

## Reverse Koebner Phenomenon Following Conservative Treatment of a Tibial Fracture

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**Abstract:** *The reverse Koebner response or the sparing phenomenon is the non-appearance or disappearance of the skin lesions in patients suffering from psoriasis following cutaneous injury. This paper reports a reverse Koebner phenomenon referring to the complete clearing of the psoriatic skin lesions from the leg of a 63-year-old man following conservative treatment of a tibial fracture.*

### INTRODUCTION

Psoriasis is a chronic autoimmune disease characterized by patches of abnormal skin that may vary in severity from small and localized to complete body coverage. Skin injury can either trigger psoriatic changes at the uninvolved skin that is referred as Koebner phenomenon or clear psoriatic changes that is called reverse Koebner reaction [1]. The latter is a very rare condition with a very limited number of reported cases.

The patient presented in this report developed the reverse Koebner phenomenon referring to the complete clearing of the psoriatic skin lesions from his leg after conservative treatment of a tibial fracture.

### CASE REPORT

A 63-year-old man presented to the emergency department, in June 2007, after falling down three stairs. He complained of pain and inability to bear weight on the right tibia. The patient was a healthy appearing white male with normal vital signs. He reported an over 30-year history of psoriasis. On examination, the psoriatic skin lesions were present on the extremities, abdomen, flanks and lower back. Psoriatic lesions were widespread and equally distributed on both lower legs with a similar morphology and arrangement. Routine blood and serum chemistries were within normal limits. Plain radiographs revealed a nondisplaced spiral fracture of the right tibial diaphysis. The fracture was treated conservatively in a long leg plaster of Paris cast. Tibial alignment was checked radiographically at regular intervals. No change of cast was necessary post-injury. At 3.5 months following the injury the cast was removed to check fracture healing. Conspicuously, the right leg was completely spared of psoriatic lesions. A below the knee posterior plaster splint was applied for a further 3-week interval. After removal of the splint the extent of the psoriatic lesions on his lower extremities was evaluated. New psoriatic lesions were evident on the whole right leg that were more pronounced above the knee, although their extent was still significantly less than on the left lower limb (Fig. 1). The patient reported no use of topical or systemic treatment of psoriasis either pre or post-injury. Partial weight bearing was then started and increased to full weight bearing after 3 weeks. The tibial fracture finally healed uneventfully. Assessment of the psoriatic skin lesions on both lower extremities showed equal distribution, morphology and arrangement on the 6-month post-injury follow-up.

### DISCUSSION

The Koebner phenomenon or the isomorphic response involves the appearance of skin lesions in the uninvolved skin of psoriatic patients after mechanical, thermal, chemical or biological traumatic insults such as surgical wounds, acupuncture, injections, use of adhesives, burns, tattoos and insect bites [2, 3]. It may also follow non-penetrating trauma, such as stretching, friction, compression and vibration, allergic or irritant reactions, and therapies or dermatoses [4]. The pathogenesis may involve

cytokines, stress proteins, adhesion molecules and autoantigens [5]. There are only few reports of the Koebner phenomenon in the world literature. Furthermore, the reverse Koebner or sparing phenomenon that includes the clearing of psoriatic skin lesions in previously affected sites is a considerably rarer entity. It has been described in psoriatic and vitiligo patients following surgery, electrodesiccation, sandpaper abrasion and infections [6], as well as over tattooed skin, over a polio-affected limb and at the site of biopsy in a case of vasculitis [7-9].



**Figure 1.** Clinical appearance of the patient. Psoriatic lesions completely spared the right leg following cast removal, 3 weeks ago. Note that new lesions have appeared, even below the knee, on splint removal.

The case presented in this report indicates that the sparing of the immobilized, in plaster cast, leg from the psoriatic skin lesions could be due to the reverse Koebner phenomenon. The cast application technique was typical, with velband bandaged around the leg and followed by plaster of Paris cast. The degree of similarity with the case presented by Yadav et al. [9] that was also covered by pressure bandage should be readily considered, despite the authors' view that vasculitis could be involved in the pathogenesis. Further research is needed to evaluate potential sparing of the psoriatic skin lesions following upper or lower limb immobilization in casts, splints and elastic bandages. The method of application using a stockinette or soft cotton padding should also be defined. The period of coverage seems also to be an important parameter. That was indicated in the presented patient by the presence of new psoriatic skin lesions below the knee following removal of the below the knee posterior plaster splint. Finally, the response of psoriatic patients should be evaluated to delineate any differences in the response property.

Although the pathogenesis of the reverse Koebner response in psoriatic patients is still obscure, the potential clinical appearance of the sparing phenomenon in patients treated for orthopaedic traumatic disorders may be proved valuable for the investigation of this rare topic and, furthermore, for the development of the psoriatic skin lesions.

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