

# Unblock the Senses: SGB Series for Long-term Improvement in COVID-related anosmia and ageusia

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## INTRODUCTION

- Sars-CoV-2, commonly known as COVID-19, can lead to anosmia (loss of smell) and ageusia (loss of taste)
- Chemoreception pathway is altered by dysregulation of the sympathetic nervous system in Long COVID, and may lead to persistent anosmia and ageusia (Figure 1)
- The stellate ganglion block (SGB) has been used as a therapy for sympathetically mediated pain & PTSD patients with hyperarousal symptoms due to sympathetic dysregulation, as seen in a 2019 RCT with PTSD patients receiving treatment over an 8 week period
- SGB has been used to treat anosmia caused by sympathetic nervous system dysfunction in patients with Long COVID.
- In a pilot study that evaluated the safety and feasibility of 3 sequential SGBs in patients with persistent olfactory dysfunction due to long COVID, most patients experienced an overall improvement in smell, sustained over 3 months.

### •Patient Background:

- Male veteran in his 60s
- Gave consent for case report publication and presentation
- Hypertension, Obstructive sleep apnea, Type 2 diabetes,
- Low back pain, PTSD, Long-COVID
- Military history:**
- Parachuting accident in 1988
- Current symptoms:**
- Flashbacks, Nightmares, Hypervigilance, Agitation, Suicidal ideation related to severe pain
- No history of alcohol, tobacco, or other drug use
- Tramadol, Meloxicam, Buccal buprenorphine, Baclofen, Metformin, Amlodipine, Lisinopril

### •COVID-19 Experience:

- Patient diagnosed with COVID-19 in summer of 2021
- Symptoms: High fever, Headaches, Fatigue. Anosmia, Ageusia
- Most symptoms resolved with supportive treatment, but anosmia and ageusia persisted

### •Treatment and Outcomes:

- Reported persistent anosmia and ageusia at pain clinic visit in late 2022
- Offered and underwent three stellate ganglion blocks (SGBs)
- Post-treatment results:**
- Significant satisfaction with return of smell and taste to baseline
- Improvement in ODOR scale
- Significant improvement in PTSD symptoms
- Symptoms evaluated on a 10-point scale before and after blocks:**
- Global PTSD symptoms
- Anosmia
- Ageusia
- Olfactory function assessed using ODOR (Olfactory Dysfunction Rating Scale):**
- 28-item tool

