TREATMENT AND RESEARCH INTO OLFACTORY & GUSTATORY DISORDERS

Fifth Sense Launch Event
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Mr Carl Philpott
Anthony Long Senior Lecturer, UEA
Honorary Consultant James Paget
and Norfolk & Norwich
University Hospitals

Smell & Taste Clinic
James Paget
University Hospital
Great Yarmouth
Contents

- How do we smell?
- Types of smell loss
- What are the treatment options currently available?
- What about loss of taste?
- Current and planned research
- How can people help the cause?
- Summary
“When I lost my sense of smell it was like being struck blind. Life lost a good deal of its savour...My whole world was radically poorer”

Exert from “The Man Who Mistook His Wife For a Hat” by O. Sacks as featured in “Aroma”
HOW DO WE SMELL?

- Passage of odorised air
- Molecules attach to receptors in olfactory neuroepithelium
- 3% of our genome for 1000 olfactory receptor types - each cell possesses only one type of odorant receptor
- Each receptor cell is therefore highly specialized for a few odours
- Axons of receptor cells form fila
- Synapse in glomeruli of olfactory bulbs
- 2nd order neurones project to higher centres:
  - thalamus
  - limbic system
  - orbitofrontal neocortex
Figure 2 | The dual olfactory system. a, Brain systems involved in smell perception during orthonasal olfaction (sniffing in). b, Brain systems involved in smell perception during retronasal olfaction (breathing out), with food in the oral cavity. Air flows indicated by dashed and dotted lines; dotted lines indicate air carrying odour molecules. ACC, accumbens; AM, amygdala; AVI, anterior ventral insular cortex; DI, dorsal insular cortex; LH, lateral hypothalamus; LOFC, lateral orbitofrontal cortex; MOFC, medial orbitofrontal cortex; NST, nucleus of the solitary tract; OB, olfactory bulb; OC, olfactory cortex; OE, olfactory epithelium; PPC, posterior parietal cortex; SOM, somatosensory cortex; V, VII, IX, X, cranial nerves; VC, primary visual cortex; VPM, ventral posteromedial thalamic nucleus.
CAUSES OF OLFACTORY DISTURBANCE (1)

Conductive:
- Nose and sinus disorders
- Nasal blockage - bent septum, foreign body

Sensorineural:
- Common colds (viruses)
- Bang to the head
- Due to a medication or an operation
CAUSES OF OLFACTORY DISTURBANCE (2)

- Stroke
- Epilepsy (temporal lobe)
- Parkinson’s disease
- Tumours
- Toxic exposure
- Other medical complaints - diabetes, poor kidney function
- Chronic alcoholism
- Snorting crack-cocaine
- Psychogenic (all in the head)
- No known cause (idiopathic)
SMELL & TASTE CLINIC DIAGNOSTIC GROUPS

![Bar chart showing various diagnoses and their counts. The x-axis represents different diagnoses such as AFRS, Chemotherapy, Congenital, CRSSNP, CRS, DM, FNS, Fungal ball, Hyperthyroidism, HIEVAR, Normal, OCD, PAR, Parkinson’s Disease, Post-encephalitis, PTOL, PVOL, FM, SLE, Thymus/lymphosarcoma, Zinc deficiency, and Hepatitis. The y-axis represents the count, ranging from 0 to 60.]
TYPES OF SMELL LOSS

- Chronic rhinosinusitis (with or without polyps) = 60%
- Post-viral olfactory loss = 12%
- Post-traumatic olfactory loss
- Idiopathic
- All other causes
PREVALENCE OF OLFACTORY DISORDERS

- Chronic Rhinosinusitis (CRS) = 11% of population
- Olfactory disorders in other countries affect at least 1% with some reports up to 20%!!

SNOT-22 - Top 5 Symptoms

All CRS

- Obstruction
- Loss of smell
- Need to blow
- Lack of sleep
- Runny nose
Swelling of the nose and sinuses

- Some cases have nasal polyps present
- Various potential causes:
  - Allergy
  - Infection
  - Allergic type reaction to bacterial toxins
  - Exaggerated immune response to fungal/mould spores
  - Specific lack of antibodies
  - Sensitive to aspirin

Condition not generally curable but very treatable with the right medical/surgical management
POST-VIRAL OLFACTERORY LOSS

- URTI is recalled as “more severe”
- Incidence 11-42%
- Women > men
- Age 40-70 years
- Highest incidence = March-May
POST-TRAUMATIC OLFACTORY LOSS

- Varying mechanisms of injury
  - High impact
  - Low impact
  - Associated facial injuries

- Why is smell lost?
  - Bruising of brain
  - Olfactory nerves are stretched/severed
  - Associated with nasal injury
  - Pre-existing sinonasal disorder
QUALITATIVE DISTURBANCES

- **Parosmia**
  - A distortion of a smell that may be:
    - Pleasant (Euosmia)
    - Unpleasant (Troposmia)

