Clinical Observation and fMRI Brain Functional Imaging Study of Nasal Acupuncture Treatment for Moderate to Severe Allergic Rhinitis

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Abstract: Objective:To investigate the clinical efficacy of intranasal acupuncture in patients with moderate-to-severe allergic rhinitis (AR) and to explore its effects on functional brain network reorganization using resting-state functional magnetic resonance imaging (fMRI).

Methods: A total of 60 patients diagnosed with moderate-to-severe AR at the Department of Otolaryngology, Dongzhimen Hospital, Beijing University of Chinese Medicine, were enrolled between March 2024 and December 2024. Under nasal endoscopic guidance, bilateral acupuncture was performed at the Yingxiang (LI20) and Nasal Hill points every other day for two weeks, totaling seven sessions. Clinical outcomes were assessed using the Visual Analog Scale (VAS), Total Nasal Symptom Score (TNSS), and the Rhinoconjunctivitis Quality of Life Questionnaire (RQLQ) at baseline, post-treatment, and during follow-up periods at two weeks (Follow-up 1) and four weeks (Follow-up 2). Resting-state fMRI scans were conducted on a subset of 19 patients. Amplitude of Low-Frequency Fluctuations (ALFF), fractional ALFF (fALFF), and functional connectivity analyses were employed to evaluate changes in brain activity network connectivity before, during, after and and intranasal acupuncture.Results:1.Clinical Efficacy:Significant improvements in clinical symptoms and quality of life were observed following intranasal acupuncture, as evidenced by reductions in TNSS and VAS scores and improvements in RQLQ scores. The therapeutic effects were sustained during follow-up periods, with a high overall treatment efficacy rate.2.Brain Functional Activity:Intranasal acupuncture induced notable changes in brain activity, particularly in the occipital lobe (lingual gyrus, middle occipital gyrus, and superior occipital gyrus), anterior cingulate cortex, and prefrontal cortex. Additionally, significant alterations in functional connectivity were observed between the limbic system and bilateral olfactory cortex.Conclusion:Intranasal acupuncture is an effective intervention for alleviating clinical

symptoms in patients with moderate-to-severe AR and promotes functional reorganization in brain regions associated with olfactory and limbic processing. These findings provide insights into the neurophysiological mechanisms underlying the therapeutic effects of intranasal acupuncture.

Keywords: allergic rhinitis;Intranasal acupuncture;Brain functional magnetic resonance imaging;TNSS;VAS



Figure 1: Endoscopic images of acupuncture at Neivingxiang acupoint (A, B) and nasal mound (C, D)





Figure 2 Brain regions with differences in ALFF values before, during, and after intranasal acupuncture in patients with allergic rhinitis

Note: Figure 2a shows the ALFF brain activation map of patients with allergic rhinitis during intranasal acupuncture compared to before acupuncture; 2b is the ALFF brain activation map after intranasal acupuncture compared to before acupuncture; 2c is the ALFF brain activation map after intranasal acupuncture compared to before acupuncture. The cool color (blue-green) represents the area where ALFF decreases, the warm color (red yellow) represents the area where ALFF increases, and the color bar represents the T-value of paired sample t-test. R is on the right side, L is on the left side.

