



# Pigmentación violácea dolorosa, reto clínico y enfoque diagnóstico en un país tropical

## *Painful violaceous pigmentation, a clinical challenge and diagnostic approach in a tropical country*

Oscar Fabián Rojas-Gómez<sup>1,2</sup>, Natalia Delgado-Ortiz<sup>3,4,5</sup>, Adriana Zamora-Suarez<sup>3,5,6</sup>, Álvaro Eduardo Mondragón-Cardona<sup>1,3,5</sup>, Freddy Escobar-Montealegre<sup>3,4,5</sup>, Carlos Eduardo Jiménez-Canizales<sup>1,3,5</sup>

<sup>1</sup> Ibagué Saludable Research Group, Ibagué, Tolima, Colombia.

<sup>2</sup> ESE Unidad de Salud de Ibagué - San Francisco, Ibagué, Tolima, Colombia.

<sup>3</sup> Department of Internal Medicine, Faculty of Health Sciences, Universidad Surcolombiana, Neiva, Colombia.

<sup>4</sup> Department of Internal Medicine, Hospital Universitario Hernando Moncaleano Perdomo, Neiva, Colombia.

<sup>5</sup> Semillero de Investigación en medicina interna (SIMI), MI Dneuropsy Research Group, Universidad Surcolombiana, Neiva, Colombia.

<sup>6</sup> Department of toxicology, Hospital Universitario Hernando Moncaleano Perdomo, Neiva, Colombia.

### Correspondencia

Oscar Fabián Rojas-Gómez  
ofrojasg@ut.edu.co

Recibido: 12/01/2022

Arbitrado por pares

Aprobado: 09/05/2022

Citar como: Rojas-Gómez OF, Delgado-Ortiz N, Zamora-Suarez A, Mondragón-Cardona AE, Escobar-Montealegre F, Jiménez-Canizales CE. Painful violaceous pigmentation, clinical challenge and diagnostic approach in a tropical country. Acta Med Peru. 2022;39(2):190-2. doi: <https://doi.org/10.35663/amp.2022.392.2307>

Este es un artículo Open Access publicado bajo la licencia Creative Commons Atribución 4.0 Internacional. (CC-BY 4.0)



### RESUMEN

Contrario a lo que se cree, los milpiés no se consideran animales venenosos, su mecanismo de defensa puede resultar perjudicial para el ser humano, manifestándose como lesiones de carácter eritematoso, purpúrico y cianótico, concomitante dolor local y parestesia; Según la exposición, el cuadro clínico puede evolucionar a lesiones moderadas y severas, ampollas y úlceras. Describimos el caso de un paciente pediátrico de sexo masculino de la región andina de Colombia, con temperaturas diarias que oscilan entre 15° y 30°C y una humedad promedio de 72 %, quien accidentalmente pisó un milpiés, lo cual fue un desafío diagnóstico entre el personal de salud que generó su atención.

**Palabras Clave:** Venenos de Artrópodos; Benzoquinonas; Hiperpigmentación; Eritema; Colombia. (Fuente: DeCS-BIREME).

### ABSTRACT

Millipedes are not considered poisonous animals, although in some cases their chemical defense mechanisms may be deleterious for human beings, manifesting as erythematous, purpuric and/or cyanotic lesions alongside local pain and paresthesia. According to the exposure, the clinical condition may progress to moderate and severe lesions such as ulcers and blisters. We describe a case of a male child from the Andean region in Colombia, an area with daily temperatures between 15° and 30° C and 72% average humidity. The boy accidentally stepped on a millipede, and this occurrence became a challenge for its diagnosis amongst staff who provided emergency health care.

**Key words:** Arthropod Venoms; Benzoquinones; Hyperpigmentation; Erythema; Colombia. (Source: MeSH-BIREME).

## INTRODUCTION

*Myriapoda* is a subphylum of arthropods containing four classes: *Chilopoda* (centipedes), *Diplopoda* (millipedes), *Paupoda* (pauropods) and *Symphyla* (symphylids). *Diplopoda* is the most diverse class of the *Myriapoda*, comprised of 16 orders and over 12000 known species [1]. These arthropods are distinguished by having body segments with attached jointed legs by pairs. The *Diplopoda* class differs from the other in that the first four segments and the head portion do not possess legs.

Change of seasons have a marked effect on these arthropod's behavior. They appear mainly during warm and rainy seasons and take places with humid conditions as their habit, dwelling in soil or under stones, wood or leaves [2-3]. *Myriapoda* have also been known to thrive in domestic settings with poor lighting such as bathrooms, kitchens and inside footwear in closets.