- **Phantosmia**
  - A hallucination of smell with no stimulus that may be:
    - Pleasant (rare)
    - Unpleasant (Cacosmia)
COMMON AETIOLOGIES FOR PAROSMIA AND PHANTOSMIA

- After a common cold (post-viral...)
- After a head injury (post-traumatic...)
- Due to chronic rhinosinusitis...
- After taking a particular medication...
- Unknown

Answered: 84  Skipped: 1
TREATMENTS
CRS TREATMENTS

- Nasal douching
- Nasal steroids
- Steroid tablets (polyps)
- Anti-fungals (polyps with thick mucus)
- Antihistamines (proven nasal allergy)
- Antibiotics (no polyps and should be taken for 3 months)
What’s new?
- Controlling polyps with one operation and good post-op Rx
- Long-term use of topical steroids
- Baby shampoo
- Topical antibiotics in place of oral
- Manuka honey

What’s out?
- Repeated polypectomies
- Open approaches to sinuses (with a few exceptions)
- Nasal packing
- Overnight stays
- Stopping nasal steroids when effective
When Medical Treatment Fails

- Bilateral (computer assisted) endoscopic sinus surgery
  - Should be targeted to the affected sinuses

- Outdated procedures:
  - Endoscopic nasal polypectomy in isolation
  - Inferior antral windows/punctures
  - Caldwell-Luc procedure
Caveats for Sinusitis Treatment

- Evidence to support douching and steroid sprays is good
- Evidence to support short-term antibiotics = 0
- Evidence to support long-term antibiotics = weak
- Evidence to support surgery over medical treatment = lacking

Long-term compliance essential!!
FROM MISERY TO QUALITY OF LIFE
SENSORINEURAL OLFACTORY LOSS - TREATMENT

- Non-steroidal pharmacological options:
  - Pentoxifylline
  - Caroverine
  - Theophylline
  - Sodium citrate
  - α-lipoic acid

- Homeopathic options:
  - Ginko biloba
  - Acupuncture


QUALITATIVE LOSS - MEDICAL TREATMENT

- Reassurance and watchful waiting appropriate for most

- Nasal blockage:
  - Hypertonic saline drops or decongestant drops every few hours
  - Make the nose swell up!
  - Nose clip

- Gabapentin

- Sedatives, antidepressants, other antiepileptics

- Topical cocaine if surgery considered
CONSERVATIVE MEASURES

- Valsalva manoeuvre
- Head movements
- Stimulating the nose with other smells
- Nasal douching
- Stimulating the nose with deep breaths in through the nose
- Stimulating the nose with trigeminal nerve stimulants e.g menthol, horseradish, mustard, capsaicin (pepper) spray
Quantitative Trial of steroids
Move to alternative pharma options
Allow patient to explore smell training and homeopathic options

Qualitative Consider quantitative options if TDI score low
Topical therapies
Gabapentin
Surgical option as last resort
NON-CRS RELATED TREATMENT

- Post-viral loss
- Post-traumatic
- Idiopathic/congenital
- Medical co-morbidity

- Response often relative to severity
- Smell training can help
- Depends on the mechanism
- Ensure diagnosis is certain
- Counselling
- Treat the cause
SMELL TRAINING

ROSE  CLOVE  LEMON  EUCALYPTUS

Purchase oils of these odours at an aromatherapy shop. Twice a day remove the caps from the bottles and spend up to 5 minutes sniffing and smelling the odours. Continue this for at least 30 days.

75% of patients have experienced hazards
50% report depression
Decreased appreciation of food and suppression of appetite are common
Negative effects on physical health, financial security, profession, partnership, friendship, emotional stability and leisure
One study of 56 patients with parosmia
- Mean duration of symptoms = 63 months
- 71.4% had hyposmia
- 28.6% had anosmia
- 55.4% severe quality of life impact
- Qualitative disorders accompany quantitative in >50%
PSYCHO-SOCIAL

- Is there a considerable impact on work/social/domestic activity?
- Consider need for antidepressants or other psychological input?
- Specific counselling regards domestic hazards
- Dietary advice
COUNSELLING ADVICE

- Gas detector?
- Carefully label all food items with a date
- Good personal hygiene
- Eating spicy foods help to maintain enjoyment of eating
- Watch weight in case it declines through loss of appetite
- Discuss disorders with your manager or supervisor if there are work-related issues
Add small amounts of low sodium MSG to chicken, steak and other meats with or without spicy condiments like salsa, Worchester sauce or A1 steak sauce or equivalent.

