



REVIEW ARTICLE

AROMATHERAPY PROTOCOL FOR OLFACTORY RESTORATION

Adriana Nunes Wolffenbüttel, PhD

Brazilian Academic Consortium for Integrative Health (CABSIn), Department of Natural Products Committee, Sao Paulo, Brazil.

 OPEN ACCESS

PUBLISHED

31 October 2024

CITATION

Wolffenbüttel, A., N., 2024. Aromatherapy protocol for olfactory restoration. Medical Research Archives, [online] 12(10).

<https://doi.org/10.18103/mra.v12i10.5878>

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DOI

<https://doi.org/10.18103/mra.v12i10.5878>

ISSN

2375-1924

ABSTRACT

The loss or decrease of smell and taste can be caused by several factors, such as psychotropic medications, chronic rhinitis and sinusitis, neurological pathologies, cancer treatments, postinfectious and posttraumatic olfactory loss, older people, car accident, fire, cigarette smoke, psychological trauma, and other causes. Currently the greatest demand is due to the sequelae of Covid-19, that is the loss of smell. This aromatherapy protocol to restore the sense of smell was developed based on research data and references of the performance of essential oils (EO). EO are lipophilic substances extracted from plant species; they are mainly constituted by terpenic structures which are therapeutic bioactives. The objective of the methodology is to re-sensitize the neural route that allows the identification of aroma and taste. Following this, we recommend the use of EO to restore the health of the respiratory system, immune system, mental and emotional system. It can be observed that the olfactory and gustatory perception improve after one month this protocol is applied. There are researchers though, showing that the average time is 3 months, and it may extend above 8 months. This treatment methodology is based on neural plasticity of the olfactory system, non-invasive and safe procedure, that should thus be considered a simple addition to existing smell treatment methods.

Keywords: aromatherapy; essential oils; anosmia; hiposmia; respiratory system; olfactory training.

Introduction

The nasal cavity has two types of epitheliums, the respiratory epithelium, and the olfactory epithelium. The respiratory epithelium is located in the majority of the nasal cavity, mainly in the anterior and median area. The olfactory epithelium is located in the upper-posterior area, occupying about 2 cm² (Saladin, 2023). The olfactory neural route starts in the olfactory epithelium, which is covered by the mucus where the olfactory receptor cells are. The odorant receptors are located at the end of these olfactory receptor cells. There are different olfactory receptors, each of them specific to one type of odorant molecule. When the odorant molecule connects with the olfactory receptor via electrochemical stimulus the neural route continues through the olfactory bulb, where the glomerulus is found. The signal follows to the

mitral cells and goes directly into the central nervous system, more precisely where the limbic system is. From this point on, with the emotional and physiological stimulus, we can be aware of the smell. This finding was so important that it earned Linda Buck and Richard Alex the 2004 Nobel Prize for Medicine in the field of Physiology (Figure 1) (Buck & Axel, 1991; Barwich, 2020). When this pathway olfactory is damaged, the inhalation of EO can help to restore it in a few months, which the average time is 3 months, and can extend up to 8 months (Haehner *et al.*, 2013; Hummel *et al.*, 2009; Ojah, 2020; Pekala *et al.*, 2016; Schriever *et al.*, 2014; Sorokowska *et al.*, 2017).

