



## Adverse reaction to isotretinoin: alteration of the hair shaft structure

*Reação adversa à isotretinoína: alteração do formato capilar*

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### ABSTRACT

Although little reported in daily practice, the use of systemic retinoids can cause changes in the shape, color, and texture of hair shafts. We report a case of a patient treated with isotretinoin for acne vulgaris who experienced new growing curly hair. Such hair changes are recognized during therapy with oral retinoids; however, isotretinoin-induced modifications on the hair fiber curvature are extremely rare.

**Keywords:** Hair; Isotretinoin; Pharmacological treatment

### RESUMO

*Embora pouco frequente na prática clínica, o uso de retinoides sistêmicos pode provocar alterações no formato, na coloração e textura das hastes capilares. Relatamos o caso de um paciente tratado com isotretinoína para acne vulgar que experimentou mudança do tipo capilar, de liso para encaracolado. Tais modificações são possíveis ao longo da terapia com retinoides orais; entretanto, a mudança do formato dos fios induzida pela isotretinoína é um fenômeno extremamente raro na literatura.*

**Palavras-chave:** Cabelo; Isotretinoína; Tratamento farmacológico

## Case Report

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## INTRODUCTION

Changes in the shape, color, and texture of hair are reported with the use of systemic retinoids, although they are rarely observed in clinical practice. The pathophysiological mechanisms that justify the physical alterations of the hair shafts in this context are partially understood. Still, they seem to be related to the duration of the treatment, the systemic retinoid used, and the doses used.

## CASE REPORT

A 20-year-old man started treatment with oral isotretinoin for acne vulgaris in 2018, with a daily dose of 0.5 mg/kg/day, obtaining an accumulated dose of 12,820 mg in 11 months. The patient reported a gradual change in hair shape, from straight to wavy, especially noticed in the last two months of treatment (Figure 1). No additional complaints were mentioned. In his last assessment, in December 2020, the hair changes persisted.

## DISCUSSION

Among the hair changes related to systemic retinoid use, the literature reports interferences in the hair cycle and changes in the shafts' color, shape, and texture.<sup>1,2,3</sup> The literature describes changes in hair shaft shape leading to a more wavy hair in patients treated with etretinate, acitretin, and, less commonly, isotretinoin.<sup>1,3</sup> Although the mechanism that leads to hair strand changes is not fully elucidated, it is known that retinoids affect the differentiation of follicular and epidermal keratinocytes and their pattern of keratin expression.<sup>4</sup>

In 2009, Seckin *et al.* observed the hair waving of a 70-year-old woman under treatment with acitretin for psoriasis vulgaris. The author proposed that the phenomenon was linked to the hair follicle's inner root sheath's (IRS) keratinization deterioration.<sup>2</sup> As a note, IRS is a structure of great importance in determining the shape of hair fibers by acting as an intrafollicular structural mold during the growth of new hairs.<sup>3</sup>

In line with the observations of Seckin, Westgate *et al.* suggested that hair's shape, type, and color are determined not only by genetic mechanisms during embryogenesis but also repeatedly in each hair cycle.<sup>3</sup> Thus, such characteristics would be subject to the influence of external and environmental factors.

With the advance of more complex studies on the human genome, more evidence points to the influence of developmental genes on the formation of wavy hair.<sup>3</sup> Ectodysplasin receptors, for example, related to hair shape and thickness, are not detected only in hair follicles during their morphogenesis but also at puberty and throughout the phase changes of the hair cycle.<sup>3</sup>

The retinoid action on the pilosebaceous unit, reducing volume and glandular activity, also represents a possible link with the hair shape change. Interestingly, and according to observations by Westgate *et al.*, when studying the straight hair of Asian patients, evolutionary glandular changes may have acted as a driving force behind the penetration of new genes that determine the shape of human hair.<sup>3</sup>

As in this case report, alterations in the curvature of hair strands after the systemic use of isotretinoin is not unprece-



**FIGURE 1:** Hair shape before treatment and alteration of hair shape, with waving, after treatment with oral isotretinoin

dented in the literature<sup>2,4,5</sup> and is in line with the mechanisms of action of systemic retinoids on the IRS and the sebaceous glands. To date, there are no data on the duration of hair changes caused by retinoids. Regarding the infrequency of this adverse event in dermatological practice, the capillary changes induced by isotretinoin may be uncommon given its temporary use and in low doses, as commonly applied in the treatment of acne vulgaris.<sup>4</sup>

## CONCLUSION

We hope that this report will contribute to the list of possible rare adverse events that isotretinoin may cause in the body during its use. The dermatologist would be prepared for more complete and refined care by recognizing infrequent adverse events related to everyday drugs. ●

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