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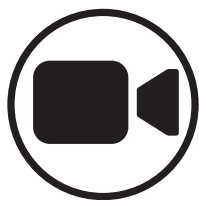
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RESEARCH LETTER

Rhinoplasty

## Variation of Vibrissal Density in Sinonasal Surgery Patients

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### Introduction

Vibrissae are commonly perceived as a nuisance necessitating trimming before sinonasal surgery. Although studies have shown that nasal hairs are important in particulate filtration,<sup>1</sup> little is known about their distribution or changes occurring with age/follicular disorders. We utilized high-definition endoscopy to quantify vibrissae in sinonasal surgery patients to identify the average density of vibrissae in humans. Understanding topographical vibrissae distribution may improve insight into inflammatory diseases of the upper airway aggravated by particulate matter and may have clinical implications among patients with hair loss disorders.

### Methods

This descriptive cross-sectional study was conducted to investigate vibrissal density among surgical patients. Approval was granted by the UC Irvine Institutional Review Board (IRB). Individuals with history of radiation were excluded. Operative videos taken using high-definition endoscopy from 30 cases (18 cosmetic or functional rhinoplasty cases and 12 endoscopic sinus cases) were analyzed. Still frames of nasal vestibule vibrissae were captured with a 5-mm diameter circular scale bar (Supplementary Fig. S1, Supplementary Video S1). Vibrissal density was defined as the number

of terminal nasal hair follicles within a 19.6-mm<sup>2</sup> area, calculated by two independent reviewers (ImageJ). The intraclass correlation coefficient (ICC) was calculated to assess inter-rater reliability. A paired-samples *t*-test was used to compare mean difference between right and left ala. Subjects were grouped according to age (<45 and ≥45 years) and gender and analysis of variance (ANOVA) was conducted to examine the effects of these variables on mean vibrissal density. *p*-values <0.05 were deemed statistically significant. Data are presented as mean ± standard error, unless otherwise noted.

### Results

The sample included 14 women and 16 men. Most patients were white (*n*=22) with a mean age of 47.47 years (Table 1). A high degree of inter-rater reliability was found between reviewers (ICC=0.978). The density of vibrissae of right and left alar margins were 34.30 ± 2.17 and 34.90 ± 2.44/19.6 mm<sup>2</sup> (*p*=0.640). Patients aged <45 years had significantly higher vibrissal density compared to older patients (41.75 ± 2.60 vs. 28.63 ± 2.51/19.6 mm<sup>2</sup>, *p*=0.001, Fig. 1). The mean vibrissal density between men and women, and between rhinoplasty and sinus cases, was not significantly different (*p*=0.068 and *p*=0.418).

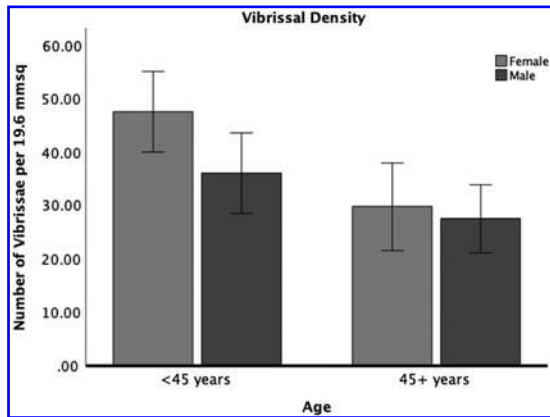
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**Fig. 1.** Vibrissal density. Overall, patients aged <45 years were found to have  $41.75 \pm 2.60$  vibrissae per  $19.6 \text{ mm}^2$ . Women and men in this age group had  $47.50 \pm 3.67$  ( $n=7$ ) and  $36.00 \pm 3.67$  ( $n=7$ ) vibrissae per  $19.6 \text{ mm}^2$ , respectively. On average, patients aged 45 years and older were found to have  $28.63 \pm 2.51$  vibrissae per  $19.6 \text{ mm}^2$ . Women and men in this age group had  $29.75 \pm 3.97$  ( $n=6$ ) and  $27.50 \pm 3.07$  ( $n=10$ ) vibrissae per  $19.6 \text{ mm}^2$ , respectively.

## Discussion

This study revealed significant age-related differences in vibrissal density. Understanding the distribution of vibrissae offers insight into airway disorders aggravated by particulate matter, such as asthma or chronic lung infections.<sup>2</sup> Prior research suggests that decreased vibrissae count increases asthma risk, likely from increased airway exposure to higher allergen load,<sup>1</sup> and advanced age is reportedly associated with higher risk of mortality from asthma.<sup>3</sup> In addition, these findings may offer clinical considerations for patients with hair loss. Individuals with alopecia subtypes have reported persistent rhinorrhea and may be at increased risk of asthma and allergic rhinitis, potentially from the absence of these filtrative hairs.<sup>4,5</sup> Taken together, important questions are raised about the role of vibrissae in the symptomatology and pathophysiology of respiratory tract diseases.

Interestingly, terminal hair growth may vary based on location within the vestibule. The highest density of vibrissae was noted along the alar margin caudal to the lateral crus and within the soft triangle. Prior studies reported a nearly uniform relation of vibrissae-bearing areas in relation to the lower lateral cartilaginous border, suggesting the utility of vibrissae as a surgical landmark

**Table 1.** Patient demographics and vibrissal density

Patient demographics		
Age (years)	Mean, SD: $47.47 \pm 18.76$ Range: 18–84	
	<45	14
	45+	16
Gender	Female	13
	Male	17
Race	White	22
	Asian	3
	Other/mixed	5
Ethnicity	Non-Hispanic	21
	Hispanic	9
No. of vibrissae per $19.6 \text{ mm}^2$		
	Age <45	Age 45+
Mean right alar margin	$40.64 \pm 3.08$	$28.75 \pm 2.33$
Mean left alar margin	$42.86 \pm 3.71$	$27.94 \pm 2.04$
Mean vibrissal density	$41.75 \pm 3.24$	$28.34 \pm 2.06$

SD, standard deviation.

for rhinoplasty.<sup>6</sup> Caution should be exercised in utilizing vibrissae as a surgical landmark in older patients as this border may be ill-defined due to hair loss.

Our study offers insight into factors contributing to changes in vibrissal density and any clinical implications. Owing to a small sample size, future studies are needed before generalizing the results across different populations.

## Authors' Contributions

All authors contributed to this study.

## Author Disclosure Statement

No competing financial interests exist.

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## Supplementary Material

Supplementary Figure S1  
Supplementary Video S1

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