RHINOLOGY

ORIGINAL CONTRIBUTION

OPEN ACCESS

Olfactory training using nasal inserts is more effective due to increased adherence

Anja L. Winter[1], Sofie Henecke[1,4], Evelina Thunell[1], Mattias Swartz[1], Joakim Martinsen[1], Pernilla Sahlstrand Johnson[2,3*], Johan N. Lundström[1,4,5*]

Rhinology 63: 4, 477 - 485, 2025

https://doi.org/10.4193/Rhin24.369

Presenter: PGY1 邱奕誠

Supervisor: VS 鄭評嘉醫師

2025.08.26

Introduction

- Research backgrounds
  - Olfactory training

    - Most common treatment for olfactory dysfunction

    - Low cost, 2–4 times/day for several weeks to months
  - Adherence issues

    - Dropout rates up to 45% in studies

    - Chronic medication (50%), Physiotherapy (70%)

    - Perceived as monotonous and time-consuming

    - Difficult for Long-term persistence

- Research backgrounds
  - Modified approaches → Nasal clips

    - Filled with Peppermint / Eucalyptus

    - 3 hours exposure, every day for one month

    - Improved odor discrimination

    - Failed to maintain nasal patency
  - New products → Scented Silicone Nasal Inserts

    - Near-normal nasal airflow

    - Potential portable OT

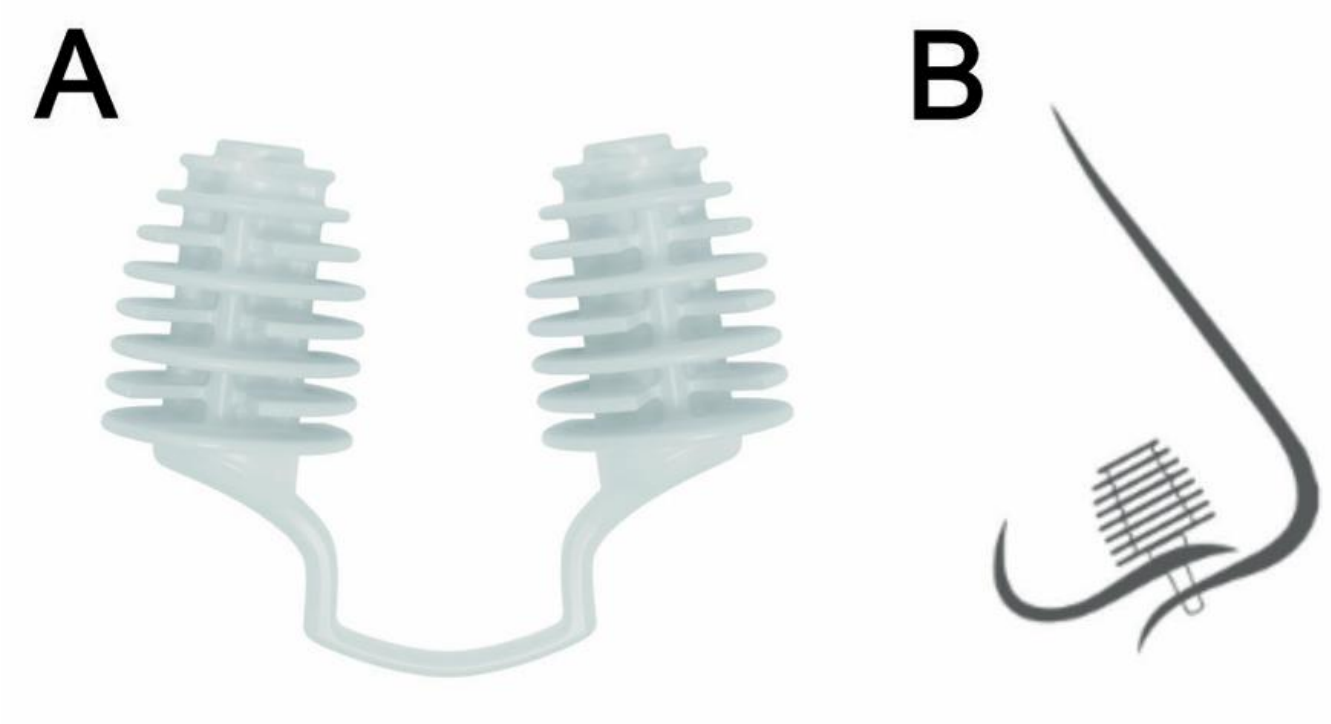


Figure 1. A. Nasal insert with its scented lamella that allow near normal nasal patency. B. Schematic drawing of a nasal insert positioned within the nose, viewed from the side.

