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# From squats to spots: vitiligo koebnerization triggered by powerlifting

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To the Editor:

The Koebner phenomenon (KP), also known as the isomorphic response, plays an integral part to the persistence, progression, and relapse of vitiligo [1-3]. The incidence of KP has been reported in 21-62% of vitiligo patients and its presence may indicate progressive disease, lower response to therapy, higher affected body surface area, and earlier age of onset [1-5]. In vitiligo, KP is more likely to occur in body areas subjected to friction and pressure [3]. This mechanism may be overlooked by providers, leading to delayed recognition [3]. We present a novel mechanism of KP in a vitiligo patient related to the friction and pressure from barbell use in the sport of powerlifting.

A 32-year-old man with a 17-year-history of generalized vitiligo presented to clinic for follow-up. Initially, he experienced depigmentation of the hands, which later spread to the face, trunk, flexural extremities, and dorsal feet over 10 years. The areas responded poorly to topical tacrolimus 0.1% ointment twice daily on the face and alternating days of clobetasol 0.05% cream with tacrolimus on the hands and body. The addition of bi-weekly narrow-band ultraviolet B (nbUVB) phototherapy resulted in stabilization and modest re-pigmentation of the affected areas over the ensuing 7 years. However, he noted that four years ago, he had new depigmented patches refractory to nbUVB treatment on his shins, upper back, and anteromedial thighs. He reported starting powerlifting two years prior to the onset of these patches. His lifting routines included barbell back-squatting approximately 350 pounds three

times weekly and barbell deadlifting in both the conventional and "sumo" styles once weekly.

Physical examination of newly affected sites showed sharply demarcated, depigmented coalescing macules and patches with fluorescence under Wood lamp. He confirmed that the barbell typically rested over the depigmented areas on the upper back when squatting (**Figures 1A, B**). When raising the barbell from the ground while deadlifting, he noted his fingernails and the barbell rubbed over the depigmented areas on the shins and thighs despite wearing compression shorts (**Figure 1C**). Based on the distribution and onset of depigmentation, these patches were attributed to koebnerization from powerlifting. He preferred to continue his current treatment, so was congratulated on his active lifestyle and encouraged to wear more protective



**Figure 1. A)** Symmetrical bilateral depigmented patches on the upper back correspond to the areas where the barbell rests during back squat exercises. **B)** Barbell imprint corresponding with areas of depigmentation on the upper back approximately two hours after completing back squat exercises. **C)** Patchy depigmentation on the anteromedial thighs and shins corresponding to areas of friction during the eccentric and concentric phases of the barbell deadlift.

clothing when lifting to mitigate the risk of cutaneous pressure and friction.

Although calluses and abrasions frequently develop at sites where sports equipment is used, instances of koebnerization as an initial or subsequent disease manifestation at high-impact sports-related locations is not well described [3,6]. Noteworthy is the absence of reports concerning triggers related to powerlifting or other sports in a recent comprehensive review of published KP triggers in vitiligo [3].

The timing of our patient's new lesions aligns with reports of clinically evident KP occurring several months after an inciting event [3]. In a back squat, the lifter holds the bar horizontally across the shoulders and bends his/her knees and hips until the thighs are lower than the top of the knees before reversing to an upright position [7]. In psoriasis, a study noted that the duration, area, depth, and width of trauma impacted the extent of KP lesions [3]. This may be particularly important in our patient with vitiligo given that he squatted heavy weights at high volumes [3]. When deadlifting, the lifter bends at the knees and hips to grip the bar, which lays horizontally in front of their feet [7]. He/she then lifts the bar from the ground to the upright position [7]. The bar typically rests at the hip crease of the mid/lower thighs, occasionally grazing the shins and lower thighs when the weight is lifted or returned to the ground [7]. Both the concentric and eccentric phases of the exercise likely contributed to the distribution of our patient's depigmentation along the thighs and shins.

Lesions of KP are treated similarly to primary lesions, as both share pathogenic mechanisms associated with tissue insult [1,3]. Topical therapies, such as corticosteroids, calcineurin inhibitors, and Janus kinase inhibitors, work to reduce the underlying inflammatory infiltrate [8]. Phototherapy helps stabilize the redox balance, decreases cytokine expression, and induces T cell apoptosis [8]. In koebnerized vitiligo, oxidative stress emerges as a multifaceted factor. Trauma-induced free radicals likely alter cell adhesion and lead to cell death [1,3,8]. This interplay may explain why our patient's KP-induced patches were partially responsive to nbUVB.

Although thicker clothing and/or bar pads have the potential to diminish overall friction, the report of koebnerization from prolonged mask use questions the effectiveness of such measures to protect against depigmentation [5,9]. Although exercise's beneficial effects on physical and mental health are undisputable and likely improve the psychosocial impact of cutaneous disease, it is imperative that patients and providers be aware that these activities may contribute to disease progression. Determining patient-specific sources of trauma, accomplished through careful history and examination, is of pivotal importance. This process aids in identifying causative factors, reducing vitiligo-associated morbidity, and identifying patients with progressive and/or refractory disease [2,3].

## Potential conflicts of interest

The authors declare no conflicts of interest.

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