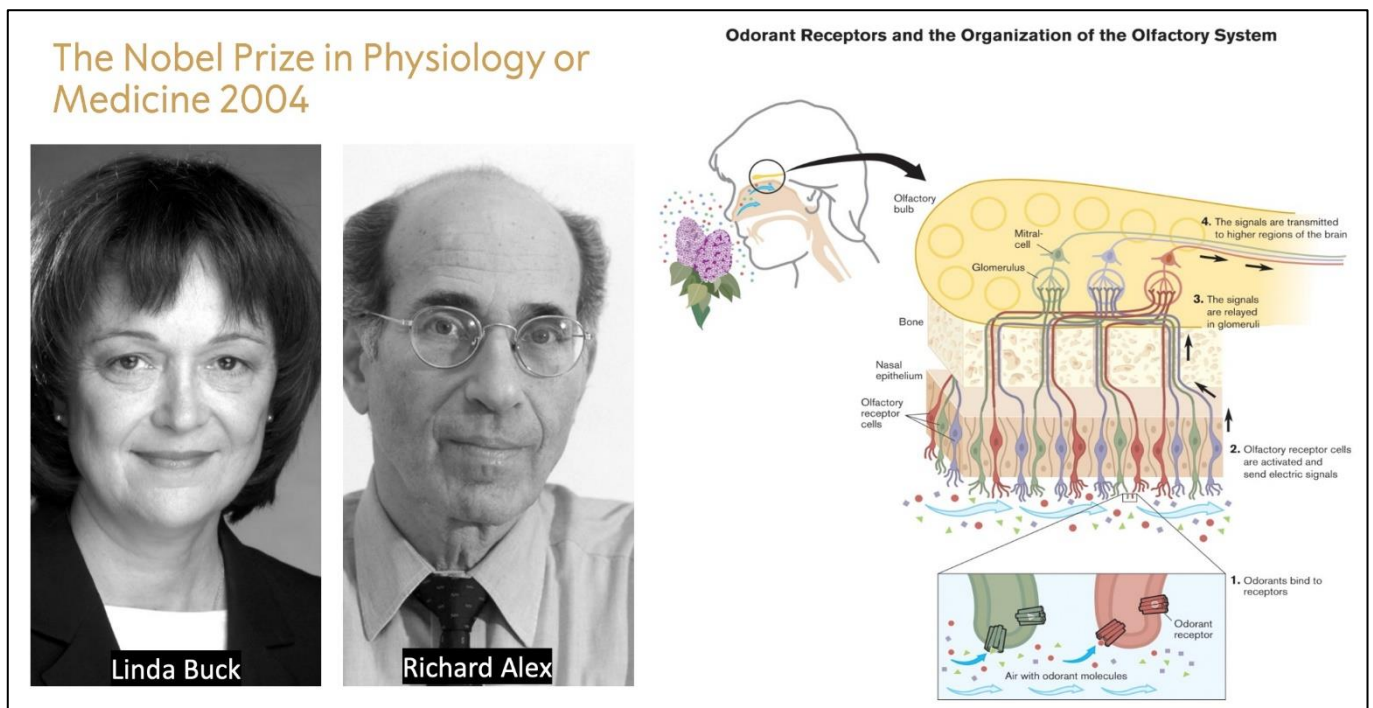


Figure 1 - Researchers laureates and the human olfactory neural route (Nobel Prize, 2004).

The mapping of human olfactory receptors is under extensive research, and many of which have been shown in publications. Recently olfactory receptors in the cells of the tongue have been discovered, which is in line with reports of a loss of taste along with a loss of smell. This protocol applies the treatment of olfactory receptors in the cells of the tongue too (Maßberg & Hatt, 2018; Malik *et al.*, 2019; Cooper *et al.*, 2020). The loss or reduction of

smell causes a deep emotional disharmony, as it is one of the primary and essential senses of the animal species. Anxiety, insecurity, and fear are some of the emotional symptoms results from this loss (Fodouliau *et al.*, 2020; Gandhi *et al.*, 2020). Researchers have shown that the sense of smell can be recovered through training, because there is a cerebral neuroplasticity of this olfactory function, which re-establishes the identification, discrimination,

and threshold of smell (Kollindorfer *et al.*, 2014; Sorokowska *et al.*, 2017; Boscolo-Rizzo *et al.*, 2022). Specifically, the Covid-19 virus initially causes an inflammation of the olfactory epithelium, blocking the attachment of the odorant molecule to the olfactory receptor. A degradation of this epithelium then begins (Finlay *et al.*, 2022). The virus goes through the previously mentioned route: olfactory neuron, olfactory bulb, glomerulus, mitral, central nervous system into the limbic system (Dey *et al.*, 2021).