Materials and Methods

- Participants
  - Total recruited: 173 (OPD + Social media) → **Final: 116**
  - Inclusion criteria:

    - Post-viral or Idiopathic hyposmia

    - TDI score: 15.25 - 31.25

    - Age: 18 - 65
  - Exclusion criteria:

    - Psychiatric diagnosis, non-viral or non-idiopathic

Variable	Nasal Insert (N = 60)	Standard Care (N = 56)	Statistic	p	Total (N = 116))
Sex			$\chi^2 = .03$	.86	
Female (percentage) Male (percentage)	50 (83.3%) 10 (16.7%)	45 (80.4%) 11 (19.6%)			95 (81.9%) 21 (18.1%)
Age			t = .90	.37	
Mean (SD)	49.3 (12.1)	47.5 (9.08)			48.4 (10.7)
TDI visit 1			t = .18	.85	
Mean (SD)	24.9 (4.58)	25 (4.62)			25 (4.58)
Duration hyposmia (months)	**(N = 59)**	**(N = 52)**	t = .09	.93	**(N = 111)**
Mean (SD) Median (Min, Max)	42.9 (41.6) 36 (1.5, 240)	43.7 (48.7) 39 (3, 360)			43.3 (44.9) 38 (1.5, 360)
Duration between visits (days)	**(N = 56)**	**(N = 43)**	t = .96	.34	**(N = 99)**
Mean (SD) Median (Min, Max)	68 (24.5) 62 (54, 204)	73.2 (30.1) 62 (53, 202)			68.2 (24.5) 62 (53, 204)

Assessment

- Baseline visit: Demographic, **TDI olfactory test**, QoL questionnaires
- Follow-up visit: **Olfactory test, Adherence study**

- Procedure

	Nasal inserted group	Standard Olfactory Training
Device	Single-use scented nasal plugs	4-6 common household odors
Schedule	Both 20 min in the morning and in the evening, weekdays only, 8wks	
Procedure details	- Morning: 2 odors (10 min each) - Evening: 2 different odors (10 min each) → **4 different odors per day**	- Each odor sniffed for 10–20 sec - Repeated throughout the 20-min session → **same odors reused within session**
Odor options	Vanilla, lemon, melon, rosemary, menthol, orange…	Participant's choice of household odors
Method	Inserted into nostrils, disposed every sessions	Direct sniffing

- Olfactory function
  - Objective olfactory function: TDI score (Range: 1-48)

