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ORIGINAL ARTICLE

Study of Frontal Hairline Patterns in Spanish Caucasian Women[☆]

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KEYWORDS

Anterior hairline;
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Reconstruction of the anterior hairline

PALABRAS CLAVE

Implantación pilosa frontal;
Mujer española caucásica;
Pico de viuda;

Abstract

Background: Anterior hairline measurements and their possible relationship with androgen levels, sebum production, and skin hydration have not been reported in white Spanish women. **Material and methods:** This was a prospective descriptive and analytical observational study conducted on 103 healthy premenopausal white Spanish women recruited from the health staff of Hospital Universitario Virgen Macarena in Seville, Spain. Measurements were made of anterior hairline implantation, sebum levels, and the degree of hydration of the stratum corneum. Androgen levels were also determined in 50 volunteers from this group 3 to 5 days after the end of the menstrual cycle.

Results: The mean age of the women was 29.7 years. A widow's peak was observed in 94.17% of the group. The mean dimensions of the widow's peak were a height of 1.01 cm and width of 2.13 cm. The mean hormone levels were within normal limits for our hospital's laboratory with the exception of 17-hydroxyprogesterone, with a mean level of 1.39 ng/mL (range, 0.6–5.9 ng/mL; normal limits, 0.15–1.10 ng/mL). The mean prostate specific antigen level was 0.04 ng/mL (range 0.02–0.08 ng/mL; normal limits, 0.00–0.02 ng/mL).

Conclusions: The hairline measurements of the white Spanish women in this study differ from those reported in American women. Knowledge of this normal pattern of anterior hairline implantation can be important in the evaluation of women with female androgenetic alopecia with male pattern, frontal fibrosing alopecia, or other established scarring alopecia seeking a surgical solution by hair transplantation.

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Estudio de patrones de implantación pilosa frontal en la mujer española caucásica

Resumen

Introducción y objetivos: Las medidas de la línea de implantación pilosa frontal de la mujer española caucásica no han sido descritas, y tampoco si existe relación entre estas medidas y los niveles hormonales androgénicos, producción sebácea e hidratación.

Material y métodos: Estudio observacional, prospectivo, descriptivo y analítico en 103 mujeres sanas españolas caucásicas premenopáusicas, pertenecientes a la plantilla sanitaria de nuestro

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Sebometría;
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Trasplante de
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Reconstrucción de la
línea de implantación
pilosa frontal

hospital a las que se les midieron la línea de implantación pilosa frontal, los niveles de sebo y la hidratación de la capa córnea, y en 50 voluntarias de este grupo se les determinaron, además, los niveles hormonales androgénicos 3-5 días después de terminar la menstruación.

Resultados: La edad media de nuestras pacientes fue de 29,7 años. El pico de viuda se objetivó en 94.17% de las pacientes. Las dimensiones medias del pico de viuda en nuestro grupo fueron de 1,01 cm de alto y 2,13 cm de ancho. Los niveles medios hormonales fueron los que habitualmente consideramos como normales en el Laboratorio de nuestro hospital excepto la 17-hidroxi-progesterona que alcanzó valores medios de 1,39 ng/mL (rango: 0.6-5,9; N: 0.15-1,10). El PSA fue de 0.04 ng/mL (rango: 0.02-0.08; N: 0.00-0.02).

Conclusiones: Las medidas de las líneas de implantación pilosa frontal de la mujer caucásica española han sido distintas de las descritas para la mujer americana. El conocimiento de este patrón de distribución de la línea de implantación pilosa frontal normal puede ayudar en el caso de que la paciente con una alopecia androgenética femenina de patrón masculino, una alopecia frontal fibrosante u otra cicatricial ya estable, desee corregir quirúrgicamente su problema mediante trasplante capilar.

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Introduction

Female alopecia may be either androgenetic or nonandrogenetic. In women, the androgenetic form manifests with miniaturization of the hair shafts and gives rise to 2 different patterns of alopecia.¹ The first of these is female androgenetic alopecia, a pattern classified by both Ludwig² and Olsen³ and characterized by a decrease in the diameter of the hair shaft—a process also known as rarefaction—and by diffuse hair loss that results in a triangular, alopecic area at the front of the vertex, but not by changes in the anterior hairline. The second pattern is androgenetic alopecia in women mimicking male pattern baldness, which was classified into 5 types by Ebling.⁴ This variant, characterized by thinning hair in the parietal and frontovertexal scalp, is found in women with persistent adrenarche syndrome and ovarian or adrenal tumors. Occasionally, it develops after hysterectomy or forms part of age-related hair loss and it is differentiated from the female pattern in that the anterior hairline is affected.

The male pattern variant results in a receding hairline in women just as it does in men. Therefore, we need data on the normal contour and structure of the hairline so that an aesthetically appropriate result can be achieved when surgical reconstruction is required. This information is also needed for the treatment of the growing number of patients presenting with frontal fibrosing alopecia and other stable scarring alopecias that affect the anterior hairline.

Anterior hairline patterns and the different racial variants of alopecia in men were described many years ago⁵⁻⁹; however, the characteristics of natural female hairlines have not yet been determined. In 2009, Nusbaum and Fuentefria¹⁰ published the anterior hairline characteristics of 360 American women who were clients of hair salons. In 2011, Jung et al.¹¹ identified 5 basic hairline shapes or patterns in 130 randomly selected Asian women.

A limitation these studies share is that the authors failed to set selection criteria obliging them to ascertain whether the participants (both those assessed in hair salons¹⁰ and those randomly selected¹¹) had any dermatological or hormonal disorder that might influence the hairline dimensions measured. Moreover, given the existence of anthropometric differences related to race, the results

obtained in American or Asian women may not be applicable to a Spanish population.

The aim of our study was to characterize the anterior hairline patterns of a sample of healthy white Spanish women aged between 18 and 45 years—focusing specifically on the frequency of occurrence of the widow's peak and the dimensions of the other structures that make up the hairline—and to determine the normal hormonal profile in this group. Furthermore, as increased sebum discharge is common in alopecia, we also measured the amount of oil secreted by normal white Spanish women and assessed skin hydration on the face and body.

Material and Methods

This was a prospective, descriptive, observational analysis of a group recruited from the clinical staff of our hospital. The study was carried out between January and June 2010.

In total, 105 white Spanish women of childbearing age (18-45 years) were recruited prospectively from among the staff of our hospital. None of the participants had a concomitant systemic disease or clinical signs suggestive of underlying hormonal disorders (alopecia, acne, hirsutism, or menstrual disorders). We subsequently excluded 2 women who were 2 and 3 months pregnant, respectively, but who were unaware of their condition when they entered the study.

In an oral interview we collected the following data: age, age at menarche, skin phototype, hair and eye color, known history of iron deficiency, oral contraceptive use, and smoking status.

The following tests were performed on all the participants:

1. Sebometry: we measured skin surface sebum on the face (forehead) and body (flexor surface of the left forearm) with a sebometer (Skin Diagnosis SD 27, Courage + Khazaka). The following normal values specified by the device manufacturer were accepted: 40 to 70 $\mu\text{g}/\text{cm}^2$ for the forehead and 0.00 to 3.00 $\mu\text{g}/\text{cm}^2$ for the arm.
2. Corneometry: the hydration of the stratum corneum was determined on the forehead and arm using a

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