Contact Dermatitis

WILEY

CONTACT DERMATITIS

ORIGINAL ARTICLE OPEN ACCESS

Contact Sensitization in Patients With Frontal Fibrosing Alopecia: Patch Test Results With an Extended Baseline Series in Consecutive Patients

María-Antonia Pastor-Nieto[1,2,3,4] | María Elena Gatica Ortega[3,5] | Anna María Giménez-Arnau[6] | Tatiana Sanz-Sánchez[7,8] | Pedro Mercader García[9] | Inmaculada Ruíz-González[10] | Gemma Melé-Ninot[11] | Pablo Chicharro[12] | Paloma Sánchez-Pedreño[13] | Marina de Vega[14] | Miguel Ángel Gallego Descalzo[14] | Leopoldo Borrego[15]

[1]Dermatology Department, Hospital Universitario de Guadalajara, Guadalajara, Spain | [2]Faculty of Medicine and Health Sciences, Medicine and Medical Specialties Department, Universidad de Alcalá, Alcalá de Henares, Spain | [3]Escuela Internacional de Doctorado, Universidad de Castilla-La-Mancha, Albacete, Spain | [4]Dermatology Department, Hospital Universitario Fundación Jiménez Díaz, Madrid, Spain | [5]Dermatology Department, Complejo Hospitalario Universitario de Toledo, Toledo, Spain | [6]Dermatology Department, Hospital del Mar Research Institute, Universitat Pompeu Fabra (UPF), Barcelona, Spain | [7]Dermatology Department, Hospital Universitario Infanta Sofía, Madrid, Spain | [8]Medicine Department. Facultad de Medicina, Salud y Deporte, Universidad Europea de, Madrid, Spain | [9]Dermatology Department, Hospital General Universitario José Mª Morales Meseguer, Murcia, Spain | [10]Dermatology Department, Complejo Asistencial Universitario de León, León, Spain | [11]Dermatology Department, Hospital Universitari Sagrat Cor, Grupo Quirónsalud, Barcelona, Spain | [12]Dermatology Department, Hospital Universitario de La Princesa, Madrid, Spain | [13]Dermatology Department, Hospital Clínico Universitario Virgen de la Arrixaca, Spain | [14]Unidad de Investigación, Academia Española de Dermatología y Venereología (AEDV), Madrid, Spain | [15]Dermatology Department, Hospital Universitario Insular de Gran Canaria, Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain

Correspondence: María-Antonia Pastor-Nieto (mapastornieto@gmail.com; MAntonia.Pastor@alu.uclm.es)

Received: 11 January 2026 | **Revised:** 1 March 2026 | **Accepted:** 19 March 2026

Keywords: allergic contact dermatitis | ethylhexyl salicylate | frontal fibrosing alopecia | gallate | patch test | shellac

ABSTRACT

Introduction: Contact sensitization has been reported in patients with frontal fibrosing alopecia (FFA).

Objectives: To analyse sensitization in FFA-patients and the improvement of symptoms after allergen avoidance.

Methods: We performed patch tests with an extended baseline series in FFA-patients across Spain and assessed the allergen avoidance impact.

Results: 133 FFA-patients were investigated. 97% were women. At least one positive allergen was found in 77/133 (58%). No differences were detected in the frequency of positive results compared with the population without FFA patch tested with an extended baseline series in the same period (52.3%) ($p = 0.21$). Having FFA was associated with being sensitized to propolis, shellac, and gallate mixture. Thirteen (9.8%) patients showed sensitization to salicylates, which was associated with subjective symptoms of intolerance to sunscreens or sun exposure. No evidence of clinical improvement was identified with allergen avoidance 4 months after patch testing.

Conclusion: No sufficient evidence was found to justify routine patch testing in FFA patients, as no evidence of clinical improvement was identified by allergen avoidance and the relevance of FFA-associated sensitizations was largely uncertain. Patch testing with salicylates may be of interest in FFA-patients with subjective symptoms of intolerance to sun exposure or sunscreens.

1 | Introduction

Frontal fibrosing alopecia (FFA) is a type of scarring alopecia that causes irreversible hair loss following a phase of variable inflammatory activity. It primarily affects postmenopausal women, although cases have also been described in premenopausal women and men [1].

Genetic factors have been implicated in its etiopathogenesis through mutations involving genes that could play a role in the skin metabolism of xenobiotic estrogens [2]. It has been hypothesized that the increasing incidence of the disease is related to environmental factors. In this regard, frequent use of sunscreens and other cosmetic products has been reported among patients with FFA [3–10]. Additionally, sensitization to a variety of allergens present in sunscreens and other cosmetic products has been reported to involve patients with FFA [3, 11–23]. However, scarce information is available regarding the prevalence of contact sensitization in non-selected patients with FFA compared to the general patch tested population or symptom improvement after allergen avoidance [14, 15, 17].

The objective of the current study is to describe the frequency of clinical sensitization in consecutive patients with FFA; to define the clinical characteristics associated with sensitization; and to assess the improvement of the symptomatology following allergenic avoidance as well as the degree of satisfaction with the patch tests.

2 | Methods

2.1 | Study Design and Population

We conducted patch testing investigations in consecutive patients with FFA in ten Dermatology Departments linked to the Spanish Allergic Contact Dermatitis Registry (REIDAC) across Spain from February 2022 to February 2024. At least 4 months after patch testing, participants were interviewed using a questionnaire to assess allergen avoidance adherence and subjective symptom improvement in the follow-up.

