

## The Direct Use of Mobile Phone and the Occurrence of Chondrodermatitis Nodularis in the Antihelix: An Exemplificative Case

### Abstract

Chondrodermatitis nodularis helicis (CNH) is an idiopathic inflammatory painful condition of the ear characterized by a tender nodule located on the helix or antihelix. Even if various causes have been ascribed, such as a microvascular injury due to acute exposure to cold or trauma, pressure, or rubbing, etiopathogenesis still remains unknown. We describe the unusual case of a young female with a peculiar sequential onset of bilateral CNH in the antihelix region, possibly ascribed to the direct use of mobile phone without earphones.

**Keywords:** Antihelix, chondrodermatitis, helix, mobile phone, nodularis, Winkler nodules

### Introduction

Chondrodermatitis nodularis helicis (CNH) is an idiopathic inflammatory painful condition of the ear. It is characterized by a tender nodule located on the helix or antihelix, affecting mainly adults.<sup>[1]</sup> Various treatment options have been described in the literature, including surgical removal (which should be considered as the first-line treatment),<sup>[2]</sup> laser therapy, curettage, topical and intralesional corticosteroids, and pressure-relieving technique,<sup>[3]</sup> but little is known about inducing causes. Up to date, few studies have evaluated the etiopathogenesis of this condition, suggesting that acute exposure to cold or a direct trauma to the ear may trigger the insurgence of CNH, as often reported in anamnesis. The pathogenesis has been related with microvascular injury.<sup>[4]</sup> Wettlé *et al.* suggested that the widespread use of new technological hardware in recent decades (hearing aids, headphones, in-the-ear inserts and ear muffs, anti-crash protection helmets) could favor the onset of CNH, through repeated or continuous mechanical microtrauma to the pinna.<sup>[5]</sup> This personal report is an example of the interaction between mobile phone use and the predisposition to a peculiar case of bilateral sequential CNH.

### Case Report

A 42-year-old female reported the onset of CNH on the antihelix in her right ear

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1 year ago [Figure 1a]. The patient assumed a possible correlation between CNH and the direct use of mobile phone (without the use of headset). To test whether this hypothesis was true, she started using the mobile phone directly on the left (opposite) ear. Her average daily phone use was about 30 minutes. After 6 months, she returned for observation. We could notice a nodule similar to that on the right ear [Figure 1b]. On physical evaluation, both antihelices showed a tender, swollen CNH; the external auditory canals and tympanic membranes were normal; nose and throat were normal on clinical examination.

Clinical history and laboratory tests were negative for autoimmune disease. A whole-body dermatological evaluation was negative for skin diseases in any district. The allergologic investigation was negative for common inhalants and contact substances (metals, plastics, cosmetics, acrylics, etc.) by prick tests and standard patch testing (Italian Society of Allergological, Occupational and Environmental Dermatology – SIDAPA series).

Both CNHs were surgically removed and histology confirmed the diagnosis, which is typically based on the classic clinical appearance, location, and the presence of a single painful nodule [Figure 2].<sup>[6]</sup>

The differential diagnosis includes basal cell carcinoma, keratoacanthoma, squamous

