

# Eyebrows Are Important in the Treatment of Alopecia Areata



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Alopecia areata affects not only scalp hair but also other sites of body hair, including eyebrows. Our objective was to investigate the importance of eyebrows in the treatment goals of patients with alopecia areata. Through an online questionnaire, subjects were asked to assess satisfaction with the visually depicted level of response to treatment, using edited photographs depicting a range of eyebrows and scalp hair growth. The questionnaire was completed by 1,741 adults. Absent or partial growth of eyebrows and scalp hair elicited <25% satisfaction. Images depicting either complete eyebrows or complete scalp hair achieved satisfaction in >50% of participants. More participants were satisfied with complete eyebrows and no scalp hair (69%) than complete eyebrows and partial scalp hair (51%). Only when both eyebrows and scalp hair were completely regrown did extreme satisfaction levels reach 90.4%. Limitations include the online nature of the survey, lack of control group, and self-reported severity of alopecia areata in participants. These results suggest that eyebrows may be as important as scalp hair for patients assessing theoretical responses to treatment for alopecia areata. Future clinical studies should consider growth of eyebrows as an outcome measure on par with scalp hair growth.

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## INTRODUCTION

Alopecia areata (AA) is a common autoimmune disease of hair loss, typically characterized by patchy alopecia involving the scalp. However, any hair-bearing site may be involved, with partial or complete hair loss. Affected patients may have no scalp hair loss and absent eyebrows, complete scalp hair loss and unaffected eyebrows, patchy hair loss of the scalp and eyebrows, and many other presentations. Whereas the importance of scalp hair growth in AA is obvious, the involvement of and growth of eyelashes and eyebrows are likely important as well.

The importance of eyebrows, in general, is well established, and studies show that eyebrows are fundamentally important in emotional expression, communication, facial attractiveness, and facial recognition (Neely et al., 2014; Nguyen, 2014; Sadr et al., 2003). However, there are no studies that specifically investigate the importance of eyebrows to patients with AA. In our experience, patients with partial or absent eyebrows often express significant dissatisfaction with that aspect of their hair loss, and some patients prioritize the growth of eyebrows over scalp hair.

In this study, we sought to characterize the relative importance of scalp and eyebrows involvement to patients with AA.

## RESULTS

The questionnaire was completed by 1,741 participants, of whom 77.9% were female and 22.1% were male, with a

median age of 44 years (interquartile range, 31–55). At the time of questionnaire administration, 53.4% reported having no eyebrows, 22.7% reported having partial eyebrows, and 23.9% reported having complete eyebrows. Demographic and clinical characteristics are summarized in Table 1.

Overall, the percentage of subjects who were satisfied with the theoretical response to treatment did not increase linearly with increasing overall hair growth but rather exhibited a threshold effect. Levels of satisfaction to theoretical response to treatment for images depicting absent hair was 10.9%, significantly less than all other images ( $P < 0.001$ ). Absent scalp hair and partial eyebrows elicited 22.4% satisfaction, and partial scalp hair with absent eyebrows similarly elicited 20.2% satisfaction ( $P = 0.13$ ). Once eyebrows or scalp hair reached complete growth, the level of satisfaction to theoretical response to treatment increased significantly to over 50%. In images depicting complete eyebrows, significantly more subjects were satisfied having no scalp hair (69%) than partial scalp hair (51%;  $P < 0.001$ ), even though the latter photograph depicted more hair growth overall.

Figure 2 shows the percentage of subjects who reported not just satisfaction but extreme satisfaction, the highest level of satisfaction and goal for treatments, with each depiction of theoretical treatment response. Depictions of complete eyebrows and scalp hair growth achieved 90.4% extreme satisfaction. Levels of extreme satisfaction to theoretical treatment response were similar for images of complete eyebrows and no scalp hair (36.4%) and partial eyebrows and complete scalp hair (36.8%;  $P = 0.86$ ) and significantly less for images of no eyebrows and complete scalp hair (32.8%;  $P = 0.027$ ). The subjects' self-reported current state of eyebrows was found to have no effect on their answers to the depicted level of response to treatment.

When asked explicitly if scalp hair or eyebrows were more important, 40.6% responded that scalp hair was more important, 26.8% responded that eyebrows were more

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Abbreviation: AA, alopecia areata

**Table 1. Demographics and clinical characteristics (N = 1,741)**

Characteristics	n (%) or median (IQR)
Sex, n (%)	
Male	384 (22.1)
Female	1,356 (77.9)
Other	1 (0.06)
Age (median, IQR)	44 (31–55)
Duration of disease (median, IQR)	12 (5–25)
Current state of eyebrows, n (%)	
No eyebrows	930 (53.4)
Partial eyebrows	395 (22.7)
Complete eyebrows	416 (23.9)

Abbreviation: IQR, interquartile range.

important, and 33.6% responded that both were equally important. 48.2% of subjects reported that they would like both eyebrows and scalp hair to be treated. Additional responses are summarized in Table 2.