The REIDAC, established in June 2018, collects data from researchers of the Spanish Contact Dermatitis Research Group (GEIDAC) [24]. Study data were collected using REDCap electronic data capture tools (http://www.project-redcap.org/; RRID:SCR_003445 hosted at the Fundación Piel Sana). During the time of the study a specific data form was implemented.

The diagnosis of FFA was made based on clinical findings by general dermatologists who also recorded several clinical variables (Table S1). Participation in the study did not require any treatment modification, except for the recommendation to avoid allergens when appropriate. Medications for the FFA disease were recorded at the time of referral for testing, as well as at least 4 months after patch testing.

Patch tests were conducted with the Spanish Extended GEIDAC Baseline 2022 (hereinafter referred to as baseline series) [25] in addition to a selection of Special FFA Series (hereinafter referred to as FFA series) composed of eight extra allergens previously described in patients with FFA (salicylates [15–17, 20, 21] and thimerosal [15]) and other allergens used in sunscreens and hair products (Table S2).

Patch tests were performed according to ESCD (European Society of Contact Dermatitis) guidelines [26]. The patch test reactions graded as +, ++ and +++ were considered positive for the analysis.

The frequency of positive patch test reactions to the baseline and FFA series in the population of consecutive patients with FFA was analysed. The positive results were compared with a control group represented by the population of all patients without the FFA-disease referred for patch testing for other reasons at the same centers during the same period.

In addition, FFA patients presenting relevant sensitization were compared with FFA patients without sensitization to determine if any clinical variables were associated with sensitization. We sought to determine if there was a patient profile that would allow us to predict a higher probability of detecting positive results if certain clinical variables were present.

Finally, an analysis regarding the improvement of various symptoms of FFA disease was conducted based on the comparison of questionnaire results between patients with FFA who practiced allergen avoidance and those who did not.

2.2 | Statistical Analysis

Frequencies and percentages were used for categorical variables, and medians with interquartile ranges (in addition to means and standard deviation) were utilized for quantitative variables. For analytical studies, the Chi-square test was used for comparisons.

Since MOAHLFA variables are not evenly distributed between the group of patients with FFA and the patients without FFA undergoing patch testing at the same centers during the same period, a logistic regression analysis was performed with positive patch test reactions to extended GEIDAC baseline-series allergens as target (dependent) variables, and seven dichotomized independent variables (MOAHLFA index variables). Results are presented as Odds Ratios (OR) with 95% confidence intervals (CI). The required level of statistical significance was determined to be $p < 0.001$.

2.3 | Ethical and Legal Aspects

The REIDAC study protocol was approved by the Ethics Committee of Complejo Hospitalario Universitario Insular Materno Infantil de las Palmas de Gran Canaria (2017/964). The specific study regarding contact sensitization in patients with FFA was approved by the Ethics Committee of Guadalajara University Hospital (CEIm 2021.49.EO); and, subsequently, by the Ethics Committees of the other participating hospitals. This study was conducted in accordance with the Declaration of Helsinki and with local and European regulations. All patients signed a written consent form for the use of their registry data.

TABLE 1 | Logistic regression analysis[a] (statistical significance set at $p < 0.001$).

Extended GEIDAC baseline series	FFA vs Non-FFA		
	OR*	95% CI	*p*-value
Nickel sulfate	0.94	0.63–1.40	0.75
Neomycin sulfate	3.07	0.61–15.53	0.17
Potassium dichromate	0.34	0.05–2.51	0.29
Caine mix	0.79	0.10–6.18	0.82
Fragrance mix I	0.36	0.09–1.49	0.16
Peru Balsam	1.21	0.42–3.49	0.72
Cobalt chloride	0.53	0.16–1.73	0.29
P-tert-butyl phenol formaldehyde resin	1.51	0.33–6.93	0.60
Epoxi resin	1.31	0.16–10.76	0.80
Carbas mix	1.12	0.14–8.79	0.91
Black rubber mix/IPPD	0.95	0.21–4.23	0.94
Methylchloroisothiazolinone/methylisothiazolinone	0.75	0.23–2.46	0.63
Quaternium-15	3.60	0.71–18.24	0.12
Paraphenylenediamine	0.49	0.15–1.60	0.24
Formaldehyde	1.47	0.50–4.30	0.48
Mercapto mix	3.14	0.33–29.83	0.32
Thiuram mix	1.01	0.13–8.02	0.10
Imidazolidinyl urea	4.66	0.42–51.33	0.21
Mercaptobenzothiazole	3.29	0.33–32.58	0.31
Methylisothiazolinone	1.96	1.00–3.85	0.050
Fragrance mix II	0.48	0.11–2.03	0.33
2-HEMA	1.60	0.53–4.78	0.40
Textile dye mix	0.93	0.39–2.23	0.88
Linalool hydroperoxides 1%	0.43	0.15–1.20	0.11
Limonene hydroperoxides 0.5%	0.30	0.07–1.23	0.094
Ethylenediamine	0.28	0.04–2.09	0.21
Methyldibromoglutaronitrile	15.43	2.99–79.73	0.0011
Propolis[b]	**7.52**	**3.44–16.44**	**0.00000**
Sodium disulfite - 1% pet.	8.63	1.87–39.89	0.0058
Compositae mix II 2.5%	0.86	0.20–3.72	0.84
Linalool hydroperoxides 0.5%	2.96	0.32–27.50	0.34
Limonene hydroperoxides 0.3%	4.52	0.47–43.30	0.19
Decyl glucoside 5% pet.	0.25	0.03–1.87	0.18
Lauryl glucoside 3% pet.	0.34	0.05–2.54	0.29
Shellac 20% pet[b]	**6.77**	**2.82–16.27**	**0.0000**
Gallate Mix 1% pet[b]	**4.92**	**2.70–8.95**	**0.0000**
Octyl gallate 0.25%	5.55	1.97–15.62	0.0012
Dodecyl gallate 0.25%	3.93	1.34–11.52	0.013