    - Threshold (1-16): phenyl ethyl alcohol

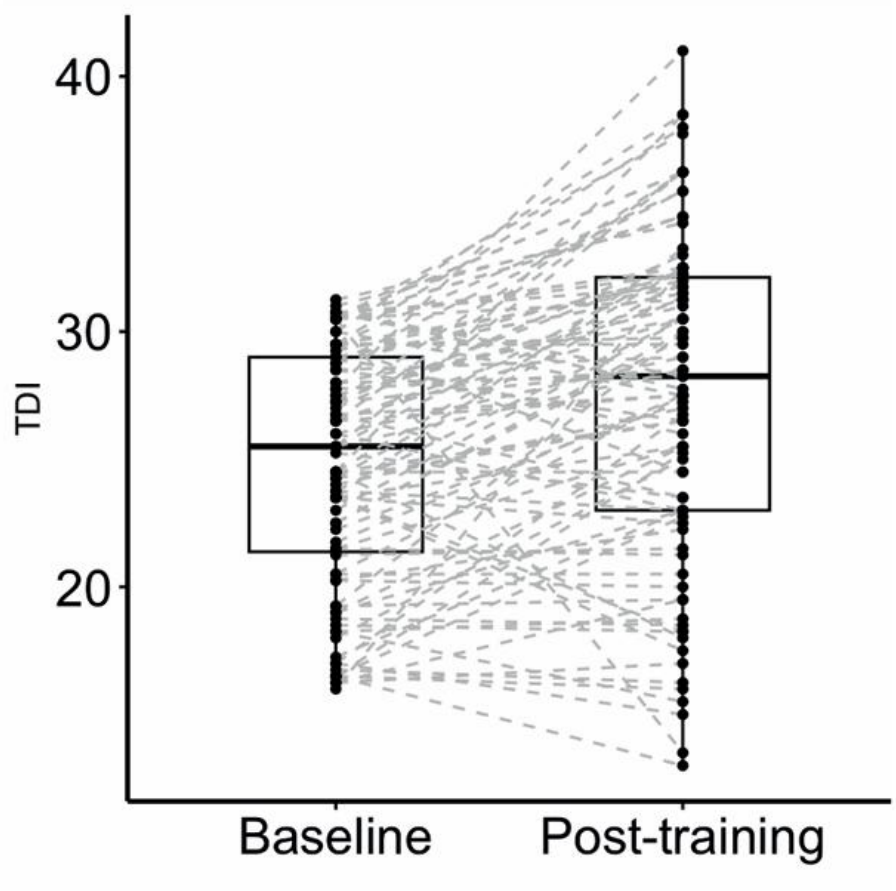
    - Discrimination (0-16)

    - Identification (0-16)

    - Article: 15.25 – 31.25
  - Subjective olfactory function: VAS score
- Compliance
  - Dropout
  - Adherence

Results

- Objective olfactory improvement
  - Overall effect of olfactory training



Paired-samples t-test
- $t(98)=5.7$, $p<.001$
- TDI scores increased after training in the full sample
- Significant overall improvement in TDI