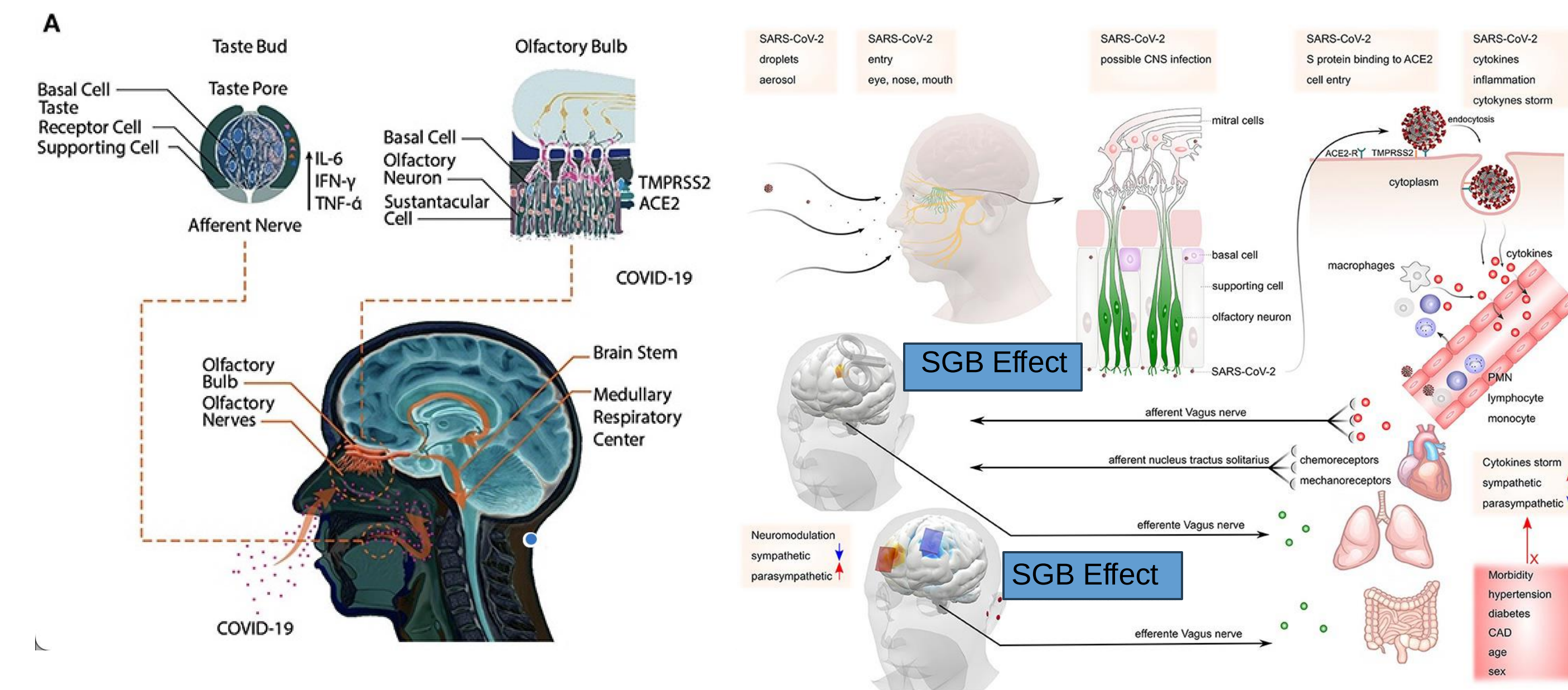


**Figure 1. Possible mechanisms for anosmia and ageusia in patients with Long COVID and therapeutic benefit of SGB.** Images show the effect of COVID on nerve pathways implicated in smell and taste, and how SGB may specifically target receptors in this pathway. Images adapted from Finlay 2022 and Baptista 2020.

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## KEY FINDINGS

# SGB series can lead to sustained improvement in PTSD & long-covid syndrome anosmia & ageusia.

# The additive improvements over a 24 month period in this case suggests a role in maintenance therapy and potential non-pharmacologic option for those suffering from Long COVID Syndrome & PTSD.

|                                     | Procedure                                                                                     | Pre-Block Symptoms                                                                          | Post-Block Symptoms                                                                       |
|-------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Block 1                             | Ultrasound guided SGB with 3ml 0.25% bupivacaine, 10 mg dexamethasone, and 3 ml 1% lidocaine. | 0/10 smell<br>0/10 taste<br>9/10 symptoms of PTSD                                           | 3/10 smell<br>4/10 taste<br>5/10 symptoms of PTSD                                         |
| Block 2:<br>3 months post Block 1   | Fluoroscopic R SGB with 3 ml 0.25% bupivacaine and 20 mg dexamethasone                        | ODOR: 50/112<br>3/10 smell<br>4/10 taste<br>5/10 symptoms of PTSD                           | Global improvement, no side effects<br>6/10 smell<br>7/10 taste<br>3/10 symptoms of PTSD  |
| Block 3:<br>12 months post Block 2  | Fluoroscopic R SGB with 3 ml bupivacaine 0.25%, 10 mg dexamethasone, and 2 ml lidocaine 1%    | Sustained improvement<br>6/10 smell<br>7/10 taste<br>3/10 symptoms of PTSD                  | Global improvement, no side effects<br>8/10 smell<br>10/10 taste<br>2/10 symptoms of PTSD |
| Interview:<br>2 months post Block 3 | Telephone follow-up                                                                           | 8/10 smell<br>10/10 taste<br>2/10 symptoms of PTSD                                          | 10/10 smell<br>10/10 taste<br>2/10 symptoms of PTSD                                       |
| Interview:<br>7 months post Block 3 | Telephone follow-up                                                                           | ODOR: 0/112<br>Sustained improvement<br>10/10 smell<br>10/10 taste<br>2/10 symptoms of PTSD | Sustained improvement<br>7/10 smell<br>10/10 taste<br>2/10 symptoms of PTSD               |
|                                     |                                                                                               | Sustained improvement                                                                       | ODOR: 12/112<br>Improvement from baseline, worsened from prior checkup                    |