Abbreviations: CI, confidence interval; FFA, frontal fibrosing alopecia; GEIDAC, Spanish Contact Dermatitis Research Group; HEMA, hydroxyethyl methacrylate: mix, mixture; pet, petrolatum; OR, odds ratio.
[a]Allergens without positive results (Lanolin alcohols, colophony, paraben mix, diazolidinyl urea, tixocortol pivalate, budesonide, sesquiterpene lactone mixture, Lyral, 2-bromo-2-nitropropane-1,3-diol) are not included in the analysis.
[b]Significant ($p < 0.001$) effects are presented with boldfaced numbers.

3 | Results

3.1 | Clinical Characteristics

We investigated 133 patients with FFA in 10 dermatology departments throughout Spain. Out of 133, 129 (97%) were women. At the time of the patch testing, 108/133 (81%) patients received some treatment, with the most common being topical minoxidil, topical corticosteroids and oral dutasteride. Clinical progression during the year prior to patch testing was reported in 55 of 124 (44%) patients. During the follow-up period, all patients received the same amount or a lesser amount of medication for FFA. Between one-fifth and one-quarter of patients had subjective symptoms of intolerance to sun exposure, eczema, pigmentation or rosacea. Eighty-six of 120 (72%) patients reported using sunscreen daily or almost daily year-round. Subjective symptoms of intolerance to cosmetic products and sunscreens were reported by 34/131 (26%) and 18/130 (14%), respectively (Table S1). The characteristics relating to the MOAHLFA(p) index are shown in Table S3.

3.2 | Patch Test Results

At least one positive allergen from the baseline series was found in 77/133 (58%) (Table S4). No significant differences were detected in the frequency of positive results in the patch test for at least one allergen from the baseline series compared to the population without FFA patch tested with the baseline series in the same period (52.3%) ($p = 0.21$).

The most frequent positive allergens were nickel sulfate (40/131; 30.6%), gallate mixture (mix) (19/126; 15.1%) propolis (12/131; 9.2%), methylisothiazolinone (11/133; 8.3%) and shellac (9/126; 7.1%); which were relevant in 25%, 37%, 33%, 82% and 33% of cases, respectively.

In the logistic regression analysis, it was observed that having FFA was significantly associated with being sensitized to propolis, shellac, and gallate mix (OR = 7.52, 95% CI: 3.44–16.44, $p < 0.001$; OR = 6.77, 95% CI: 2.82–16.27, $p < 0.001$; and OR = 4.92,

TABLE 2 | Positive patch test reactions from FFA Series.

	Positive		Patch test reactions					Clinical relevance	
	Total positive (+/++/+++)	Total patch tested	IR	?+	+	++	+++	Present	Past
FFA Series	N (%)	N	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
1. Ethylhexyl salicylate (10.0% pet.)	8 (6)	(132)	0 (0)	4 (3)	6 (5)	2 (2)	0 (0)	7 (87.5)	0 (0)
2. Benzyl salicylate (10.0% pet.)	7 (5.3)	(132)	0 (0)	6 (5)	7 (5)	0 (0)	0 (0)	6 (85.7)	0 (0)
3. Homosalate (10.0% pet.)	2 (1.5)	132	0 (0)	1 (1)	1 (1)	1 (1)	0 (0)	1 (50)	0 (0)
4. Butyl methoxydibenzoylmethane (10.0% pet.)	0 (0)	132	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
5. Thimerosal (0.1% pet.)	2 (1.5)	132	0 (0)	0 (0)	2 (2)	0 (0)	0 (0)	0 (0)	0 (0)
6. Benzophenone-3 (10.0% pet.)	0 (0)	132	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
7. Benzophenone-4 (2.0% pet.)	2 (1.5)	132	0 (0)	0 (0)	2 (2)	0 (0)	0 (0)	0 (0)	0 (0)
8. Ammonium persulfate (2.5% pet.)	6 (4.6)	131	1 (1)	2 (2)	5 (4)	1 (1)	0 (0)	2 (33.3)	0 (0)

Abbreviations: FFA, frontal fibrosing alopecia; IR, irritant; pet.: petrolatum.

95% CI: 2.7–8.95, $p < 0.001$, respectively) after adjusting for the MOAHLFA variables (Table 1).

Regarding patch test results with the FFA series, the most frequent positive allergens were ethylhexyl salicylate (8/132; 6%), benzyl salicylate (7/132; 5.3%) and ammonium persulfate (6/130; 4.6%), being relevant in 7/8 (87.5%), 6/7 (85.7%) and 2/6 (33.3%) cases, respectively (Table 2). Thirteen of 133 (9.8%) patients had positive patch test reactions to at least one salicylate (benzyl salicylate, ethylhexyl salicylate and/or homosalate). Three patients had concomitant positive reactions to ethylhexyl salicylate and benzyl salicylate. Four of 13 (31%) patients with FFA who had patch test reactions to any salicylate also developed concomitant patch test reactions to any gallate.