Due to being slow and possessing unsuitable mouth parts, the survival of millipedes largely depends on complex chemical defense mechanisms, when in presence of a threat they produce and secrete substances from specialized glands present throughout their entire bodies [4-5]. The composition of these chemical irritants varies from one species to another. Species belonging to the *Julida*, *Spirobolida* and *Spirostreptida* orders secrete benzoquinones among which the most commonly known are 2-methyl-1,4-benzoquinone and 3,3a,4,5-tetrahydro-1H-pyrrolo-[2,3-b] pyridine-2,6-dione; species from the *Glomeridae* and *Polyzoniidae* orders produce alkaloid compounds; species from the *Callipodida* and *Chordemouidea* orders secrete phenols and species from the *Polydesmida* order secrete hydrogen cyanide [3-6].

Contrary to popular belief, millipedes are not considered poisonous to humans. Their defense mechanisms can be innocuous or may in some cases result in harm towards human beings, manifesting as erythematous, purpuric and/or cyanotic lesions along with local pain and paresthesias. Depending on the exposure's duration, intensity and the chemical compound itself,

moderate to more severe lesions such as ulcers and blisters may present [7]. Rare cases of corneal lesions have been reported [8].

We describe a case from the Andean region of Colombia, with daily temperatures ranging from 15° and 30°C and an average humidity of 72%. The patient accidentally stepped on a millipede that was in one of his shoes.

## CASE PRESENTATION

A 25-month-old male was brought into the emergency department for appearance of a painful violaceous pigmentation located on the right foot between the first and fourth toes developing over less than 1 hour of exposure to a millipede that was inside the patient's right shoe according to his mother (Figure 1A). He did not have emesis, muscle spasms or any other symptoms. On admission he was afebrile with stable vital signs, adequate distal perfusion with the previously described cutaneous lesions on his right foot, with no local swelling or heat (Figure 1B). The rest of the physical examination was within normal limits. Laboratory test results were unremarkable. The patient underwent observation and pain management. At 2 weeks after hospital discharge, the extent of surface area involvement by hyperpigmented lesions was found to have resolved by more than 50% from initial presentation. Full clinical resolution was expected to occur within a timeframe of weeks to months, as described in the medical literature.

## DISCUSSION

Exposure of the skin to millipede's toxins, although uncommon, may be of high medical concern due to potential evolution of skin lesions, even more so if failure to recognize the underlying pathological process occurs [7]. *Millipede* populations have been reported to overcome 30 to 40 specimens per square meter in certain areas [2-3]. Any type of lesion can be present in any



**Figure 1. A.** Millipede, invertebrate arthropod of the Myriapoda subphylum and Diplopoda class. **B.** well-defined violaceous macules between the first and fourth toes.

individual at risk. Once the skin is exposed to the chemical compound a dark red to blackish change of color is expected, that can simulate inflammatory or even necrotic lesions<sup>[9]</sup>.

Particularly in this case, a precise diagnosis was established based on the aspect of the lesions and the recognition of the *Millipede*. Due to the darkened and cyanotic/ischemic appearance of the lesion, vasculitis was strongly suggested as a diagnosis on admission. Many authors, including *Arab et al* found that the chemical compounds responsible for the change of color are 2-methyl-1,4-benzoquinone and 3,3a,4,5-tetrahydro-1H-pyrrolo-[2,3-b] pyridine-2,6-dione present in arthropod glands<sup>[6]</sup>.

The diagnosis of an Accident by *Myriapoda* is determined through epidemiological history and physical examination<sup>[10]</sup>. There are no laboratory tests that are specific to these cases. Arterial ischemia, meningococemia, bacterial endocarditis, cryoglobulinemia and collagen disease may be considered among differential diagnoses<sup>[10]</sup>. Trauma and child abuse must also be considered as a likely cause for skin lesions and chemical burns<sup>[10]</sup>.

Prompt washing of the affected part with soap and water must be initiated as part of medical treatment. Either alcohol or ether may also be employed, in order to dissolve toxins (benzoquinones)<sup>[11]</sup>. Topical steroid ointments can be used for blisters and for symptomatic relief of burning sensation. Patients with any degree of eye exposure must be consulted to an ophthalmologist to rule out corneal ulceration. Hyperpigmentation can last weeks and even months, without repercussion on the patient's health or need for specific treatment<sup>[10-12]</sup>.

Shaking shoes before wearing them and turning socks inside-out are in general, effective and practical preventive measures that also apply for accidents by scorpions and spiders<sup>[11]</sup>.

In conclusion, accidents by *Myriapods* are not a common occurrence in most Emergency Department settings. Proper case management requires not only knowledge on the subject, but of epidemiological aspects necessary to rule out other entities. Pharmacological treatments aimed towards symptomatic relief are the mainstay of therapy, along with a careful follow-up to ensure a satisfactory clinical outcome.