Essential oils (EO) are lipophilic substances extracted from plant species, they are mainly constituted by terpenic structures which are therapeutic bioactives (Perry & Perry, 2006; Li *et al.*, 2006; Passos *et al.*, 2009; Astani *et al.*, 2011; Lee *et al.*, 2017; Wolffenbüttel *et al.*, 2018, 2023, 2024; Wolffenbüttel, 2020; Nadjib, 2020; Ojah, 2020). Currently it is known that EO act on the human body through the interaction of their components with receptors. There are the Olfactory Receptors (ORs) and the Ectopic Olfactory Receptors (EORs). ORs are in the nasal olfactory tract. EORs are expressed in non-nasal tissues of human body. Both receptors can be triggered by odorants components from EO (Maßberg & Hatt, 2018; González-Cofrade *et al.*, 2019; Raka *et al.*, 2022). The many mechanisms of action of EO, such as oxidative stress, apoptosis, anti-inflammatory, neuroprotective, cause the effects such as anti-viral, bactericidal, fungicidal, analgesic, immunomodulatory, action on the central nervous system, antitumor, among others (Agarwal *et al.*, 2022). Evidence Map of the Clinical Effectiveness of Aromatherapy (Wolffenbüttel *et al.*, 2021), research recommended by the World Health Organization (WHO), highlights the therapeutic action of EO. This Map combines information of double-blind randomized clinical trials of systematic reviews and meta-analyses.

This protocol aims to recover the olfactory epithelium, initially by inhaling EO, which have dermal anti-inflammatory action, as well as targeting antiviral replication, when applicable.

Next, we recommend the use of EO to restore the health of the respiratory system, immune system, and mental and emotional system. The objective of the methodology is to re-sensitize the neural route that allows the identification of aroma and taste.

Methodology

The methodology is based on the biochemical activity of the EO in Table 1 according to the review by Wolffenbüttel AN (2023), as well as the olfactory training studies of many researchers (Haehner *et al.*, 2013; Hummel *et al.*, 2009; Ojah, 2020; Pekala *et al.*, 2016; Schriever *et al.*, 2014; Sorokowska *et al.*, 2017).

Start the Aromatherapy Protocol to Restore Smell by filling in the Anamnesis Datasheet (Box 1). Boxes 2 and 3 describe the preparation of the inhaler apparatus. Boxes 4 and 5 describe the dynamics of the inhalation procedure. Choose two EO, for inhalation during the first week. Choose three EO for inhalation during the second week. For inhalation during the third and fourth weeks, choose different EO. Table 1 shows the list of the EO to choose from. Use a new inhaler containing EO every single week, this will ensure that the EO is inhaled in its full composition. After each day of olfactory training, complete the forms in Boxes 6 and 7 respectively. Box 8 contains additional information to expand the application of this protocol and Box 9 shows examples of EO selected for this training.

Box 1 - Anamnesis datasheet: olfactive and/or taste loss

A. Name:
B. Age:
C. Gender:
D. Date of traumatic event or viral detection (answer if this question is appropriate for your case)
E. Report of the main olfactory symptoms: anosmia (selective, partial, or total loss of aroma): phantosmia (sensing aroma that is not in the environment): hyperosmia (sensing too much a type of aroma): hyposmia (sensing a type of aroma diminished): parosmia (sensing a scent that belongs to another object): cacosmia (sensing a fetid aroma in something that doesn't have it):
F. Report of the main taste symptoms: ageusia (selective, partial, or total loss of flavour): phantogeusia (sensing the taste that is not in the environment): hypergeusia (sensing too much a type of flavour): hypogeusia (sensing a type of flavour diminished): parageusia (sensing a taste that belongs to another food):
G. Exclusive for cases of viruses: Possible cause of the contamination or type of exposure that caused the contamination (the higher the viral load, the symptoms may be more pronounced):
H. Tick the symptoms you presented: fever () shortness of breath () tiredness () headache () diarrhea () dry cough () others symptom: how many days did these symptoms remained? Has the patient been hospitalized? yes (), for days no ()
J. Does the patient have one of these aggravating or comorbid conditions? smoker () obesity () diabetes () sedentary lifestyle () heart disease () chronic respiratory disease, asthma () immunodepressed () cancer () others:
L. Please write here any other information you want to report:

Box 2 - Inhaler preparation

A. The use of inhalers with essential oils, daily and weekly (Box 3):

a) First week: the kit consists of one essential oil (inhaler 1) or one hydrosol (wash both the nasal and buccal mucosal) with anti-inflammatory activity, and one essential oil with antiviral activity (inhaler 2). Choose these essential oils from Table 1.