3.3 | Comparative Analysis Between Clinical Variables and Contact Sensitization

Relevant sensitization to any salicylates (ethylhexyl salicylate, benzyl salicylate or homosalate) was significantly associated with subjective symptoms of intolerance to sun exposure ($p < 0.0001$) and symptoms of intolerance to sunscreens ($p < 0.0001$).

Statistical significance was not reached for the relationship between salicylate sensitization and other clinical variables such as rosacea ($p < 0.024$) or symptoms of intolerance to cosmetics ($p < 0.031$).

No significant associations were identified between the analysed clinical variables and relevant sensitization to allergens from the baseline series, or selected hairdressing allergens (paraphenylenediamine, ammonium persulfate, shellac or sodium metabisulfite) or selected fragrance-related allergens (limonene hydroperoxides, linalool hydroperoxides, fragrance mix I or fragrance mix II) (Table 3).

3.4 | Results of the Analysis of the Questionnaire Regarding Symptoms Improvement Following Patch Testing After Allergen Avoidance

Of the 106 patients with FFA who responded to the questionnaire, 52 (49.1%) reported having experienced sensitization and received instructions on avoidance strategies. Forty-seven of them (90.38%) confirmed that they followed these instructions.

During the follow-up period, all patients received the same amount or a lesser amount of medication than they were receiving at the time they were referred for the patch tests. Improvement of itching in the area of alopecia affected 57% of the patients who reported having avoided the allergens however statistically significance was not reached ($p = 0.015$).

No statistically significant differences were observed in the improvement of trichodynia, hair loss progression, eczema or symptoms of intolerance to cosmetics or sunscreens between patients who avoided allergens and patients who did not.

Most patients considered patch testing worthwhile without any significant differences being observed between patients who complied with the avoidance measures and those who did not ($p = 0.098$). Only two patients, belonging to the non-allergen avoidance group, indicated that they would have preferred not to undergo patch testing (Table S4).

4 | Discussion

To date, our study includes the largest population of unselected FFA patients who have undergone consecutive patch testing and who have been interviewed on adherence to allergen avoidance and symptom improvement following patch testing.

TABLE 3 | Comparative analysis between clinical variables and relevant sensitizations to different allergen groups.

	Any relevant sensitization to									
	GEIDAC Baseline Series allergens		Sunscreen allergens[a]		Salicylate allergens[b]		Hairdressing allergens[c]		Fragrance allergens[d]	
Clinical variables	**Obs**	***p***	**Obs**	***p***	**Obs**	***p***	**Obs**	***p***	**Obs**	***p***
Subjective symptoms of intolerance to sun exposure	129	0.0059	129	**0.0001**	129	**0.0001**	129	0.34	129	1.0
Pigmentation	120	0.16	120	0.097	120	0.097	120	0.52	120	0.065
Follicular hyperkeratosis	131	1.0	131	1.0	131	1.0	131	0.69	131	0.32
Perifollicular erythema	129	1.0	129	0.78	129	0.78	129	1.0	129	1.0
Rosacea	130	0.28	130	0.024	130	0.024	130	1.00	130	0.21
Eczema	130	0.62	130	0.22	130	0.22	130	0.67	130	0.24
Scalp itching	128	0.82	128	0.78	128	0.78	128	0.22	128	0.30
Trichodynia	125	0.12	125	0.13	125	0.13	125	0.58	125	0.31
Frequent use of sunscreens	120	0.45	120	0.20	120	0.21	120	0.79	120	0.70
Symptoms of intolerance to sunscreens	130	0.002	130	**0.0001**	130	**0.0001**	130	0.055	130	1.0
Symptoms of intolerance to cosmetics	131	0.15	131	0.031	131	0.031	131	0.013	131	0.45
Clinical progression last year	124	0.82	124	1.0	124	1.0	124	0.40	124	1.0
Frontal hairline regression	120	0.48	120	0.38	120	0.38	120	1.0000	120	0.43
Eyebrow hair loss	128	0.26	128	0.79	128	0.79	128	1.0000	128	0.65

Note: Bold value shows the significance levels $p < 0{,}001$.
[a]Sum of patients with relevant sensitization to sunscreen compounds (ethylhexyl salicylate + benzyl salicylate + homosalate + butylmethoxy dibenzoylmethane + benzophenone 3 + benzophenone 4).
[b]Sum of patients with relevant sensitization to salicylates (ethylhexyl salicylate + benzyl salicylate + homosalate).
[c]Sum of patients with relevant sensitization to hairdressing allergens (PPD + ammonium persulfate + shellac + sodium metabisulfite).
[d]Sum of patients with relevant sensitization to fragrance allergens (FMI + FMII + limonene hydroperoxides + linalool hydroperoxides).

4.1 | Is FFA Associated to Contact Sensitization?

No significant differences were detected between the percentage of positive allergens in the population of patients with FFA and in the population without FFA patch tested with the extended baseline series in the same period due to other reasons mainly eczema. However, some allergens were significantly overrepresented in patients with FFA, such as: propolis, shellac and gallate mix. Said allergens had been provisionally included in the extended baseline series during the study period as part of other REIDAC projects. Sensitization to propolis, shellac and gallates had already been described in FFA-patients [14–17, 20, 23] sometimes concomitantly with salicylates [15, 20].