- Objective olfactory improvement
  - NI group vs SC group

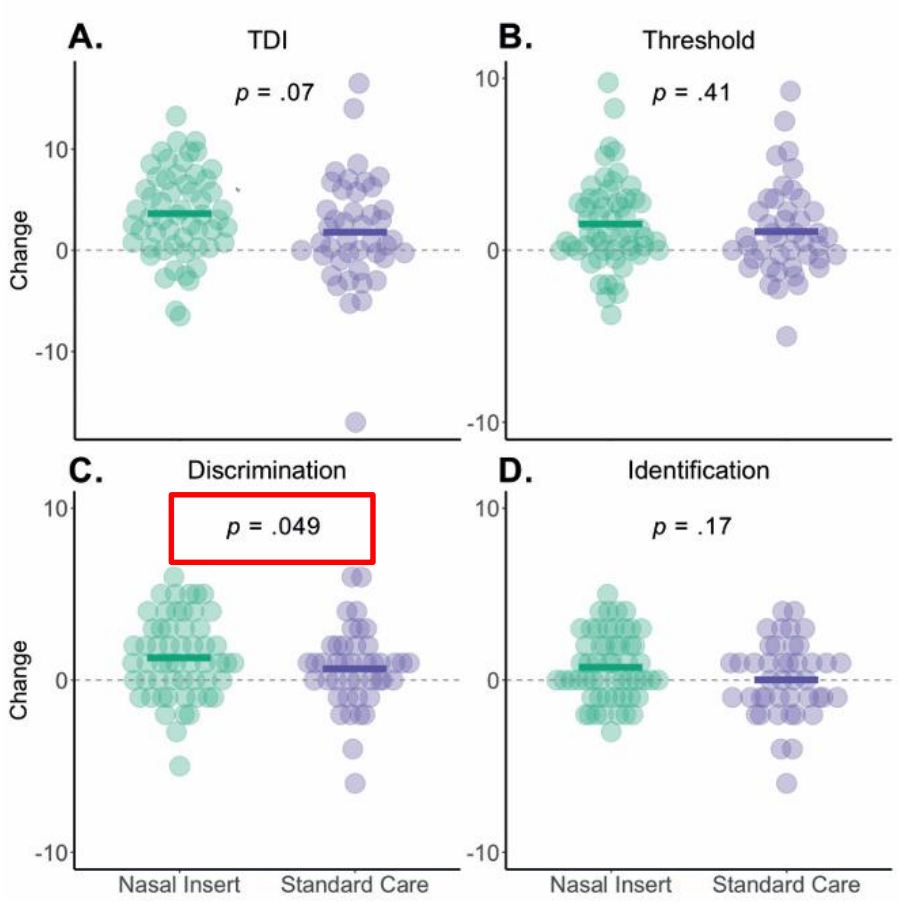


Figure 3. Change in objective olfactory function from baseline to post-treatment per olfactory test score and olfactory training group. A. Combined TDI scores. B. Odor detection threshold scores. C. Odor quality discrimination scores. D. Odor identification scores. In all panels, dots represent individual values (scores slightly jittered for visualization purposes) and solid bars depict group means. Dashed lines indicate 0. Note the difference in scale between panels A and B-D. Note that p-values in figure originates from ANCOVAs with baseline score as covariate.

- Objective olfactory improvement
  - Clinically Relevant Change

    - Previous study: ΔTDI ≥ 5.5 is considered clinically meaningful improvement in olfactory function

    - NI group: 36.7% / SC group: 19.6%
  - Recovery to Normosmia

    - Definition: TDI > 30.75

    - NI group: 35.7% / SC group: 34.8%

- Subjective olfactory improvement
  - Overall

    - Compared baseline vs post-training, self-reported

    - Paired-samples t-test: $t(98)=5.5$, $p<0.01$
  - Group comparison (NI vs SC)

    - $F(1.96)=3.5$, $p=0.06$
  - Duration of Dysfunction

    - Previous study: longer olfactory dysfunction → worse training outcomes

	Spearman's r	P-value	Interpretation
TDI	r = -0.12	0.22	Not significant
VAS	r = 0.03	0.77	Not significant

- Dropout and treatment adherence
  - Dropout

    - NI group: 4/60 (6.7%) / SC group: 13/56 (23.2%)