b) Second week: the kit consists of one essential oil with respiratory health activity (inhaler 3), one essential oil with immunological health activity (inhaler 4) and one essential oil with mental and emotional health activity (inhaler 5). Choose these essential oils from Table 1.

c) Third week: choose different essential oils from Table 1 to perform olfactory training. The kit consists of one essential oil with respiratory health activity (inhaler 6), one essential oil with immunological health activity (inhaler 7) and one essential oil with mental and emotional health activity (inhaler 8).

d) Fourth week: choose different essential oils from Table 1 to perform olfactory training. The kit consists of one essential oil with respiratory health activity (inhaler 9), one essential oil with immunological health activity (inhaler 10) and one essential oil with mental and emotional health activity (inhaler 11).

B. Inhalation apparatus (Figure 2):

a) Individual inhaler apparatus containing cotton or filter paper.

b) Write the name of the essential oil on a label and attach it to the inhaler.

c) Add 1 mL, or 25 drops, of pure essential oil (undiluted) in each inhaler.

d) Perform the inhalation procedure and close the inhaler tightly. Store in a cool place (below 23 °C), out of direct sunlight.

e) Use each inhaler 5 days a week. After that, discard the inhaler apparatus and use the cotton or filter paper to scent some drawers in your closet.

f) This protocol uses 11 inhaler apparatuses in one month.

IMPORTANT: each inhaler apparatus contains one essential oil. A blend or synergy with essential oils is NOT carried out.

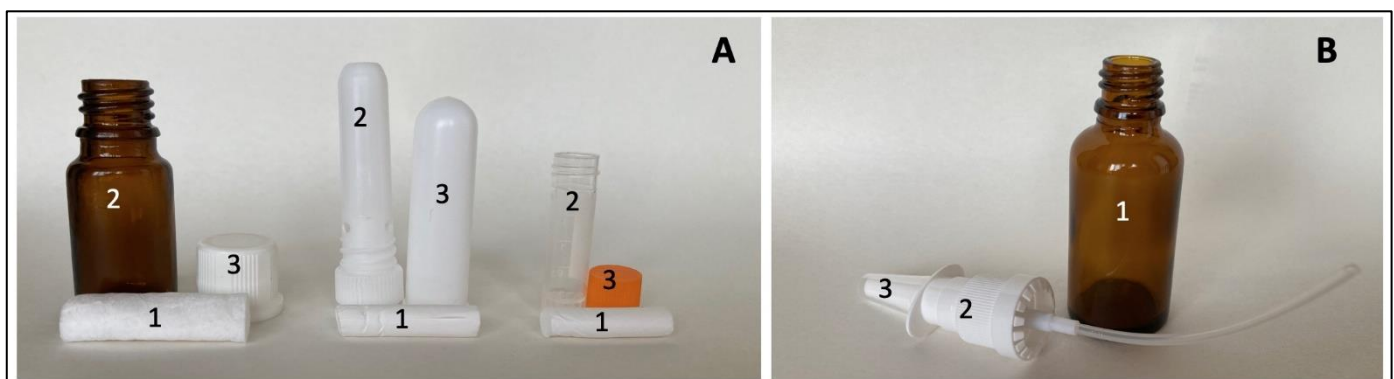


Figure 2 - Apparatuses for the olfactory training: (A) three types for inhaling the essential oils (1: cotton to put EO; 2: bottle to put cotton inside; 3: bottle top to close it after the use); (B) one type for washing with hydrosol (1: bottle to put the hydrosol inside; 2: valve to wash both the nasal and buccal mucosal; 3: bottle top to close it after the use).