We also detected a high frequency of clinically relevant sensitization to salicylates (common ingredients in perfumes, hair cosmetics [27, 28] and sunscreens) associated with subjective symptoms of intolerance to sun exposure and sunscreens intolerance. Since salicylates are not routinely patch tested in the baseline series, it is uncertain whether salicylate sensitization is more common among patients with FFA than in the general population undergoing patch testing; however, salicylate sensitization is currently considered rare [27–32]. Sensitization to salicylates (benzyl salicylate, ethylhexyl salicylate and homosalate) has also been previously published involving other patients with FFA [15–17, 20, 21]. In some case reports, false negative results were described with commercial patch test preparations and the diagnosis was only achieved

after complex diagnostic procedures [17, 20]. Regarding other UV filters, only two cases of sensitization to benzophenone-4 were identified, and none to benzophenone-3 or butylmethoxydibenzoylmethane.

A high proportion of patients used sunscreen daily/almost daily (72%), which is consistent with published research [3–9]. It could be speculated that the frequent daily use of sunscreen in patients with FFA might be related to a clinical condition associated with the disease, such as rosacea, pigmentation or subjective symptoms of intolerance to sun exposure. In our study, however, no evidence of an association between frequent sunscreen application and these clinical features was found. Although it may be hypothesized that contact sensitization to sunscreens in the context of FFA could result from increased exposure, we were not able to find a significant association between frequent sunscreen use and sensitization to sunscreen allergens ($p = 0.20$), including salicylates.

The reasons for the differences in results between different types of sunscreens are unknown: they could be due to disparities in exposure, sensitization potential or diverse exposure sources. In addition to reports showing sensitization to salicylates in patients with FFA, cases showing follicular or lichenoid skin reactions involving patients exposed topically or systemically to salicylates have been reported suggesting a possible disease specificity [33–38].

Sensitization to propolis, shellac and gallate mix was significantly more frequent in patients with FFA than in controls. However, in general, it was difficult to establish clinical relevance for them (20%–25%), which made it difficult to interpret the reasons for its association with the FFA-disease. This could lead to future research, although we can speculate on some hypotheses. For example, the fact that we frequently find positive patch tests for octyl gallate and dodecyl gallate (generally described as food additive allergens) [39] could lead to the hypothesis of a sensitization route by exposure through food. Additionally, we could speculate on co-sensitization or cross-reactivity [15] as tentative explanations for the concomitant patch test reactions identified among salicylates and gallates.

However, this study, which was not designed to assess causal relationships, has not allowed the establishment of a causal, triggering or aggravating role of contact sensitization in the inflammation and/or progression of FFA.

4.2 | Could Avoiding Allergens Improve Symptoms in Patients With FFA?

According to prior reports, allergen avoidance has been reported to lead to improvement of the FFA symptoms in some cases. A study found significant improvement in pruritus but not with a significant change in perifollicular erythema or perifollicular scale [40]. Another study showed improvement both in scalp pruritus and erythema in a high percentage of patients with *lichen planopilaris* or FFA after allergen avoidance [14]. Improvement in quality of life has also been described due to reduced pruritus when benzyl salicylate was avoided in patients with FFA sensitized to it [15]. Resolution of neck hyperpigmentation has been reported after avoiding fragrances and salicylates in cosmetics in two patients with FFA sensitized to ethylhexyl salicylate [17]. Additionally, a recent case of a patient with FFA and symptoms of sunscreens intolerance of simultaneous onset, diagnosed with sensitization to benzyl salicylate, ethylhexyl salicylate and homosalate, has been published, who experienced a stabilization of disease activity with allergen avoidance without other therapeutic approach [41].

While improvements in various clinical manifestations of the disease have been previously reported, our study did not identify significant differences in improvement in pruritus in the alopecic area, trichodynia, or hair loss progression between patients who followed allergen avoidance instructions and those who did not.

4.3 | Limitations of the Study

The analysis was performed on a population of Spanish patients with FFA. The degree of sensitization and the specific allergens may vary depending on the geographical area.

The control group consisted of patients referred for patch testing rather than the general population, which possibly introduced referral bias.

The frequency of sensitization to the FFA series, including salicylates, is unknown in the control population since they are not part of the baseline series, so comparative analyses regarding their possible association with the disease are not available.

It was not possible to determine whether the subjective symptoms of intolerance to sun exposure were indeed photosensitivity or photoallergy, since no light test or photopatch tests were performed.

Although adjustment for MOAHLFA variables was applied for comparative analysis, additional confounders such as cosmetic exposure intensity, occupational factors or disease duration were not considered.

The assessment of symptom improvement was based on subjective questionnaires administered after a 4-month period, a short timeframe in which improvement is unlikely. A larger number of patients, longer follow-up, and objective measurements of severity at baseline and during follow-up could better assess clinical improvement.

4.4 | Conclusions

Should patch testing and allergen avoidance be implemented in patients with FFA?

We performed routine patch testing on a large, consecutive, unselected population of patients with FFA and found that there was no evidence that patients with the disease had a higher rate of sensitization than the general patch-tested population during that period. However, sensitization to certain allergens such as

propolis, shellac and gallate mix, was significantly associated with FFA disease compared to the general population patch-tested during the same period after adjusting for MOAHLFA variables, although clinical relevance was difficult to determine in most cases.