Drinking cold grapefruit or orange juice (sour and sweet preserved in olfactory loss) with pulp, can increase the enjoyment and taste of a drink in the place of milk, coffee or water.
<table>
<thead>
<tr>
<th>Foods</th>
<th>Spice Combinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breads</td>
<td>Poppy seed, sesame seed, fennel seed, anise, dill, thyme, garlic, parsley</td>
</tr>
<tr>
<td>Vegetables</td>
<td>Tarragon, rosemary, parsley, oregano, marjoram, sage, garlic, thyme, dill, anise, basil</td>
</tr>
<tr>
<td>Beef</td>
<td>Tarragon, rosemary, dill, thyme, bay leaf, basil, oregano, marjoram, garlic</td>
</tr>
<tr>
<td>Poultry</td>
<td>Tarragon, parsley, sage, thyme, rosemary, caraway, oregano, basil, paprika, bay leaf</td>
</tr>
<tr>
<td>Pork</td>
<td>Rosemary, cumin, caraway seed, parsley, mustard, fennel seed, thyme, basil</td>
</tr>
<tr>
<td>Lamb</td>
<td>Thyme, dill, fennel seed, basil, sage, marjoram, tarragon, rosemary, caraway seed</td>
</tr>
<tr>
<td>Soups</td>
<td>Rosemary, dill, caraway seed, anise, parsley, sage, bay leaf, oregano, chives, tarragon</td>
</tr>
<tr>
<td>Fish</td>
<td>Marjoram, tarragon, rosemary, bay leaf, basil, thyme, dill, sage</td>
</tr>
<tr>
<td>Shellfish</td>
<td>Oregano, basil, garlic salt, marjoram, thyme, dill, tarragon, turmeric</td>
</tr>
<tr>
<td>Eggs</td>
<td>Thyme, garlic, chives, bay leaf, oregano, dill, basil, parsley, rosemary, tarragon</td>
</tr>
<tr>
<td>Cheese</td>
<td>Anise, thyme, parsley, caraway seed, dill, sage, basil, tarragon</td>
</tr>
<tr>
<td>Desserts</td>
<td>Vanilla bean, anise, allspice, cinnamon, nutmeg</td>
</tr>
</tbody>
</table>
Primary cases of CRS will recover olfaction in 90% of cases; previous surgery will reduce this to 75% and compliance is key.

Post-infectious patients: 32-66% recovery within 3 years after the onset of olfactory loss.

Post-traumatic patients: 30-35% recovery within 5 years; perhaps up to 50% in 10 years.

Idiopathics - small possibility of Parkinson’s/Alzheimer’s.
TASTE (GUSTATORY) DISORDERS

- Rare - due to 6 cranial nerves
- Many cases idiopathic
- Vitamin and trace element deficiencies
- Iatrogenic
  - Tonsillectomy
  - Middle ear surgery
  - Microlaryngoscopy
  - Salivary gland surgery
Taste

Distribution

Zones of increased sensibility

Chandrashekar, Nature, 2006
“IS IT POSSIBLE TO CURE ME?”

- CRS is likely to respond to medical treatment with surgery to aid that treatment in some cases
- Previous surgical intervention can adversely affect outcomes
- Many patients have more than one possible factor in their smell loss
- All sense decline with age and will be a factor in adversely affecting outcomes
- No assumptions should be made in any case about the possibility of treatment until fully evaluated in a smell & taste clinic
PATIENT RESPONSE TO TREATMENTS

The box plot shows the TDI score before and after treatment. The TDI score decreases significantly after treatment, indicating a positive response to the treatments.
Smell has conductive (nasal) and sensorineural (nerve) components.

True taste is rarely affected clinically.

Smell loss affects social and psychological well-being.

Sinus disease, common colds, head injury and unknown cause cases account for 80-90% of cases.

Patients should be thoroughly investigated.

Treatments are available - don’t be fobbed off!

More work is needed on treatments though...
RESEARCH
**RESEARCH DOMAINS**

**Basic science**
- How does the olfactory system work?
- How can we better understand the disease process to target new treatments?

**Clinical**
- How do we raise awareness of the problem?
- How do we provide better treatments from existing drugs?
CURRENT STUDIES

- Background information and awareness:
  - CRES
  - SoCCoR
  - Personal accounts of anosmia
  - Predict PD study

- Clinical trials
  - Citrate study
  - Feasibility study for a clinical trial of clarithromycin in CRS
PLANNED RESEARCH

- Clinical trials
  - Long-term antibiotics for CRS
  - Medicine vs medicine & surgery for CRSwNPs
  - Caroverine versus placebo for post-viral olfactory loss

- Laboratory research
  - Proving fungus has a role in suspected fungal sinusitis
  - Personalising sinusitis - tissue markers to predict which medications will work
HOW CAN PEOPLE HELP?

- Join Fifth Sense and make donations
- Visit the Involve website
- Join PPI initiatives - contact Jim Boardman at Fifth Sense
- Volunteer for existing studies - contact Jane Woods at the James Paget University Hospital on jane.woods@jpaget.nhs.uk or call switchboard on 01493 452452
SOME BEDTIME READING...

MOLLY BIRNBAUM
SEASON TO TASTE
HOW I LOST MY SENSE OF SMELL AND FOUND MY WAY

aroma
THE CULTURAL HISTORY OF SMELL
“THAT WHICH WE CALL A ROSE, BY ANY OTHER WORD WOULD SMELL AS SWEET.”

William Shakespeare - from Romeo and Juliet, circa 1597
ANY QUESTIONS?