  - Adherence to training

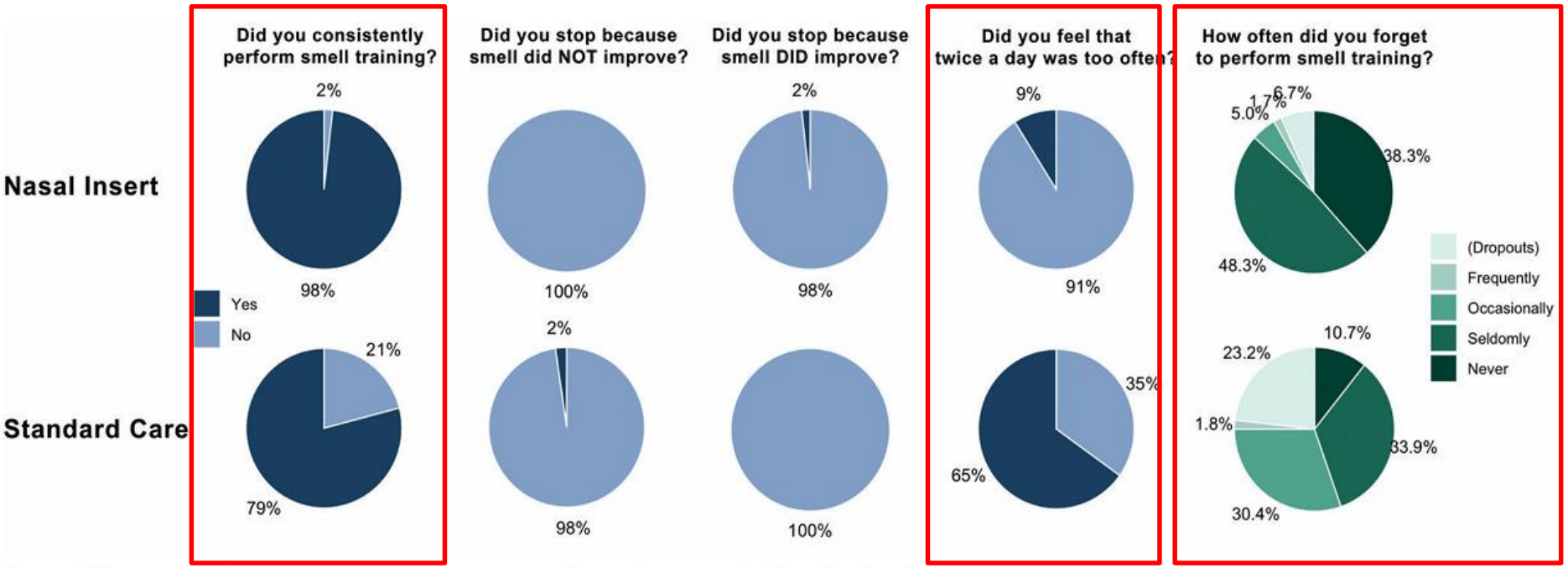


Figure 4. Frequency of answers to the adherence questionnaire separated by olfactory training group.

Discussion

- Key results
  - Nasal inserts showed higher adherence (98% vs. 79%), fewer forgotten sessions (86.6% vs. 64.3%), and lower dropout rates (6.7% vs. 23.2%)
  - Compliance: SC group found training "too much" more often (35% vs. 9%)
  - Satisfaction: No significant difference
  - Treatment effect:

    - Clinically relevant improvement: 36.7% (NI) vs. 19.6% (SC)

    - No significant difference in TDI score between groups

    - Outlier?

- Interpretation
  - Nasal inserts may be a clinically advantageous method, enhancing adherence and possibly improving effectiveness

    - Greater mobility during training

    - More odors choices

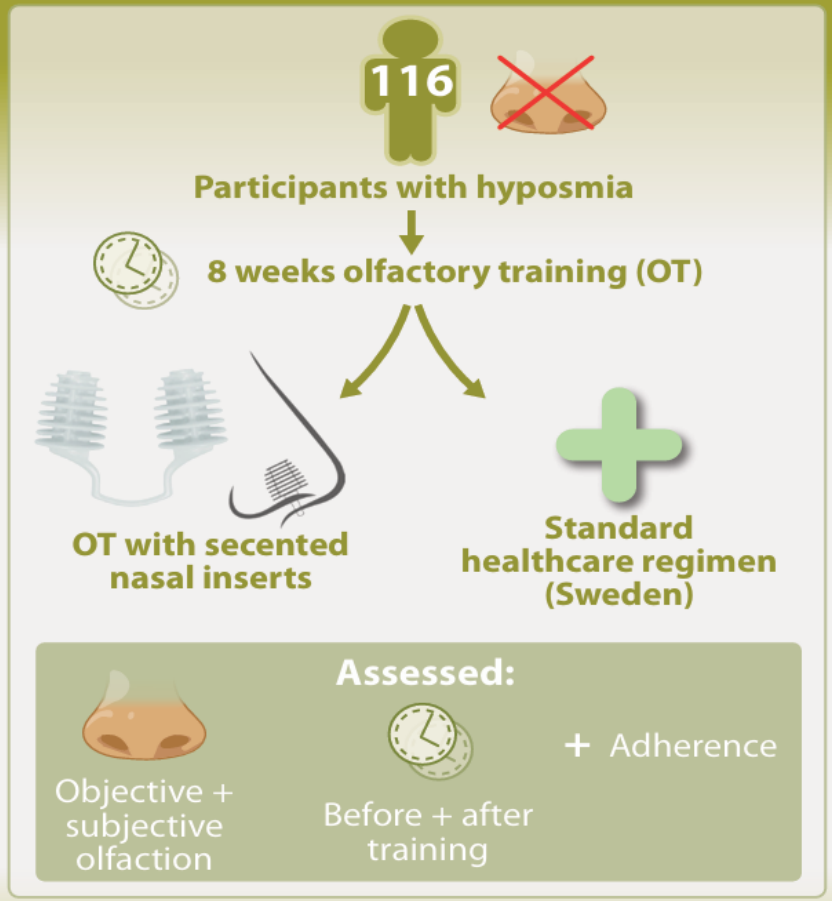
    - Increased saliency by being provided with a device/system
  - Dropout reasons: Linked to subjective perception of improvement or lack thereof, though subjective vs. objective function correlate poorly