Box 3 - Dynamics of the use of inhalers with essential oils, daily and weekly

Week	Essential oils activity	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
1 st	anti-inflammatory	inhaler 1 or wash hydrosol	inhaler 1 or wash hydrosol	inhaler 1 or wash hydrosol	inhaler 1 or wash hydrosol	inhaler 1 or wash hydrosol	free	free
	antiviral	inhaler 2	inhaler 2	inhaler 2	inhaler 2	inhaler 2		
2 nd	respiratory health	inhaler 3	inhaler 3	inhaler 3	inhaler 3	inhaler 3	free	free
	immunological health	inhaler 4	inhaler 4	inhaler 4	inhaler 4	inhaler 4		
	mental and emotional health	inhaler 5	inhaler 5	inhaler 5	inhaler 5	inhaler 5		
3 rd	respiratory health	inhaler 6	inhaler 6	inhaler 6	inhaler 6	inhaler 6	free	free
	immunological health	inhaler 7	inhaler 7	inhaler 7	inhaler 7	inhaler 7		
	mental and emotional health	inhaler 8	inhaler 8	inhaler 8	inhaler 8	inhaler 8		
4 th	respiratory health	inhaler 9	inhaler 9	inhaler 9	inhaler 9	inhaler 9	free	free
	immunological health	inhaler 10	inhaler 10	inhaler 10	inhaler 10	inhaler 10		
	mental and emotional health	inhaler 11	inhaler 11	inhaler 11	inhaler 11	inhaler 11		
5 th	—	free	free	free	free	free	free	free

Table 1 - Essential oils for use in aromatherapy protocol for olfactory restoration according to activities.

Essential Oil (EO)		Activity ^a				
Popular name	Botanical name	Anti-inflammatory ^b	Antiviral	Respiratory Health	Immunological Health	Mental and Emotional Health
Alojan ^c or Ajowan or Ajwain or Caraway or Fighter oil	<i>Trachyspermum ammi</i>	X	X	X	X	
Anethum or Endro or Dill	<i>Anethum graveolens</i>	X	X	X	X	X
Basil	<i>Ocimum basilicum</i>	X	X	X		
Bay Pepper ^c or Bay Rum	<i>Pimenta racemosa</i>	X	X		X	X
Bergamot	<i>Citrus bergamia</i>	X	X	X	X	X
Bitter orange	<i>Citrus aurantium</i>	X	X	X	X	X
Black cumin ^c	<i>Nigella sativa</i>	X	X	X	X	X
Black Pepper	<i>Piper nigrum</i>	X	X	X	X	
Blue chamomile or German chamomile	<i>Chamomilla matricaria</i> (synonyms: <i>Chamomilla recutita</i> , <i>Matricaria recutita</i>)	X	X		X	X
Cajeput	<i>Melaleuca cajuputi</i>	X	X	X	X	
Ceylon cinnamon ^c	<i>Cinnamomum zeylanicum</i> (synonym: <i>Cinnamomum verum</i>)	X	X	X	X	
Cinnamon Cassia ^c or Cinnamon from China	<i>Cinnamomum cassia</i>	X	X		X	
Citronella or Ceylon Citronella	<i>Cymbopogon nardus</i>	X	X		X	
Citronella-java	<i>Cymbopogon winterianus</i>		X			X
Clove ^c	<i>Syzygium aromaticum</i> (synonym: <i>Eugenia caryophyllata</i>)	X	X		X	
Copaiba	<i>Copaifera ssp</i>	X	X	X	X	
Cordia verbenacea (Erva-baleeira Brazil)	<i>Varronia curassavica</i> or <i>Cordia verbenacea</i>	X	X	X	X	
Coriander	<i>Coriandrum sativum</i>	X		X	X	X

