

## Pitted keratolysis\*

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DOI: <http://dx.doi.org/10.1590/abd1806-4841.20164096>

**Abstract:** Pitted keratolysis is a skin disorder that affects the stratum corneum of the plantar surface and is caused by Gram-positive bacteria. A 30-year-old male presented with small punched-out lesions on the plantar surface. A superficial shaving was carried out for scanning electron microscopy. Hypokeratosis was noted on the plantar skin and in the acrosyngium, where the normal elimination of corneocytes was not seen. At higher magnification (x 3,500) bacteria were easily found on the surface and the described transversal bacterial septation was observed.

**Keywords:** Microscopy, electron, scanning; Skin; Skin diseases, bacterial

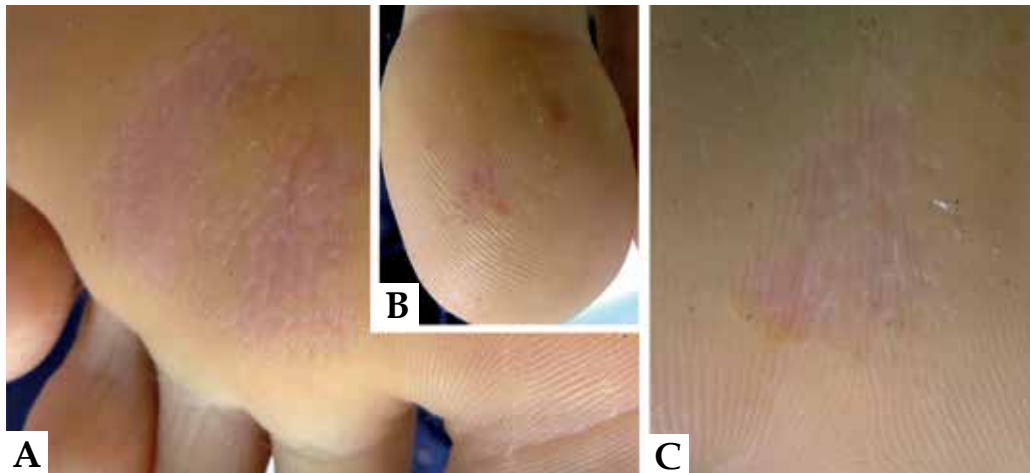
### INTRODUCTION

Pitted keratolysis (PK), also known as keratolysis plantare sulcatum, is a skin disorder that affects the stratum corneum of the plantar surface. It is caused by Gram-positive bacteria that may show filamentous and coccoid structures.<sup>1</sup> Responsible agents include *Corynebacterium sp.*, *Micrococcus sedentarius*, and *Dermatophilus congolensis*. All these bacteria open small tunnels in the stratum corneum.<sup>2</sup>

We describe the scanning electron microscopy (SEM) findings of a case of PK.

### CASE REPORT

A 30-year-old male farmer with alopecia areata was being treated with topical anthralin. Two weeks before, during a follow-up evaluation, he noticed the appearance of lesions on his feet. On examination, small punched-out lesions were noted on the plantar surface of the left halux and larger erosions were seen in the metatarsal region of both feet (Figure 1). Culture identified *Corynebacterium sp.*



**FIGURE 1:** Punched-out lesions on the plantar surface of the left halux (**B**); larger erosions in the metatarsal region (**A** and **C**)

Received on 07.08.2014

Approved by the Advisory Board and accepted for publication on 04.12.2014

\* Study conducted at the Universidade Federal de Pelotas (UFPel) – Pelotas (RS), Brazil.

Financial Support: None.

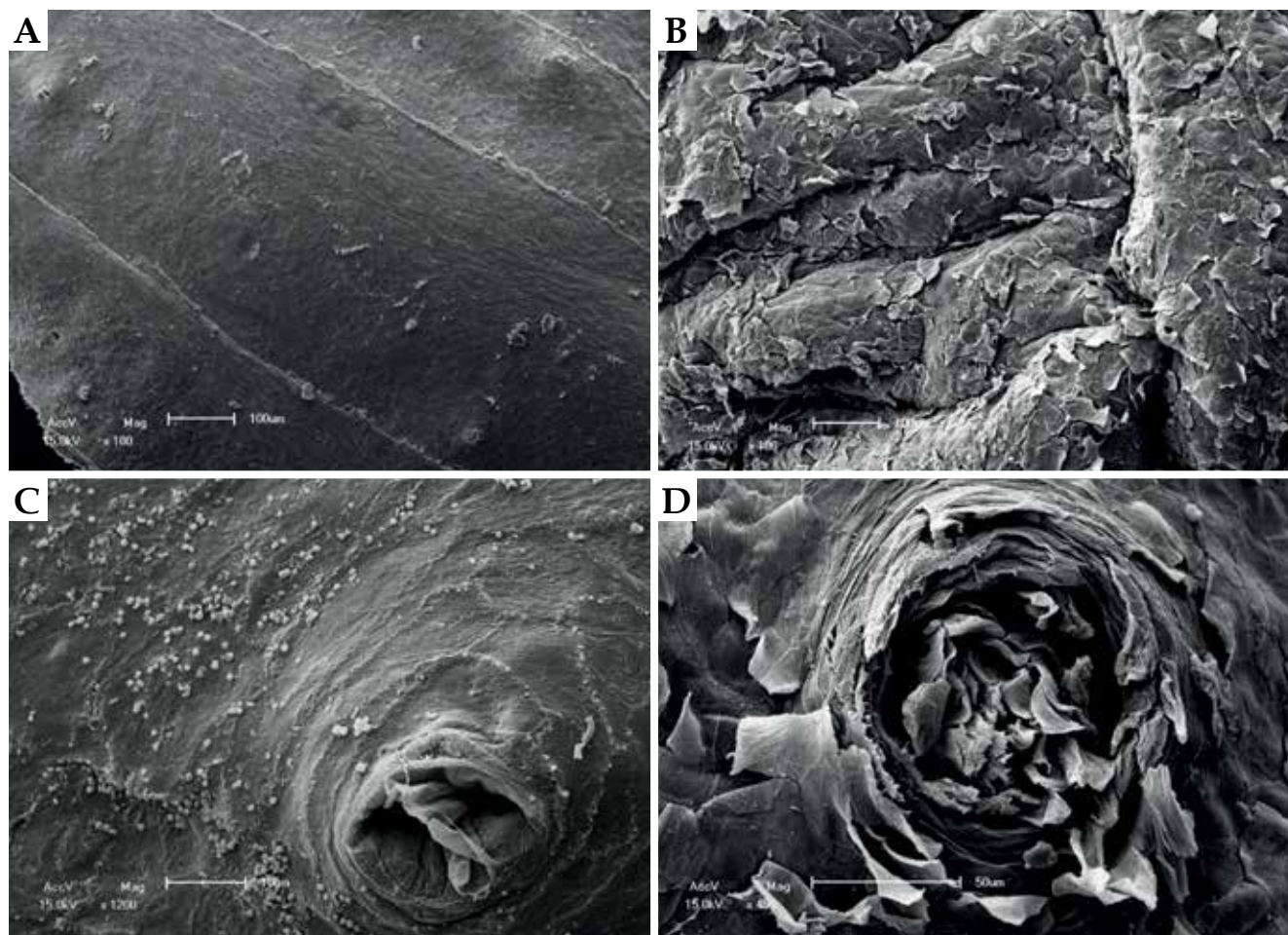
Conflict of Interest: None.

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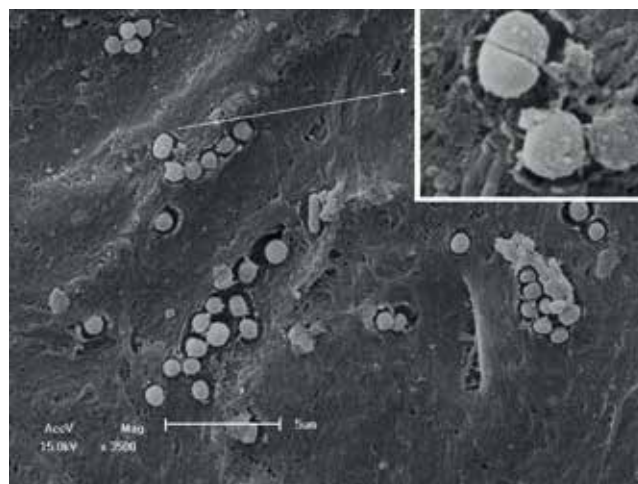


**FIGURE 2:** Scanning electron microscopy - A. decreased horny layer (x 100) with absence of the regular elimination of corneocytes B. normal plantar skin with corneocytes (x 100). C. hypokeratosis in the acrosyringium (x 1,200) D. normal skin with the presence of corneocytes arranged in a circular manner in the acrosyringium (x 450)

Specimens of the epidermis (from both lesional and perilesional skin) were collected by superficial shaving of the lesion. They were cut with a surgical blade and routinely prepared for scanning electron microscopy.

Analysis at small magnification revealed a decreased horny layer with absence of the regular elimination of corneocytes, as seen in the normal plantar skin (Figure 2). Examination of the acrosyringium also showed hypokeratosis, differently of the presence of corneocytes arranged in a circular manner in the acrosyringium of the normal skin (Figure 2).

At higher magnification (x 3,500), bacteria were easily found on the surface and the described transversal septation was observed (Figure 3). In addition, the tunnels opened by the bacteria in the stratum corneum could be better seen in other areas (Figure 4).



**FIGURE 3:** Scanning electron microscopy - coccoid bacteria found on the plantar surface (x 3,500) with detail of the transversal septation (inset x 10,000)

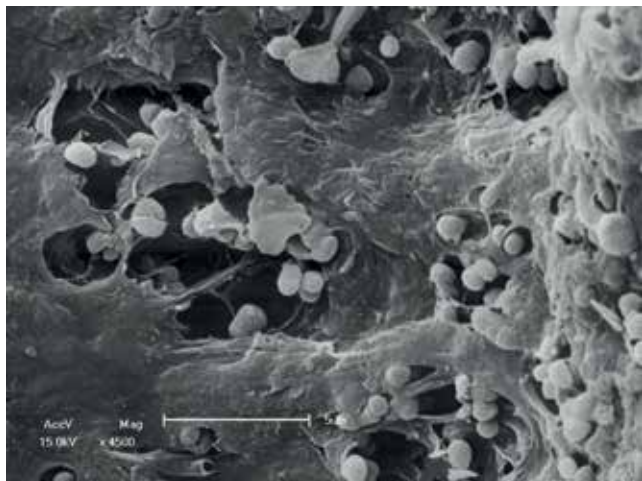


FIGURE 4: Scanning electron microscopy- tunnel openings with bacteria in the stratum corneum (x 4,500)

## DISCUSSION

Concurrent corynebacterial diseases (i.e. erythrasma, trichomycosis axillaris, and pitted keratolysis) have been reported, which suggests that corynebacterium is an important etiologic agent of all three disorders.<sup>3,4</sup>

The primary change of the pitted keratolysis is the secondarily absent or diminished stratum corneum. This finding was also demonstrated in our ultrastructural examination, which showed hypokeratosis on the plantar surface and in the acrosyringium.<sup>2</sup> Clinically, the lesions are crater-shaped pits that coalesce to form erosive areas of irregular shapes and varying sizes, as reported in this case. It is usually asymptomatic and may be accompanied by bromhidrosis and burning.<sup>1,5,6</sup>

Humidity is an aggravating factor, often caused by or associated with hyperhidrosis. It is common in athletes and workers who wear rubber boots for long periods.<sup>5,6</sup> The prevalence among workers in the dairy industry was estimated in 10%.<sup>7</sup> The treatment is based on topical antibiotics such as clindamycin, erythromycin, fusidic acid and mupirocin, and foot humidity should be avoided, if possible.<sup>5,8</sup> Systemic antibiotics can be also prescribed, especially for resistant cases.<sup>2</sup> □

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**How to cite this article:** Almeida Jr HL, Siqueira RN, Meireles RS, Rampon G, Suita de Castro LA, Marques e Silva R. Pitted keratolysis. *An Bras Dermatol.* 2016;91(1):106-8.