Indicator	(I) Time	(J) Time	Mean Difference	Standard Error	Significance ^b	95% Confidence Interval of the	
			(I-J)			Difference ^b	
						Lower Limit	Upper Limit
VAS Score	Before Treatment	After	23.350*	1.551	.000	20.246	26.454
		Treatment					
	Before Treatment	Follow-up1	25.883*	1.756	.000	22.370	29.397
	Before Treatment	Follow-up2	26.200*	1.818	.000	22.563	29.837
	After Treatment	Follow-up1	2.533	1.638	.127	743	5.810
	After Treatment	Follow-up2	2.850	1.597	.079	345	6.045
	Follow-up1	Follow-up2	.317	1.144	.783	-1.972	2.606
TNSSS core	Before Treatment	After	5.133*	.374	.000	4.385	5.882
		Treatment					
	Before Treatment	Follow-up1	5.850*	.407	.000	5.036	6.664
	Before Treatment	Follow-up2	3.783*	.533	.000	2.717	4.850
	After Treatment	Follow-up1	.717*	.344	.041	.029	1.404
	After Treatment	Follow-up2	-1.350*	.490	.008	-2.331	369
	Follow-up1	Follow-up2	-2.067*	.410	.000	-2.888	-1.246
RQLQ Score	Before Treatment	After	52.131*	3.626	.000	44.876	59.385
		Treatment					
	Before Treatment	Follow-up1	67.967*	4.443	.000	59.076	76.857
	Before Treatment	Follow-up2	67.100^{*}	4.445	.000	58.205	75.995
	After Treatment	Follow-up1	15.836*	3.146	.000	9.542	22.131

Table 2. Comparison of VAS Scores, TNSS Scores and RQLQ Scores at Different Time Points

After Treatment	Follow-up2	14.969*	3.182	.000	8.602	21.337
Follow-up1	Follow-up2	867	1.941	.657	-4.751	3.018

Recent Publications: Liu L L, Gong Z, Tang L, et al. A novel and alternative therapy for persistent allergic rhinitis via intranasal acupuncture: a randomized controlled trial[J]. Eur Arch Otorhinolaryngol,2023,280(6):2773-2783.

Biography:

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YAN Zhan-feng, MD, PhD

Born in 1984, Dr. YAN Zhan-feng is a Chief Physician and Doctoral Supervisor with a Doctor of Medicine degree. He is a distinguished recipient of the Qihuang Talents and Young Famous Doctors program at Beijing University of Chinese Medicine (BUCM) and serves as a Specially Appointed Professor at Qihuang College. Dr. YAN is also recognized as a reserve leader in the national Double First Class Construction Discipline, focusing on Integrated Traditional Chinese and Western Medicine and Otorhinolaryngology.

Currently, Dr. YAN holds multiple leadership roles, including Vice President of Dongzhimen Hospital, BUCM; Director of the Traditional Chinese Medicine Ear, Nose, and Throat (ENT) Research Institute at Dongzhimen Hospital; and Director of the ENT Department and Teaching and Research Office across both campuses of Dongzhimen Hospital, BUCM.

With a long-standing commitment to clinical and basic research in otolaryngology, Dr. YAN's primary research focus is the prevention and treatment of ENT and head-neck diseases through the integration of Traditional Chinese Medicine (TCM) and Western Medicine. He has made significant contributions to the field, serving in key academic positions, including:

Standing Committee Member and Deputy Secretary-General of the ENT Branch of the Chinese Association of Traditional Chinese Medicine;

Deputy Director and Executive Member of the International Expert Committee on ENT of China;

Secretary-General of the ENT Head and Neck Disease Special Committee of the Chinese

Society of Pathophysiology;

Deputy Chairman of the Sleep Cooperation Committee of the Beijing Chinese Medicine Difficult Disease Research Association;

Secretary-General of the ENT Branch of the Beijing Association of Integrated Traditional Chinese and Western Medicine.

During his tenure, Dr. YAN has led 20 research projects, including those funded by the National Natural Science Foundation of China, Beijing Natural Science Foundation, Beijing Science and Technology Commission, Chinese Association of Traditional Chinese Medicine, and university-level grants. He has also contributed as a key researcher in multiple national and provincial-level projects.

Dr. YAN has an impressive academic output, having published 32 papers in the past five years, including 23 as first author or corresponding author, with 7 publications in SCI-indexed journals. He has applied for 4 utility model invention patents and achieved technology transfers valued at 1 million yuan. Additionally, he has edited 6 national planning textbooks and authored 4 monographs, further solidifying his impact on the field.

Recent Photograph:

