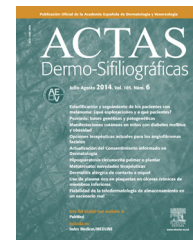




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## ORIGINAL ARTICLE

# Allergic Contact Dermatitis due to Nickel: Descriptive Study in a Tertiary Hospital, 2000-2010<sup>☆</sup>



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### KEYWORDS

Contact dermatitis;  
Nickel;  
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Dimethylglyoxime test

### PALABRAS CLAVE

Eccema de contacto;  
Níquel;  
Relevancia;  
Test de dimetilglioxima

### Abstract

**Objective:** The aim of this study based on the records of the dermatology department of a tertiary referral hospital was to describe patients treated for allergic contact dermatitis induced by nickel between 2000 and 2010.

**Materials and methods:** From records of the skin allergy section of the dermatology department we extracted and analyzed information for patients who underwent patch testing with the standard series of the Spanish Contact Dermatitis Research Group (GEIDAC), which includes a patch with 5% nickel sulfate in petroleum jelly. The possibility that nickel release from various objects might have triggered the patient's dermatitis was assessed with the dimethylglyoxime spot test, which reveals a reddish precipitate if the metal is present.

**Results:** A total of 3,404 patients underwent GEIDAC patch testing during the study period; 24.2% had positive reactions to the patch containing 5% nickel sulfate in petroleum jelly. However, the contact dermatitis could be attributed to nickel in only 57 of the 824 patients (6.9%) who showed sensitization to nickel.

**Conclusions:** Patch-test evidence of sensitization was found to be clinically relevant in only a small percentage of patients. We emphasize the usefulness of the dimethylglyoxime test to help establish the relevance of a positive nickel patch test. This test is even useful for identifying the specific object responsible for a patient's dermatitis.

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### Dermatitis alérgica de contacto a níquel. Estudio descriptivo en un hospital terciario en la década del 2000 al 2010

### Resumen

**Objetivo:** El objetivo de este trabajo es el estudio descriptivo de los pacientes con dermatitis alérgica de contacto por níquel que han sido atendidos en un hospital de referencia en dermatología en un periodo de 10 años.

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**Material y métodos:** Se han analizado los datos de todos los pacientes parchados con la batería estándar del Grupo Español de Investigación en Dermatitis de Contacto y Alérgica Cutánea (GEIDAC) que incluye un parche con sulfato de níquel en vaselina al 5%, a partir de la base de datos informatizada de la sección de alergia cutánea de nuestro servicio. Para conocer la implicación de diferentes objetos metálicos en el origen de la dermatitis utilizamos un método colorimétrico llamado test de dimetilglioxima (DMGO).

**Resultados:** Durante el periodo de estudio se ha explorado mediante pruebas epicutáneas con la batería estándar del GEIDAC a 3.404 pacientes. Del total de pacientes parchados un 24,2% presentaron un parche positivo para sulfato de níquel al 5% en vaselina. Sin embargo, de los 824 pacientes sensibilizados al níquel solo en 57 de ellos (6,9%) se pudo demostrar una asociación de la sensibilización con la dermatitis por la que consultaban.

**Conclusiones:** Solo se identificó relevancia presente en un pequeño porcentaje de pacientes con positividad al níquel en las pruebas epicutáneas. Destacamos la utilidad del test de DMGO como método de ayuda para establecer la relevancia de la positividad del parche con níquel, e incluso para conocer el objeto causante de dicha dermatitis.

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## Introduction

Numerous epidemiologic studies on contact dermatitis show that sensitization to nickel is highly prevalent in Europe.<sup>1-3</sup> Since this information is usually retrieved from data on patients with skin complaints who have been referred for patch testing, it does not generally apply to patients who consult directly for nickel-induced contact dermatitis, even if they are sensitized to nickel.

It is important to differentiate between prevalence of sensitization and prevalence of allergic contact dermatitis; hence the key role of relevance in positive patch test results.

In the case of nickel-induced allergic contact dermatitis, a colorimetric approach—the dimethylglyoxime spot test—can be used to determine the involvement of various metal objects in a skin disease. Not all objects that contain nickel necessarily release nickel. Those that do can be rapidly indentified using this simple test, which demonstrates the reaction between nickel and dimethylglyoxime by the formation of a reddish-brown precipitate.

Systematic implementation of this test would prove extremely useful when attempting to determine the cause of a skin disease and even for ascertaining which objects are causing contact dermatitis.

We performed a descriptive, observational, and retrospective study to evaluate nickel-induced contact dermatitis as the main presenting complaint in the skin allergy section of the dermatology department.

## Material and Methods

### Study Population

Between January 2000 and December 2010, a total of 3404 patients underwent patch testing with the standard series of the Spanish Contact Dermatitis Research Group (GEIDAC), which includes a patch with 5% nickel sulfate in petroleum jelly. Data were obtained from the computerized database of the Skin Allergy Section of the Dermatology Department of Hospital Universitario de Valencia, Valencia, Spain. Readings were taken at 48 and 96 hours using the evaluation

criteria established by the International Contact Dermatitis Research Group (+, ++, +++).

### Assessment of Relevance

Relevance was always assessed by the same researcher (Dr de la Cuadra), who classified the relevance of the patch test to nickel as follows: positive and present when sensitization was totally or partially associated with the clinical symptoms that led the patient to consult; and past when the patient remembered previous symptoms associated with sensitization (eg, dermatitis caused by objects such as earrings and watch strap fastenings). When none of the previous criteria were fulfilled, relevance was classed as negative or unknown.

Patients who reported contact with metallic objects at the site of their dermatitis (eg, hands, wrists, thighs, and abdomen) brought the objects (belt buckles, trousers with metallic buttons, watches, bracelets, necklaces, earrings, scissors, key rings, telephones, and prostheses) for the dimethylglyoxime test (Fig. 1).

Present relevance was defined as definite, probable, or possible as follows:

- Definite: gradual resolution of the complaint and positive dimethylglyoxime test result (eg, buckles, bracelets, garment fastenings, and key rings).
- Probable: gradual resolution of the complaint and negative dimethylglyoxime test result (eg, surgical staples and metallic body piercings).
- Possible: only clinical improvement and positive dimethylglyoxime test result, albeit with nonpermanent (occasional) contact items (eg, coins, scissors, tweezers, scrubbing pads, and metal scourers).

In this study, we only collected data from patients who had positive patch test results to nickel with positive and present relevance when this relevance was certain or at least probable.

### Dimethylglyoxime Test

The test was performed using a 1% dimethylglyoxime solution in ethanol and a 9.9% ammonium hydroxide solution,

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