On the other hand, a high frequency of contact sensitization to salicylates was also observed, which was associated with subjective symptoms of intolerance to sun exposure and sunscreen intolerance. Prevalence data on salicylate sensitization in controls undergoing patch testing without FFA should be made available in order to draw conclusions regarding its potential association with the disease. Standardization of the salicylate patch test may also be necessary, given the reported false negatives and doubtful tests, and the complex diagnostic procedures sometimes required to reach a diagnosis.

No sufficient evidence was found in our study to justify routine patch testing for patients with FFA. No clinically significant improvement was identified—with no differences observed between patients who followed an allergen avoidance strategy and those who did not—and the clinical relevance of disease-related sensitizations (such as shellac, gallate mixture or propolis) remains uncertain. However, patch testing with an expanded baseline series, including salicylates, may be offered to patients with FFA who report subjective symptoms of intolerance to sun exposure or sunscreens.

Author Contributions

María-Antonia Pastor-Nieto: conceptualization, investigation, writing – original draft, methodology, validation, visualization, writing – review and editing, project administration, formal analysis, data curation, supervision. **María Elena Gatica Ortega:** conceptualization, investigation, writing – original draft, methodology, validation, visualization, writing – review and editing, formal analysis, project administration, supervision, data curation. **Anna María Giménez-Arnau:** investigation, methodology, conceptualization, writing – review and editing. **Tatiana Sanz-Sánchez:** investigation, methodology, conceptualization. **Pedro Mercader García:** investigation, methodology, conceptualization, writing – review and editing. **Inmaculada Ruíz-González:** investigation. **Gemma Melé-Ninot:** investigation, writing – review and editing. **Pablo Chicharro11:** investigation. **Paloma Sánchez-Pedreño:** investigation. **Marina de Vega:** investigation, methodology, software, formal analysis, data curation. **Miguel Ángel Gallego Descalzo:** investigation, methodology, formal analysis, software, data curation. **Leopoldo Borrego:** conceptualization, investigation, writing – review and editing, methodology, supervision, project administration, visualization, validation, formal analysis, data curation.

Funding

The Spanish Registry of Research in Contact Dermatitis and Cutaneous Allergy (REIDAC) is supported by the Fundación Piel Sana of the Academia Española de Dermatología y Venereología, which receives financial support from the The Spanish Agency of Medicines and Medical Devices (AEMPS) through an agreement with the Spanish Agency for Medicines and Health Products (AEMPS). The REIDAC accepts donations from other pharmaceutical industry members and currently receives financial support from Sanofi and Leo; Pharma. The collaborating companies neither participated in the project nor influenced its creation or management. The collection, management, analysis, interpretation, publication, and review of data generated in the REIDAC are independent of the public and private funding sources of the project.

Ethics Statement

The REIDAC study protocol was approved by the Ethics Committee of Complejo Hospitalario Universitario Insular Materno Infantil de las Palmas de Gran Canaria (2017/964). This study was conducted in accordance with the Declaration of Helsinki and with local and European regulations. All patients signed a written consent form for the use of their registry data. The specific Frontal Fibrosing Alopecia study was approved by the Ethics Committee of Guadalajara University Hospital (CEIm 2021.49.EO) as well as those of the other participating centers.

Consent

Authors obtained informed written consent from our patients authorizing publication of the attached photographs.

Conflicts of Interest

Pedro Mercader-García reports lectures and advisory boards from Sanofi, Leo Pharma, Lilly and AbbVie, outside of the scope of the submitted work. He has also received support for conference attendance from Lilly, Almirall and Sanofi. The remaining authors declare no conflicts of interest.

Data Availability Statement

Research data are not shared.

References

1. D. Saceda-Corralo, A. Combalia, P. Fernandez-Crehuet, et al., "Consensus Document on the Clinical Management of Frontal Fibrosing Alopecia: Recommendations From Spanish Working Group on Trichology and Onychology of the AEDV," *Actas Dermo-Sifiliográficas* 117, no. 1 (2026): 104486.

2. D. Saceda-Corralo, D. Ortega-Quijano, G. Muñoz-Martín, et al., "Genotyping of the rs1800440 Polymorphism in CYP1B1 Gene and the rs9258883 Polymorphism in HLA-B Gene in a Spanish Cohort of 223 Patients With Frontal Fibrosing Alopecia," *Acta Dermato-Venereologica* 103 (2023): adv9604.

3. N. Aldoori, K. Dobson, C. R. Holden, A. J. McDonagh, M. Harries, and A. G. Messenger, "Frontal Fibrosing Alopecia: Possible Association With Leave-On Facial Skin Care Products and Sunscreens; a Questionnaire Study," *British Journal of Dermatology* 175, no. 4 (2016): 762–767.

4. A. Debroy Kidambi, K. Dobson, S. Holmes, et al., "Frontal Fibrosing Alopecia in Men: An Association With Facial Moisturizers and Sunscreens," *British Journal of Dermatology* 177 (2017): 260–261.

5. O. M. Moreno-Arrones, D. Saceda-Corralo, A. R. Rodrigues-Barata, et al., "Risk Factors Associated With Frontal Fibrosing Alopecia: A Multicentre Case-Control Study," *Clinical and Experimental Dermatology* 44, no. 4 (2019): 404–410.