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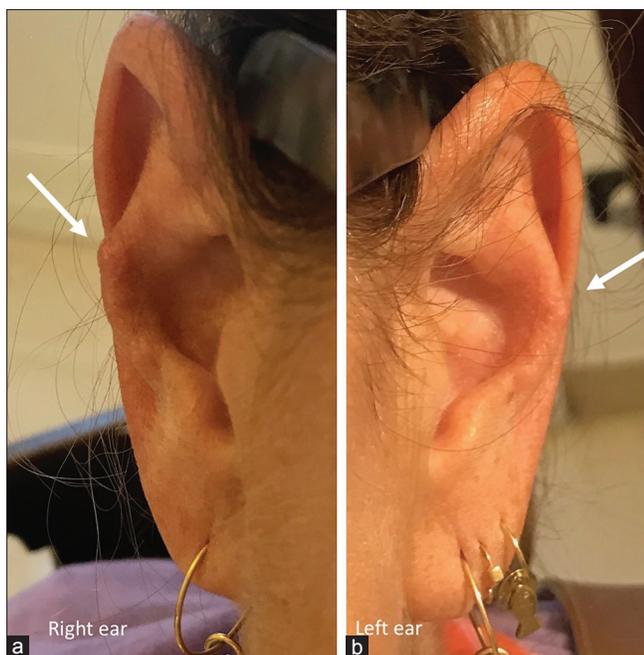
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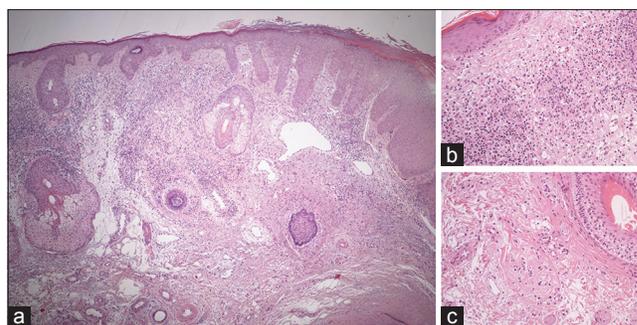
**Figure 1:** CNH located on the antihelix of the right ear (a), which was the first to form, and on the left ear (b), 6 months later

cell carcinoma, actinic keratosis, atypical fibroxanthoma, cystic chondromalacia, elastotic nodules of ears, small dome-shaped painless bumps (“milia”), gout tophi, and Merkel cell carcinoma.

### Discussion

The random coincidental occurrence of the use of mobile phones and the onset of CNH cannot be excluded *per se*, but some peculiar features of the patient make it really unlikely. CNH is most commonly seen on the helix; it occurs more frequently in men 58–72 years of age and in the right ear. The bilateral simultaneous occurrence or the presence of multiple lesions on one ear is known, but rarely reported.<sup>[7]</sup> As far as we know, bilateral CNH with a sequential occurrence in the contralateral ear after exposure to a direct physical agent has never been reported in literature. The antihelix region is an unusual site of CNH growth, compared with the helix. In this case, the patient was young and female; juvenile CNH is generally associated with dermatomyositis or systemic sclerosis which was not the case for our patient. In this patient, we noticed that the antihelix region was protruding and more prominent than the helix. Thus, CNH arose in a more exposed location (antihelix), in agreement with the hypothesis proposed by Ortiz *et al.*<sup>[8]</sup> of a possible direct correlation between mobile phone use and CNH.

In addition to mechanical pressure (or friction) on the skin, the bilateral onset of two CNHs might also have been enhanced by repeated heating of the antihelix induced by microwaves (900–1800 MHz) produced by the mobile phone.<sup>[9,10]</sup> Furthermore, the patient was using a normal (soft) pillow and was not wearing hats, helmets, or



**Figure 2:** A typical depiction of CNH with epithelial hyperplasia and perichondrial inflammation and disruption. (a) (H and E, ×20). Dermal inflammatory reaction with lymphocytes, (b) collagen degeneration and fibrin deposition, vascular, and nerve hyperplasia (c) (H and E, ×200). (Courtesy of Prof E.F.Berti, Director of the Institute of Dermatological Sciences, University of Milan, and of Venegoni Luigia, Histology and Histopathology Laboratory)

headphones or other devices potentially causing friction in the auricle region.

In conclusion, this case report reminds the general warning by mobile technology manufacturers against prolonged use with active contact with skin. Although there is no definite proof of the correlation between mobile phones and CNH, a simple advice is to use mobile phones not directly on the ear but with insert earpieces. Given the prevalence of CNH on the right side and in elderly, it might be interesting to further investigate the correlation with the use of mobile phone directly without earpieces and to define whether this association is peculiar to antihelix region.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

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