**DISCUSSION**

Eyebrows give complexity to the canvas of the face, without which facial recognition and identity may be lost. Our results suggest that for patients with AA, eyebrows are important, with many respondents explicitly prioritizing eyebrows over scalp hair in treatment goals. Furthermore, levels of extreme satisfaction to theoretical treatment response were significantly less for images of no eyebrows and complete scalp hair (32.8%; *P* = 0.027) than complete eyebrows and no scalp hair (36.4%).

The level of satisfaction did not increase linearly with depictions of overall hair growth, scalp hair growth, or eyebrows growth. Specifically, levels of extreme satisfaction were low for depictions of complete scalp hair growth together with either no (32.8%) or partial (36.8%) eyebrows

growth. Similarly, levels of extreme satisfaction to depicted levels of treatment response were low for complete scalp hair regrowth together with absent eyebrow regrowth (32.8%) as they were for complete eyebrow regrowth together with absent scalp hair growth (36.4%). Only when both eyebrows and scalp hair were completely regrown did extreme satisfaction levels reach 90.4%. Paradoxically, in images depicting complete eyebrows, significantly more subjects expressed satisfaction and extreme satisfaction with theoretical treatment response with images having no scalp hair than having partial scalp hair, even though the latter photograph depicted more hair growth overall. These findings lend support to the notion that treatments that do not achieve a threshold of response (all or nothing) may not be meaningful to patients.

Limitations of this study include the online nature of the study, depictions of theoretical responses to treatment, and lack of control group. In addition, this study was unable to control for severity of AA in subjects or the use of cosmetics or wigs.

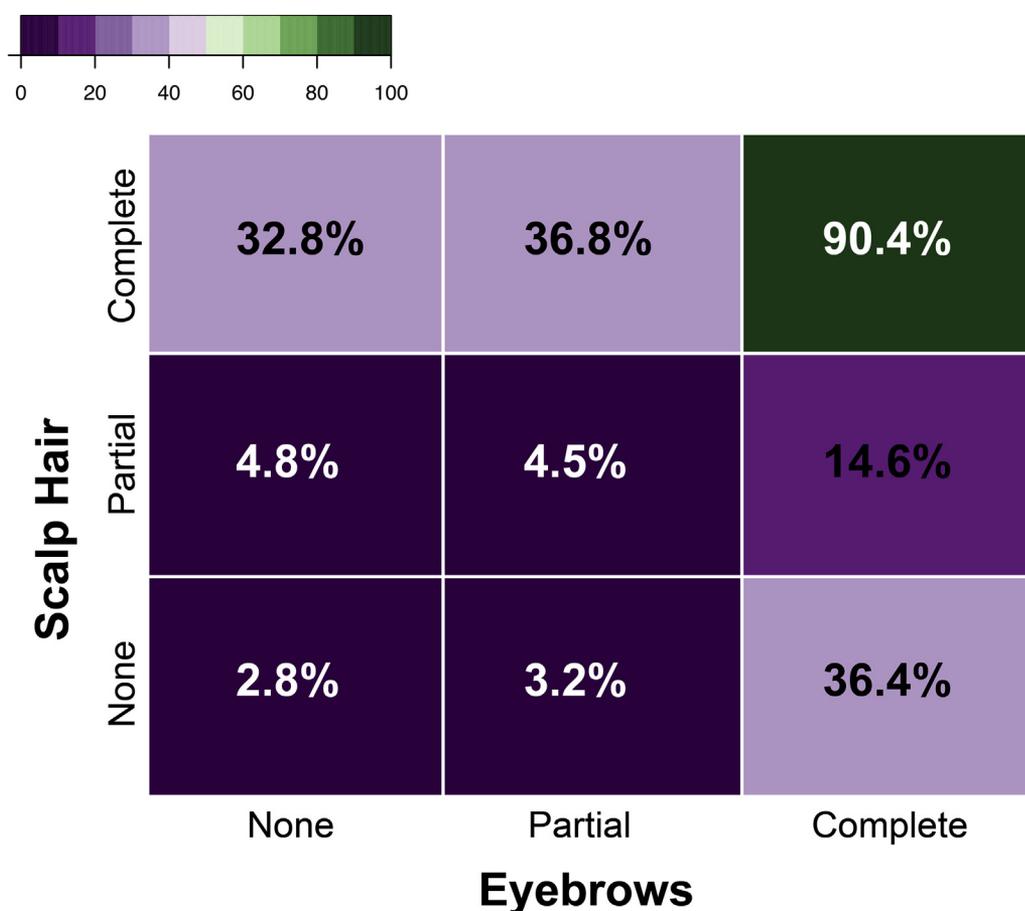
Eyebrows may be as important as scalp hair for patients with AA. With the recent surge in potential therapeutics for AA, it is increasingly important to understand the spectrum of issues that matter to patients with AA. Whereas scalp hair growth is inarguably important, clinical trials need to consider growth of eyebrows as an outcome measure on par with scalp hair growth and recognize it as a factor that influences and contributes to patient satisfaction with treatment response.