Aromatherapy protocol for olfactory restoration

Essential Oil (EO)		Activity ^a				
Popular name	Botanical name	Anti-inflammatory ^b	Antiviral	Respiratory Health	Immunological Health	Mental and Emotional Health
Eucalyptus ^c	<i>Eucalyptus globulus</i>	X	X	X	X	X
Eucalyptus radiata	<i>Eucalyptus radiata</i>	X	X	X	X	
Fennel	<i>Foeniculum vulgare</i>	X	X			
Frankincense or Olibanum	<i>Boswellia carterii</i> (synonym: <i>Boswellia sacra</i>)	X	X	X	X	X
Gataria or Catnip or Catnep	<i>Nepeta cataria</i>	X	X	X	X	
Geranium	<i>Pelargonium graveolens</i>	X	X		X	X
Ginger	<i>Zingiber officinale</i>	X	X	X	X	X
Hinoki	<i>Chamaecyparis obtusa</i>				X	X
Ho wood or Ho leaf	<i>Cinnamomum camphora</i> (chemotype linalool)	X		X		X
Labdanum or Cistus	<i>Cistus ladanifer</i>		X		X	
Laurus	<i>Laurus nobilis</i>	X	X		X	X
Lavandin	<i>Lavandula intermedia</i>	X	X	X	X	X
Lavender or Fine lavender or True lavender	<i>Lavandula angustifolia</i>	X	X	X	X	X
Lavender spike	<i>Lavandula latifolia</i>	X	X	X	X	
Lemon siciliano or Lemon	<i>Citrus limon</i> (synonym: <i>Citrus limonum</i>)	X	X	X	X	X
Lemon verbena	<i>Lippia citriodora</i> (synonym: <i>Aloysia citriodora</i>)	X	X	X		X
Lemongrass	<i>Cymbopogon citratus</i>	X	X	X	X	X
Lemongrass-india	<i>Cymbopogon flexuosus</i>	X	X	X	X	X
Litsea cubeba or May Chang	<i>Litsea cubeba</i>	X	X	X	X	X
Manuka or Tea Tree from New Zealand	<i>Leptospermum scoparium</i>		X		X	
Marjoram	<i>Origanum majorana</i>	X	X		X	X
Melissa or Lemon balm	<i>Melissa officinalis</i>	X	X	X		X
Myrrha	<i>Commiphora myrrha</i>	X			X	X
Niaouli	<i>Melaleuca quinquenervia</i>	X	X	X	X	
Origanum ^c	<i>Origanum vulgare</i> (synonym: <i>Origanum compactum</i>)	X	X	X		
Origanum wild ^c	<i>Origanum munitiflorum</i>	X	X			

Aromatherapy protocol for olfactory restoration

Essential Oil (EO)		Activity ^a				
Popular name	Botanical name	Anti-inflammatory ^b	Antiviral	Respiratory Health	Immunological Health	Mental and Emotional Health
Palmarosa	<i>Cymbopogon martinii</i>	X	X	X		X
Pau-rosa	<i>Aniba rosaeodora</i>	X	X	X	X	X
Peppermint ^c or Mentha or True Mentha	<i>Mentha piperita</i>	X	X	X	X	X
Pepper from Jamaica ^c	<i>Pimenta dioica</i> (synonym: <i>Pimenta officinalis</i>)	X	X		X	
Petitgrain	<i>Citrus aurantium</i>	X	X		X	X
Ravintsara ^c	<i>Cinnamomum camphora</i> (chemotype 1,8 cineol)	X	X	X	X	
Roman chamomile	<i>Chamaemelum nobile</i> or <i>Anthemis nobilis</i>	X	X	X	X	X
Rose	<i>Rosa damascena</i>	X		X	X	X
Rosmarinus or Alecrim	<i>Rosmarinus officinalis</i>		X	X	X	X
Sage ^c or Salvia or Salvia dalmaciana	<i>Salvia officinalis</i>		X	X	X	X
Sandalwood	<i>Santalum album</i>	X	X			X
Satureja ^c or Segurelha	<i>Satureja cuneifolia</i>	X	X	X		
Spearmint or Mint or Green mint	<i>Mentha spicata</i>		X	X	X	X
Star anise	<i>Illicium verum</i>		X		X	
Sweet orange	<i>Citrus sinensis</i>	X	X	X	X	X
Tahiti lemon	<i>Citrus latifolia</i>	X		X	X	X
Tarragon ^c or Garden wormwood or Dragon herb	<i>Artemisia dracunculus</i>	X	X			
Tea-tree or Melaleuca	<i>Melaleuca alternifolia</i>	X	X	X	X	X
Thuja-apple ^c or Red Cedar or Cedar leaf	<i>Thuja plicata</i>		X		X	X
Thyme	<i>Thymus vulgaris</i> (chemotype thymol ^d)	X	X	X	X	X
Thyme wild	<i>Thymus serpyllum</i> (synonym: <i>Thymus vulgaris</i> chemotype limonene)	X	X	X	X	
Winter savory ^c	<i>Satureja montana</i> (synonym: <i>Satureja hortensis</i> , <i>Satureia montana</i> , <i>Satureia hortensis</i>)	X	X	X		

^aWolffenbüttel *et al.*, 2021; Wolffenbüttel AN, 2023.