**Table 1. Treatment and Symptom Course over 24 months.** The patient was followed over a period of 2 years from the initial block. His symptom severity of anosmia, ageusia, and PTSD at each time point was evaluated, along with ODOR scale results before the first SGB and at two telephone checks after the third SGB.



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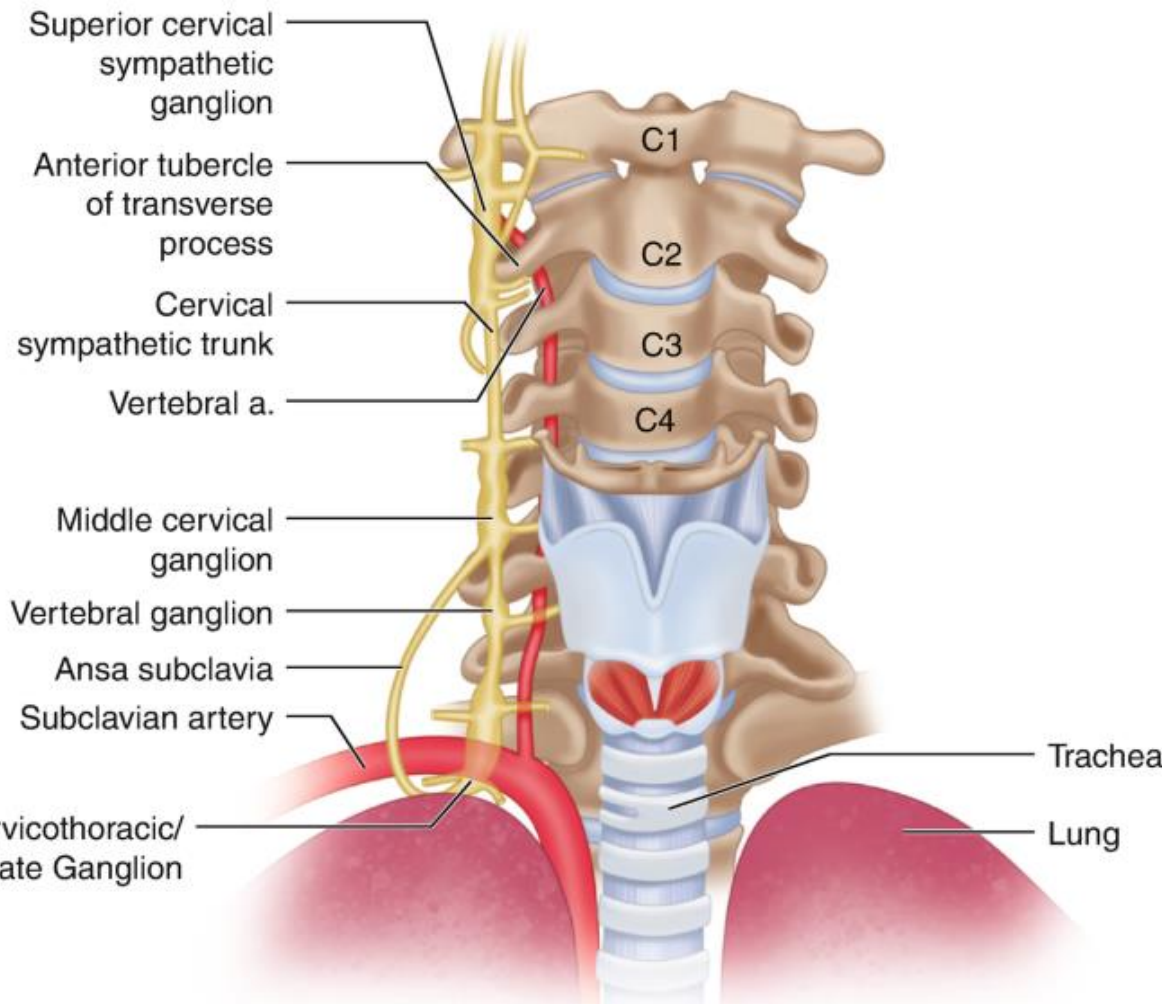
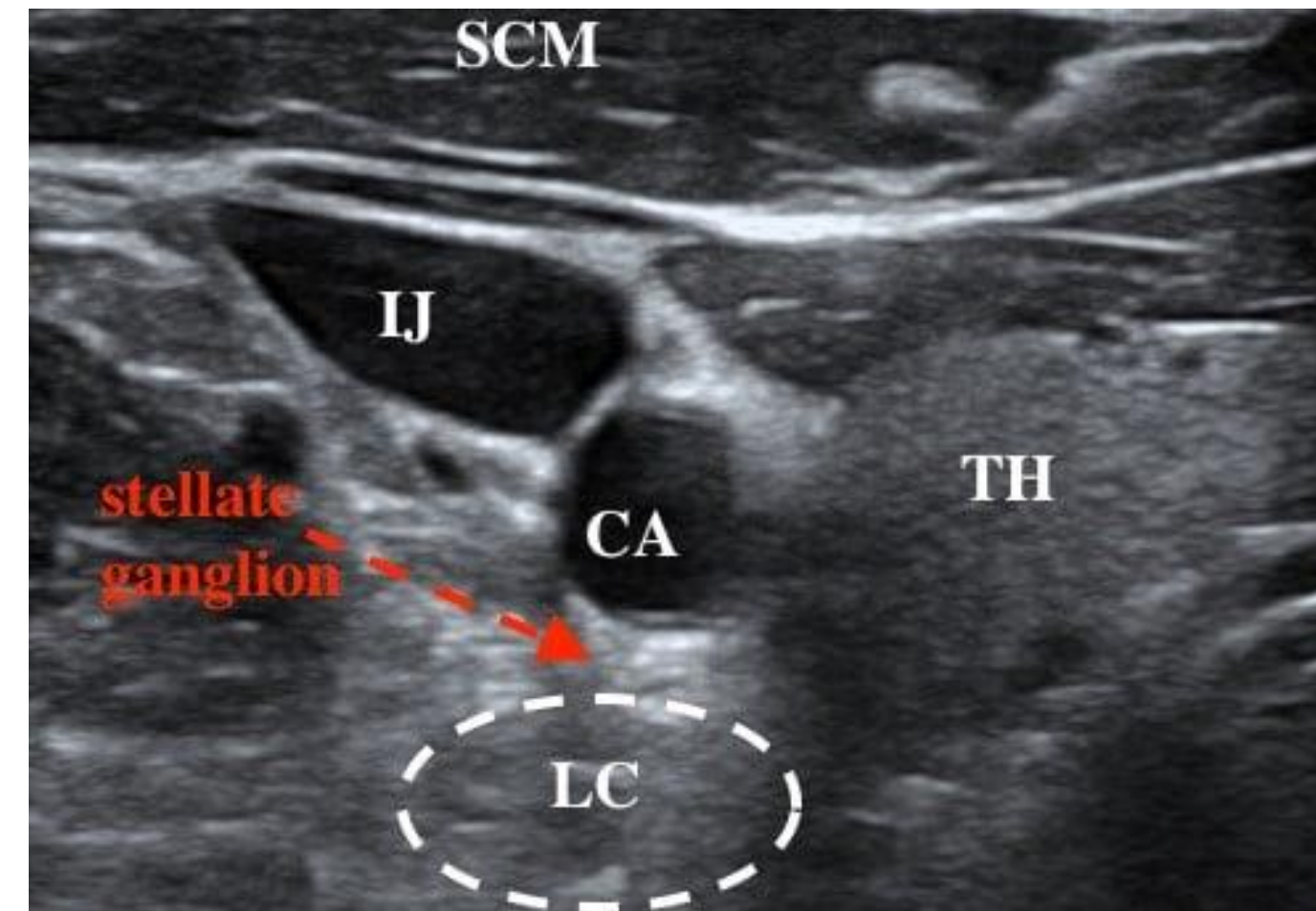