**Contribution Details:** O.F.R.-G., C.E.J.-C. and A.E.M.-C were the lead physicians in this case. A.Z.-S. was the Toxicologist in this case. O.F.R.-G., C.E.J.-C, F.E.-M. and N.D.-O. performed the literature search and wrote the manuscript. Editing of the manuscript draft was done by all authors. The decision of the final version to be published was agreed upon by all authors.

**Funding:** Financial support and sponsorship nil.

**Conflict of interest:** none

## ORCID:

Oscar Fabián Rojas-Gómez: <https://orcid.org/0000-0001-9129-1154>

Natalia Delgado-Ortiz: <https://orcid.org/0000-0002-5041-387X>

Adriana Zamora-Suarez: <https://orcid.org/0000-0002-9330-6097>

Álvaro Eduardo Mondragón-Cardona: <https://orcid.org/0000-0001-5577-5434>

Freddy Escobar-Montealegre: <https://orcid.org/0000-0002-5604-2141>

Carlos Eduardo Jiménez-Canizales: <https://orcid.org/0000-0001-7728-1523>

## REFERENCES

1. Brewer MS, Sierwald P, Bond JE. Millipede taxonomy after 250 years: classification and taxonomic practices in a mega-diverse yet understudied arthropod group. PLoS One. 2012;7(5):e37240. doi: 10.1371/journal.pone.0037240.
2. Haddad Jr V, Cardoso JLC, Rotta O, Eterovic A. Accidents provoked by Millipede with dermatological manifestations: report of two cases. An Bras Dermatol 2000; 75:471-74. <https://www.researchgate.net/publication/282886159>.
3. Sierwald P, Bond JE. Current Status of the Myriapod Class Diplopoda (Millipedes): Taxonomic Diversity and Phylogeny. Annu Rev Entomol. 2007;52(1):401–20. doi: 10.1146/annurev.ento.52.111805.090210
4. Eisner T, Eisner M, Siegler M. Secret Weapons: Defenses of Insects, Spiders, Scorpions, and Other Many-legged Creatures. Harvard University Press; 2005. 388 p.
5. Heeren Neto Augusto Scardazan, Bernardes Filho Fred, Martins Gustavo. Skin lesions simulating blue toe syndrome caused by prolonged contact with a millipede. Rev. Soc. Bras. Med. Trop. doi: 10.1590/0037-8682-0212-2013.
6. Arab A, Zacarin GG, Fontanetti CS, Camargo-Mathias MI, Santos MG dos, Cabrera AC. Composition of the defensive secretion of the Neotropical millipede *Rhinocricus padbergi* Verhoeff 1938 (Diplopoda: Spirobolida: Rhinocricidae). Entomotrópica. 2003 Jul 20;18(2):79–82. <https://www.researchgate.net/publication/26742725>.
7. Mokni S, Boussofara L, Saidi W, Aounallah A, Belajouza C, Ghariani N, Nouira R, Denguezli M. Four cases of exogenous acral pigmentation related to a darkling beetle (coleoptera: tenebrionidae: blaps). J Eur Acad Dermatol Venereol. 2017 Jul;31(7):e330-e331. doi: 10.1111/jdv.14118.
8. Radford AJ. Millipede burns in man. Trop Geogr Med. 1975 Sep;27(3):279-87. PMID: 1103388.
9. De Capitani EM, Vieira RJ, Bucarety F, Fernandes LCR, Toledo AS, Camargo AC. Human accidents involving *Rhinocricus* spp., a common millipede genus observed in urban areas of Brazil. Clin Toxicol Phila Pa. 2011 Mar;49(3):187–90. DOI: 10.3109/15563650.2011.560855
10. Lima CAJ, Cardoso JLC, Magela A, Oliveira FGM de, Talhari S, Haddad Junior V. Exogenous pigmentation in toes feigning ischemia of the extremities: a diagnostic challenge brought by arthropods of the Diplopoda Class ("millipedes"). A Bras Dermatol. 2010 Jun;85(3):391–2. doi: 10.1590/s0365-05962010000300018
11. Haddad Junior V, Amorim PC, Haddad Junior WT, Cardoso JL. Venomous and poisonous arthropods: identification, clinical manifestations of envenomation, and treatments used in human injuries. Rev Soc Bras Med Trop. 2015;48(6):650-7. doi: 10.1590/0037-8682-0242-2015
12. Kauffman P, Netto BM, Presti C, Sitrângulo Jr. CD, Simão E, Ferrari F, et al. Doenças Vasculares das Extremidades – Arterial, Venosa e Linfática. In: Lopes AC, editor. Tratado de Clínica Médica. São Paulo: Roca; 2006. p. 734-787