^bExceptionally, EO or Hydrosol can be used. If Hydrosol is chosen, then the procedure is to wash both the nasal and buccal mucosal with it.

^cAvoid use in children under 6 years old and in the elderly over 80 years old, due to the potential toxicity of its major components (Tisserand & Young, 2013).

Box 4 - Treatment methodology

- A. Training frequency (Box 5):
- This protocol provides olfactory training for 4 weeks, changing the essentials oils every week.
 - At the end of the fourth week, stop for one week.
 - Perform inhalation twice a day, for 5 consecutive days, using the same inhaler.
 - Then stop the performed inhalation for 2 days.
 - Re-evaluate the olfactory and gustatory sensation. If necessary, restart all the process of the olfactory training described in this protocol.
- B. Training process:
- Inhale with each blowhole separately, keep the oral cavity closed.
 - Do 3 inhalations slowly with one nostril, while the other nostril remains covered with the finger. Invert and change the nostrils (Do 3 inhalations slowly with the other nostril, while the first nostril remains covered with the other finger).
 - Aspirate 3 times through the oral cavity, keeping the 2 nostrils closed.
 - Aspirate 3 times through the oral cavity, keeping the 2 nostrils open.

Box 5 - Dynamic of training frequency twice a day

Week	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
1 st	morning training	morning training	morning training	morning training	morning training	free	free
	evening training	evening training	evening training	evening training	evening training		
2 nd	morning training	morning training	morning training	morning training	morning training	free	free
	evening training	evening training	evening training	evening training	evening training		
3 rd	morning training	morning training	morning training	morning training	morning training	free	free
	evening training	evening training	evening training	evening training	evening training		
4 th	morning training	morning training	morning training	morning training	morning training	free	free
	evening training	evening training	evening training	evening training	evening training		
5 th	free	free	free	free	free	free	free

Box 6 - Complementary actions

- Maintain the patient calm and hopeful during the olfactory training of this protocol.
- Offer as many aromas to the patient as possible: cigarette smoke, gasoline, onion, chocolate, soap, banana, fried food, boiled egg, barbecue or roast, softeners, garlic, honey, coffee, and others.
- After the aroma has been perceived, try to minimize it to observe the olfactory detection limit (threshold).
- Offer to the patient bottles with different aromas, however in one of them, do not add aromatic substance, in order to evaluate the placebo effect.
- Variations of this protocol can be implemented according to the experience of the aromatherapist and the needs of the patient.

Box 7 - Two examples of essential oils chosen from Table 1 for the training.

Example 1				Example 2			
Week	Hydrosol or EO	Wash or Inhaler	Activity	Week	EO	Inhaler	Activity
1 st	Lavender Hydrosol	nasal and buccal mucosa washing	anti-inflammatory	1 st	Roman chamomile EO	inhaler 1	anti-inflammatory
	Eucalyptus EO	inhaler 2	antiviral		Ravintsara EO	inhaler 2	antiviral
2 nd	Geranium EO	inhaler 3	respiratory health	2 nd	Peppermint EO	inhaler 3	respiratory health
	Ginger EO	inhaler 4	immunological health		Petitgrain EO	inhaler 4	immunological health
	Bergamot EO	inhaler 5	mental and emotional health		Palmarosa EO	inhaler 5	mental and emotional health
3 rd	Bay Pepper EO	inhaler 6	respiratory health	3 rd	Niaouli EO	inhaler 6	respiratory health
	Blue chamomile EO	inhaler 7	immunological health		Litsea cubeba EO	inhaler 7	immunological health
	Frankincense EO	inhaler 8	mental and emotional health		Lemon verbena EO	inhaler 8	mental and emotional health
4 th	Ho wood EO	inhaler 9	respiratory health	4 th	Fennel EO	inhaler 9	respiratory health
	Laurus EO	inhaler 10	immunological health		Eucalyptus radiata EO	inhaler 10	immunological health
	Lemon siciliano EO	inhaler 11	mental and emotional health		Bitter orange EO	inhaler 11	mental and emotional health
5 th	-	-	-	5 th	-	-	-

Results and Discussion

Daily and weekly monitoring results must be recorded in the Box 8 and Box 9 sheets.