**Figure 2. Stellate Ganglion and surrounding anatomy with representative image of ultrasound-guided SGB.** SGBs were performed under either fluoroscopic guidance with radiopaque dye confirmed appropriate spread at C6 Chassaignac’s tubercle without vascular uptake, or with ultrasound.

## DISCUSSION

- Anosmia and ageusia** present as persistent sequelae of **COVID-19** infection and can **persist for prolonged periods of time** following resolution of acute symptoms
- Anosmia, ageusia, and PTSD** have all been posited to be due to **dysregulation** of the autonomic **nervous system**
- Current therapies** for anosmia and ageusia in Long-COVID patients have been **limited in effectiveness**
- The patient’s continued improvement with **blocks of differing agents** conducted by three **distinct providers** suggests **flexibility in treatment**, allowing for greater access to care and a more **pragmatic therapeutic avenue**

## REFERENCES

1. Lai CC, Hsu CK, Yen MY, Lee PI, Ko WC, Hsueh PR. Long COVID: An inevitable sequelae of SARS-CoV-2 infection. J Microbiol Immunol Infect. 2023 Feb;56(1):1-9. doi: 10.1016/j.jmii.2021.174582. Epub 2021 Oct 19. PMID: 34678243; PMCID: PMC8524700.
2. Chaudhri G, Upadhyay A, Khanduja S, Emerick T. Stellate Ganglion Block for Anosmia and Dysgeusia Due to Long COVID. Cureus. 2022 Aug 6;14(8):e27779. doi: 10.7759/cureus.27779. PMID: 36106285; PMCID: PMC9450932.
3. Mulvaney SW, Lynch JH, Hickey MJ, Rahman-Rawlings T, Schroeder M, Kane S, Lipov E. Stellate Ganglion Block Used to Treat Symptoms Associated With Combat-Related Post-Traumatic Stress Disorder: A Case Series of 166 Patients. Military Medicine. Volume 179, Issue 10, October 2014, Pages 1133–1140. <https://doi.org/10.2307/4610151>.
4. Peterson AM, Miller BJ, Kalligieri D, Piccirillo JF, Kukuljan S, Roland LT, Schneider JS, Crook LW, and Farrell NE. (2024). Stellate Ganglion Block for the Treatment of COVID-19-Induced Olfactory Dysfunction: A Prospective Pilot Study. Otolaryngol Head Neck Surg, 170: 272-276. <https://doi.org/proxy.library.emory.edu/10.1002/ohn.530>
5. Malik P, Patel K, Pinto C, Jaiswal R, Tirupathi R, Pillai S, Patel U. Post-acute COVID-19 syndrome (PCS) and health-related quality of life (HRQL)-A systematic review and meta-analysis. J Med Virol. 2022 Jan;94(1):253-262. doi: 10.1002/jmv.27309. Epub 2021 Sep 7. PMID: 34468396; PMCID: PMC8662132.
6. Mahmood MM, Aboualshikh HM, Khairy DA, Ragshan AS, Khan AM, Mouneddat MM. Pathogenesis of dysgeusia in COVID-19 patients: a scoping review. Eur Rev Med Pharmacol Sci. 2021;25(2):1114-1134. doi: 10.26355/eurrev\_202101\_24683