**MATERIALS AND METHODS**

An anonymous prospective online questionnaire was designed using Qualtrics (Qualtrics, Provo, UT, February 2016) to assess the importance of eyebrows to adult patients with AA. Completion of all questions was required. The questionnaire was divided into two parts: implicit assessment using photographs and explicit assessment without photographs. Using Adobe Photoshop Creative Suite 6 (Adobe Systems Incorporated, San Jose, CA, February 2016), photographs of well-known celebrities were downloaded and



**Figure 1.** Public domain images were graphically edited to depict varying degrees of hair growth and used to assess satisfaction with theoretical treatment responses.



**Figure 2.** Percentage of subjects that reported extreme satisfaction with the degree of scalp and eyebrows growth in response to treatment. Purple indicates low percentages of extreme satisfaction, and green indicates high percentages of extreme satisfaction.

graphically edited to depict varying levels of eyebrows and scalp hair growth as a theoretical response to treatment (Figure 1). Eyebrows and scalp hair growth were either depicted as no growth, partial growth, or complete growth. Responses were reported on a 5-point Likert scale: extremely dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, and extremely satisfied. All responses that were somewhat satisfied or extremely

satisfied were considered as achieving theoretical treatment satisfaction. Specifically, extreme satisfaction represented the standard for theoretical treatment goals. The questionnaire can be reviewed in the Supplementary Materials. Participants of the National Alopecia Areata Foundation listserv were invited to take the questionnaire through e-mail. This prospective study was approved by Yale University's Institutional Review Board.

All incomplete surveys, surveys completed on behalf of a child, and surveys completed by those aged <18 years were discarded. Descriptive statistics were used to report clinical and demographic information. Given the non-normality of data, all values are reported in median and interquartile ranges. Wilcoxon rank-sum tests were used to compare responses from male and female groups. All statistical analyses were conducted using R Statistical Package software (<https://www.r-project.org>).

#### Data availability statement

Datasets related to this article will be provided upon reasonable request submitted to the corresponding author.

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#### CONFLICTS OF INTEREST

BAK has received funding support from The Ranjini and Ajay Poddar Resource Fund for Dermatologic Diseases Research. BAK has also served on advisory boards or is a consultant for Celgene, Concert Pharmaceuticals Inc, Eli Lilly and Company, Pfizer Inc, Regeneron Pharmaceuticals, and Roivant

**Table 2. Responses to Questionnaire (N = 1,741)**

Questions	n (%)
How important are eyebrows to you?	
Extremely important	861 (49.5)
Very important	548 (31.5)
Moderately important	241 (13.8)
Slightly important	71 (4.1)
Not at all important	20 (1.1)
Are eyebrows or scalp hair more important to you?	
Eyebrows are more important	450 (25.8)
Scalp hair is important	706 (40.6)
I care about them the same amount	585 (33.6)
When treating alopecia areata, would you rather target your eyebrows or scalp?	
Eyebrows	296 (17.0)
Scalp	559 (32.1)
Both	839 (48.2)
Doesn't matter	47 (2.7)

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#### AUTHOR CONTRIBUTIONS

Conceptualization: LYL, BAK, JMK; Methodology: LYL, JMK; Investigation: LYL; Data Curation: LYL; Formal Analysis: LYL; Visualization: LYL, JMK; Writing - Original Draft Preparation: LYL; Supervision: BAK, JMK; Writing - Review and Editing: BAK, JMK

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#### REFERENCES

- Neely JG, Lisker P, Drapekin J. Importance of the brow in facial expressiveness during human communication. *Otol Neurotol* 2014;35. e97–103.
- Nguyen JV. The biology, structure, and function of eyebrow hair. *J Drugs Dermatol* 2014;13(Suppl):s12–6.
- Sadr J, Jarudi I, Sinha P. The role of eyebrows in face recognition. *Perception* 2003;32:285–93.