6. J. T. Pathoulas, K. E. Flanagan, C. J. Walker, et al., "A Multicenter Descriptive Analysis of 270 Men With Frontal Fibrosing Alopecia and Lichen Planopilaris in the United States," *Journal of the American Academy of Dermatology* 88, no. 4 (2023): 937–939.

7. S. S. Ocampo-Garza, M. E. Herz-Ruelas, S. Chavez-Alvarez, D. M. de la Fuente-Rodriguez, and J. Ocampo-Candiani, "Association of Frontal Fibrosing Alopecia and Contact Allergens in Everyday Skincare Products in Hispanic Females: A Case-Control Study," *Anais Brasileiros de Dermatologia* 96, no. 6 (2021): 776–778.

8. J. Maghfour, M. Ceresnie, J. Olson, and H. W. Lim, "The Association Between Frontal Fibrosing Alopecia, Sunscreen, and Moisturizers: A Systematic Review and Meta-Analysis," *Journal of the American Academy of Dermatology* 87 (2022): 395–396.

9. O. Kam, S. Na, W. Guo, C. I. Tejeda, and T. Kaufmann, "Frontal Fibrosing Alopecia and Personal Care Product Use: A Systematic Review and Meta-Analysis," *Archives of Dermatological Research* 315, no. 8 (2023): 2313–2331.

10. W. C. Cranwell and R. Sinclair, "Sunscreen and Facial Skincare Products in Frontal Fibrosing Alopecia: A Case-Control Study," *British Journal of Dermatology* 180, no. 4 (2019): 943–944.

11. V. B. Rocha, A. Donati, L. A. Contin, et al., "Photopatch and Patch Testing in 63 Patients With Frontal Fibrosing Alopecia: A Case Series," *British Journal of Dermatology* 179, no. 6 (2018): 1402–1403.

12. O. Aerts, A. Bracke, A. Goossens, V. Meuleman, and J. Lambert, "Titanium Dioxide Nanoparticles and Frontal Fibrosing Alopecia: Cause or Consequence?," *Journal of the European Academy of Dermatology and Venereology* 33, no. 1 (2019): e45–e46.

13. L. Rudnicka, G. R. Rokni, T. Lotti, et al., "Allergic Contact Dermatitis in Patients With Frontal Fibrosing Alopecia: An International Multi-Center Study," *Dermatologic Therapy* 12 (2020): e13560.

14. S. Prasad, D. H. Marks, L. J. Burns, et al., "Patch Testing and Contact Allergen Avoidance in Patients With Lichen Planopilaris and/or Frontal Fibrosing Alopecia: A Cohort Study," *Journal of the American Academy of Dermatology* 83, no. 2 (2020): 659–661.

15. M. A. Pastor-Nieto, M. E. Gatica-Ortega, C. Sánchez-Herreros, A. Vergara-Sánchez, J. Martínez-Mariscal, and E. De Eusebio-Murillo, "Sensitization to Benzyl Salicylate and Other Allergens in Patients With Frontal Fibrosing Alopecia," *Contact Dermatitis* 84, no. 6 (2021): 423–430.

16. M. A. Pastor-Nieto, M. E. Gatica-Ortega, and M. Torralba, "Response to Letter to the Editor," *Contact Dermatitis* 85, no. 4 (2021): 485–486.

17. M. A. Pastor-Nieto, M. E. Gatica-Ortega, and L. Borrego, "Sensitization to Ethylhexyl Salicylate: Another Piece of the Frontal Fibrosing Alopecia Puzzle," *Contact Dermatitis* 90, no. 4 (2024): 402–410.

18. J. S. Truel, C. X. Wang, D. I. Schlessinger, D. M. Sheinbein, and C. M. Mann, "Cetrimonium Bromide Patch Test Positivity Is Found With a High Frequency in a Cohort of Patients With Frontal Fibrosing Alopecia," *Dermatitis* 35, no. 1 (2024): 100–101.

19. L. C. Chen, C. Ogbutor, C. Spencer, Ü. Yıldız-Altay, K. J. Kelley, and M. M. Senna, "Patch Testing and Allergic Contact Dermatitis in Patients With Lichen Planopilaris and/or Frontal Fibrosing Alopecia: A Systematic Reviewand Meta-Analysis," *Dermatitis* 36, no. 1 (2025): e100–e102.

20. M. E. Gatica-Ortega, M. A. Pastor-Nieto, R. Torres-Aranda, L. Alonso-Naranjo, and C. Pérez-Hortet, "Contact Sensitization to *Magnolia officinalis* Bark Extract and Other Allergens in a Patient With Frontal Fibrosing Alopecia and Lichen Planus Pigmentosus," *Contact Dermatitis* 86, no. 5 (2022): 434–436.

21. M. A. Pastor-Nieto and M. E. Gatica-Ortega, "Allergic Contact Dermatitis to Drometrizole Trisiloxane in a Woman Thereafter Diagnosed With Frontal Fibrosing Alopecia," *Contact Dermatitis* 89, no. 3 (2023): 215–217.

22. M. E. Gatica-Ortega, L. Vergara-de-la-Campa, L. Alonso-Naranjo, and M. A. Pastor-Nieto, "Relevant Sensitization to Diethylamino Hydroxybenzoyl Hexyl Benzoate and Fragrances in a Patient With Frontal Fibrosing Alopecia and Acquired Dermal Macular Hyperpigmentation," *Contact Dermatitis* 87, no. 3 (2022): 287–289.