7. Khani E, Khiali S, Beheshiriouy S, Entezari-Maleki T. Potential pharmacologic treatments for COVID-19 smell and taste loss: A comprehensive review. Eur J Pharmacol. 2021 Dec 5;912:17482. doi: 10.1016/j.ejphar.2021.17482. Epub 2021 Oct 19. PMID: 34678243; PMCID: PMC8524700.
8. Schrader C, Ross A. A Review of PTSD and Current Treatment Strategies. Mo Med. 2021 Nov-Dec;118(6):546-551. PMID: 34924624; PMCID: PMC8672952.
9. Kalava A, Benyahia SA, Tico Calzada R, Saat CM. Efficacy of Stellate Ganglion Block in Treating Long-Term COVID-19-Related Olfactory and Gustatory Dysfunction: A Case Series. Cureus. 2023 Jun 25;15(6):e40929. doi: 10.7759/cureus.40929. PMID: 37496529; PMCID: PMC10368190
10. Peterson AM, Miller BJ, Kalligieri D, Piccirillo JF, Kukuljan S, Roland LT, Schneider JS, Crook LW, and Farrell NE. (2024). Stellate Ganglion Block for the Treatment of COVID-19-Induced Olfactory Dysfunction: A Prospective Pilot Study. Otolaryngol Head Neck Surg, 170: 272-276. <https://doi.org/proxy.library.emory.edu/10.1002/ohn.530>
11. Moon HS, Chon JY, Lee SH, Ju YM, Sung CH. Long-term Results of Stellate Ganglion Block in Patients with Olfactory Dysfunction. Korean J Pain. 2013 Jun;26(1):57-61. doi: 10.3344/kjp.2013.26.1.57. Epub 2013 Jan 4. PMID: 23342209; PMCID: PMC3546212
12. Rao Olmsted, K. L., Barroze, M., Mulvaney, S., McLean, B., Tunali, A., Young, R., Kim, E., Vandermas-Peeler, R., Morgan, J. K., Constantinescu, O., Kane, S., Nguyen, C., Hirsch, S., Munoz, B., Wallace, D., Croxford, J., Lynch, J. H., White, R., & Walters, B. B. (2020). Effect of Stellate Ganglion Block Treatment on Posttraumatic Stress Disorder Symptoms: A Randomized Clinical Trial. JAMA psychiatry, 77(2), 130–138. <https://doi.org/proxy.library.emory.edu/10.1001/jamapsychiatry.2019.3474>
13. Finlay JB, Bram DH, Als Hachen R, et al. Persistent post-COVID-19 smell loss is associated with immune cell infiltration and altered gene expression in olfactory epithelium. Science Translational Medicine. 2022 Dec;14(679):eadi4084. DOI: 10.1126/scitranslmed.adi4084. PMID: 36542694; PMCID: PMC10317309.
14. Baptista AF, Baltar A, Okano AH, Moreira A, Campos ACP, Fernandes AM, Brunoni AR, Badran BW, Tanaka C, de Andrade DC, da Silva Machado DG, Morya E, Trujillo E, Swami JK, Camprodon JA, Monte-Silva K, Sá KN, Nunes I, Goulardins JB, Bilsom M, Sudbrack-Oliveira P, de Carvalho P, Duarte-Moreira RJ, Pagano RL, Shinjo SK and Zana Y (2020) Applications of Non-invasive Neuromodulation for the Management of Disorders Related to COVID-19. Front. Neurol. 11:573718. doi: 10.3389/fneur.2020.573718

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