinical diagnosis.

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## Case presentation

A 42-year-old female presented at a walk-in clinic with erythematous, scaly plaques over a recently acquired tattoo on her lower back. The plaques erupted approximately 10 days after receiving a tattoo. Patient is otherwise healthy except for a chronic issue with scalp psoriasis over the past 10 years. General physical examination was within normal range. Skin exam revealed multiple, well defined erythematous lesions 1-4 cm in diameter, covered by thick silvery scales over a tattoo on lower back. Several satellite skin lesions, with the same characteristics, were noted bordering the tattoo. Patient's subjective complaints included mild pruritus with occasional pain. Differential diagnoses included symptomatic contact dermatitis, lichen planus and psoriasis. However, the patient's history of recent acquired tattoo raises the possibility of Koebner phenomenon.

## Pathophysiology

Koebner phenomenon can be observed in relation to various disorders, an example being the presence of a medical record of psoriasis; and can be identified by the new development of isomorphic lesions of the skin that is mechanically stimulated or injured.<sup>1</sup> The time period from stimulation of skin to lesion development can vary but usually ranges from 10 to 20 days<sup>2</sup> and in 20-76% of patients with a history of psoriasis Behranwala & Gui, 2002 as cited by Alolabi N,<sup>2</sup> Koebner response may follow mechanical or thermal trauma, dermatoses, and irritant reactions. Numerous provoking factors have been reported including physical trauma, burns, insect bites, surgical incisions, recent vaccines, allergic and contact dermatitis, radiation exposure, tattoos and acupuncture procedures<sup>3</sup> Both the epidermis and dermis need to be involved in the injury for Koebner phenomenon to develop.<sup>2</sup>

The specific mechanism underlying Koebner phenomenon involves the nerve growth factor (NGF), synthesized in the skin, which specifically influences the key pathological events of psoriasis. The NGF begins a cascade of keratinocyte proliferation leading to angiogenesis and T-cell activation concluding in the development of psoriatic lesions. A study was conducted, traumatizing skin with tape stripping, which observed an elevation of NGF resulting 24 hours after trauma. The clinical appearance of psoriasis emerged two weeks after tape stripping and peak NGF levels coincided with the dermatosis.

Evidence of NGF elevation is suggestive that it plays a critical role in the pathophysiology of psoriasis, which is required for initiation and perpetuation of Koebner phenomenon.<sup>4</sup>

## History

In 1872, a German dermatologist, Heinrich Koebner, first introduced this phenomenon describing the appearance of psoriatic lesions in uninvolved skin areas which had a history of dermatosis.<sup>5</sup> An article published in 1956 by an Italian dermatologist, L. Nardelli, noted erythematous areas appeared after various reported skin traumas and seemed to occur more in the winter, correlating with the seasonal characteristic of psoriasis Nardelli, 1956 as cited by Medeiros dos Santos Camargo C.<sup>6</sup> Taking into consideration literature review regarding Koebner phenomenon, this patient's history of dermatosis, along with recent mechanical injury of a tattoo, leads to a clinical diagnosis of Koebner phenomenon or tattooed induced psoriasis.

## Gap of knowledge

Although limited, there have been some cases reporting the occurrence of Koebner phenomenon after obtaining a tattoo.<sup>5</sup> The expanding popularity of tattoos is seen among adults of all ages. Some use it as a fashion statement where others acquire them as a mode of identity formation.<sup>7</sup> Tattoos are now considered a part of social transformation and body art is touted as mainstream culture.<sup>7</sup> With the evolving popularity of tattoos, much discussion will be required to disseminate relevant information regarding Koebner phenomenon in obtaining an accurate clinical diagnosis. This is extremely relevant in order to guide primary care providers and dermatology specialists to avoid the use of further irritants, such as biopsies or chemical agents that can worsen the patient's condition.

## Management

According to the American Academy of Dermatology Association Guidelines of Care for psoriasis, evidence supports the use of topical treatments, phototherapy, traditional systemic agents and biological therapies for the treatment of psoriasis. Topicals and targeted phototherapy is prescribed for limited disease, whereas extensive disease may require systemic and biologic treatments.<sup>8</sup> In this case report, the patient was treated with calcipotriene/betamethasone dipropionate topical ointment once a day up to 4 weeks. Treatment

should not exceed 30% of body surface area and it is not to be used on the face, axillae or groin. Generally, patients with a history of dermatosis and Koebner phenomenon should weigh the potential of inducing new lesions with the desire to express themselves through body art.

## Acknowledgements

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## Conflict of interest

The author declares no conflict of interest.

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