23. F. J. Navarro-Triviño, "Allergic Contact Dermatitis From Shellac in an Ecological Hair Spray Occurring in a Patient With Frontal Fibrosing Alopecia," *Contact Dermatitis* 86, no. 6 (2022): 544–545.

24. C. P. Hernández-Fernández, P. Mercader-García, J. F. Silvestre Salvador, et al., "Candidate Allergens for Inclusion in the Spanish Standard Series Based on Data From the Spanish Contact Dermatitis Registry," *Actas Dermo-Sifiliograficas (English Edition)* S0001-7310, no. 21 (2021 May 23): 192–197.

25. F. J. Navarro-Triviño, L. Borrego, J. F. Silvestre-Salvador, et al., "Standard and Expanded Series Patch Testing Update by the Spanish Contact Dermatitis and Skin Allergy Research Group (GEIDAC)," *Actas Dermo-Sifiliográficas* 115, no. 7 (2024): T712–T721.

26. J. D. Johansen, K. Aalto-Korte, T. Agner, et al., "European Society of Contact Dermatitis Guideline for Diagnostic Patch Testing - Recommendations on Best Practice," *Contact Dermatitis* 73, no. 4 (2015): 195–221.

27. F. Tous-Romero, M. Prieto-Barrios, J. J. Andrés-Lencina, and J. O. de Frutos, "Allergic Contact Dermatitis Caused by Benzyl Salicylate in Hair Products," *Contact Dermatitis* 79 (2018): 310–311.

28. P. Fernández-Canga, I. Ruíz-González, E. Varas-Meis, L. M. Valladares-Narganes, and M. A. Rodríguez-Prieto, "Contact Allergy to Benzyl Salicylate," *Contact Dermatitis* 76, no. 5 (2017): 315–316.

29. A. C. Dens, A. Goossens, J. Darcis, S. Huygens, C. Lambrecht, and L. Gilissen, "Allergic Contact Dermatitis Caused by Ethylhexyl Salicylate With Possible Cross-Reactivity With Benzyl Salicylate," *Contact Dermatitis* 81, no. 4 (2019): 317–318.

30. D. W. Shaw, "Allergic Contact Dermatitis From Octisalate and Cis-3-Hexenyl Salicylate," *Dermatitis* 17, no. 3 (2006): 152–155.

31. C. G. Mortz, H. Thormann, A. Goossens, and K. E. Andersen, "Allergic Contact Dermatitis From Ethylhexyl Salicylate and Other Salicylates," *Dermatitis* 21, no. 2 (2010): E7–E10.

32. A. Scheman and R. Te, "Contact Allergy to Salicylates and Cross-Reactions," *Dermatitis* 28, no. 4 (2017): 291.

33. R. L. Rietschel and C. W. Lewis, "Contact Dermatitis to Homomenthyl Salicylate," *Archives of Dermatology* 114, no. 3 (1978): 442–443.

34. R. Ruiz Villaverde, J. Blasco Melguizo, F. Mendoza Guil, M. C. Martín Sánchez, and R. Naranjo Sintes, "Generalized Lichen Planus-Like Eruption due to Acetylsalicylic Acid," *Journal of the European Academy of Dermatology and Venereology* 17, no. 4 (2003): 470–472.

35. E. M. Alstead, A. G. Wilson, and M. J. Farthing, "Lichen Planus and Mesalazine," *Journal of Clinical Gastroenterology* 13, no. 3 (1991): 335–337.

36. M. L. Powell, A. Ehrlich, and D. V. Belsito, "Lichenoid Drug Eruption to Salsalate," *Journal of the American Academy of Dermatology* 45, no. 4 (2001): 616–619.

37. T. N. Canavan, S. F. McClees, J. R. Duncan, and B. E. Elewski, "Lichen Planopilaris in the Setting of Hair Sunscreen Spray," *Skin Appendage Disorders* 5, no. 2 (2019): 108–110.

38. P. Mirmirani and S. G. Vanderweil, "Frontal Fibrosing Alopecia With Involvement of the Central Hair Part: Distribution of Hair Loss Corresponding to Areas of Sunscreen Application," *Dermatology Online Journal* 26, no. 11 (2020): 13030/qt8t41g0th.

39. M. L. García-Melgares, J. de la Cuadra, B. Martín, C. Laguna, L. Martínez, and V. Alegre, "Sensitization to Gallates: Review of 46 Cases," *Actas Dermo-Sifiliográficas* 98, no. 10 (2007): 688–693.

40. J. S. Truel, D. I. Schlessinger, M. Lazarus, C. Rojas Marcos, D. M. Sheinbein, and C. M. Mann, "Effects of Allergen Avoidance in Patients With Frontal Fibrosing Alopecia: A Retrospective Cohort Analysis," *Dermatitis* 36 (2025): 535–537.

41. S. M. Franken and T. Rustemeyer, "Salicylate Allergy and Frontal Fibrosing Alopecia: A Case Report With Stabilisation of the Complaints After Allergen Avoidance," *Contact Dermatitis* 94, no. 3 (2026): 306–307.

Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Table S1:** Clinical variables of FFA-patients (registered by the general dermatologist who referred the patients to be patch tested). **Table S2:** Patch tested allergen series. **Table S3:** MOAHLFAp analysis. **Table S4:** Results of the analysis of the data collection sheet (questionnaire) on the symptom improvement comparing patients who declared to avoid exposure to the positive allergens with patients who did not.