Box 8 - Records of the first week procedure

Week: 1 st	
Essential oils	
anti-inflammatory (write here the name of the chosen essential oil or hydrosol)	antiviral (write here the name of the chosen essential oil)
Note what occurs during the procedure here	
DAY 1:	
DAY 2:	
DAY 3:	
DAY 4:	
DAY 5:	
1 st evaluation of smell and taste:	
Further report:	

Box 9 - Records of the following weeks procedure

Weeks*: 2 nd - 3 rd - 4 th		
(*choose 3 different essential oils each week)		
Essential oils		
respiratory health (write here the name of the chosen essential oil)	immune health (write here the name of the chosen essential oil)	mental and emotional health (write here the name of the chosen essential oil)
Note what occurs during the procedure here		
DAY 1:		
DAY 2:		
DAY 3:		
DAY 4:		
DAY 5:		
Evaluation of smell and taste: 2 nd - 3 rd - 4 th		
Further report:		
ONE WEEK BREAK		
Report of what happens during this week:		

The loss or decrease of smell and taste can be caused by several factors, such as psychotropic medications, chronic rhinitis and sinusitis, neurological pathologies, cancer treatments, postinfectious and posttraumatic olfactory loss, older people, car accident, fire, cigarette smoke, psychological trauma, and other causes. The olfactory training can restore the olfactory and

taste loss in patients, as research shows (Pekala *et al.*, 2016; Schriever *et al.*, 2014). According to Haehner *et al.* (2013), there is plasticity in the peripheral olfactory system that can be reflected by increased growth of olfactory receptor neurons and/or increased expression of olfactory receptors in response to exposure to components of EO. Hummel *et al.* (2009) presented that the olfactory

sense has to ability to change and recover by the olfactory training. Currently, the greatest demand is due to the sequelae of Covid-19 (Boscolo-Rizzo *et al.*, 2022; Ojah, 2020; Parma *et al.*, 2020). Cooper *et al.* (2020) showed the damage that SARS-CoV-2 doing on Ace2 (Angio- tensin I Converting Enzyme 2 receptor) expression of the tongue and taste buds, nasal respiratory epithelium, olfactory epithelium, and the olfactory bulb. According to Sorokowska *et al.* (2017), although the exact mechanism of olfactory recovery following the smell training still requires further investigation, it is observed a positive and statistically significant effect of olfactory training in the case of all olfactory abilities, with effects of training on identification, discrimination and threshold for odor detection.

According to the Evidence Map of the Clinical Effectiveness of Aromatherapy (Wolfenbüttel *et al.*, 2021) and a review on the subject carried out by Wolffebuttel (2023), EOs have therapeutic activities located in each column of Table 1. The mechanisms of these activities are individual and specific to each EO, and it is not possible to state whether one EO is more effective than another. Therefore, the methodology of this protocol suggests choosing and changing the EO every week. The proposal is both the stimulation of the olfactory receptors caused by different EOs and the therapeutic activity of this EO. This protocol is safe regarding the adverse effects and toxicity of the EO (Tisserand & Young, 2013).

Conclusion

This aromatherapy protocol for olfactory restoration was developed based on scientific research that demonstrated the bioactivity of EO components. The proposed methodology is the inhalation of each EO separately, observing a sequence and frequency. It can be stated that olfactory and gustatory perception improves after one month of applying this protocol. However, complete perception may take average of 3 months, and can extend above 8 months, depending on each patient's body, as well as the degree of severity of the initial damage. This treatment methodology is based on neural plasticity of the olfactory system, non-invasive and safe procedure, that should thus be considered a simple addition to existing smell treatment methods.

Conflict of Interest:

The author confirms that this article content has no conflict of interest.

Funding Statement:

None.

Acknowledgements:

The author is thankful to the CABSIn, volunteers and patients who helped with this research.

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