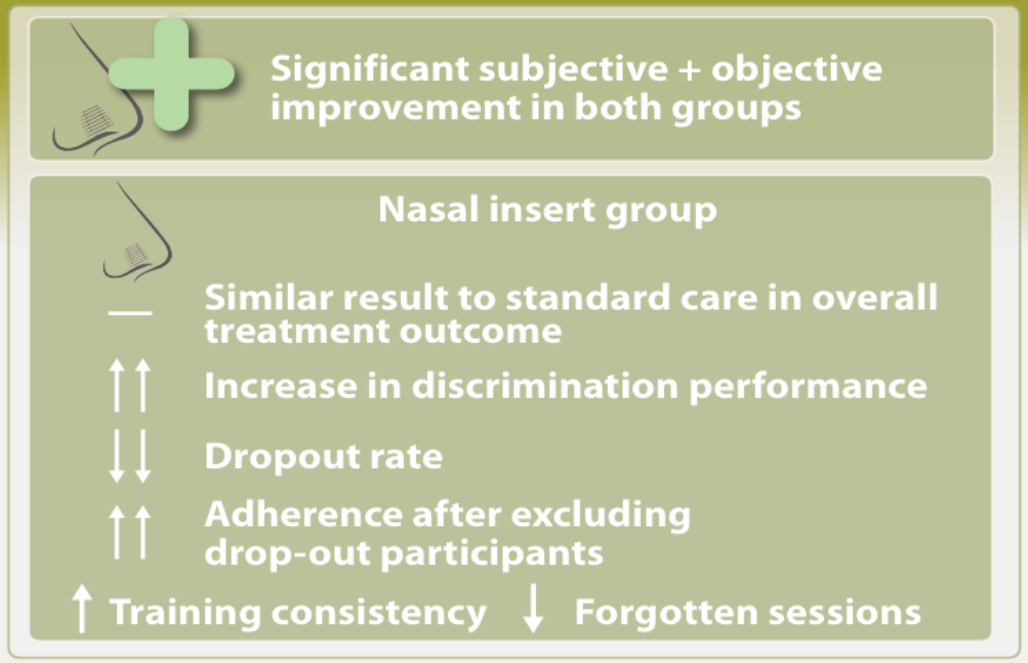
- Limitations
  - Cannot confirm whether nasal insert participants focused on odor objects
  - Difference in odor types (household vs. single molecules) could affect results
  - Study limited to post-viral or idiopathic hyposmia
  - Training period relatively short
  - The data may drop in real clinical world

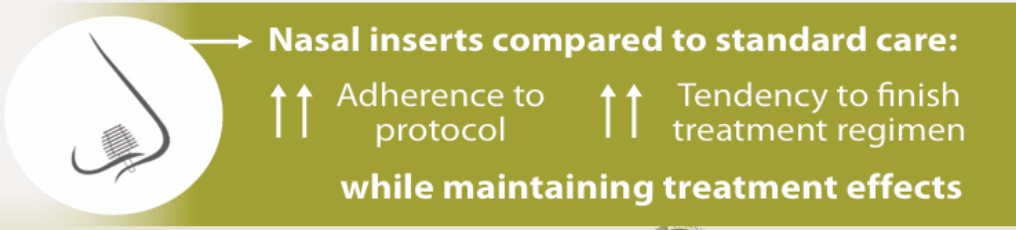
Conclusion

- Olfactory training with scented nasal inserts leads to a significantly higher adherence to treatment protocol with more consistent training and fewer forgotten training sessions while maintaining treatment effects, when compared to standard care. **This combination of significantly lower dropout rates and higher adherence, while maintaining treatment outcomes, makes nasal inserts an interesting method to increase the effectiveness of olfactory training in standard clinical populations.**

Olfactory training using nasal inserts is more effective due to increased adherence







Winter AL, Henecke S, Thunell E, et al. Rhinology 2025. https://doi.org/10.4193/Rhin24.369

RHINOLOGY
Official Journal of the European and International Societies

Thank you for listening!