

Fragrance and Dementia

Innovative fragrance therapy is increasingly being used to enrich the lives of those suffering from dementia by supporting engagement, alertness and appetite stimulation.

Kate Williams, Seven Scent

Dementia is a major health and social care issue. About 5.4 million Americans are currently living with Alzheimer's disease, the most common form of dementia, while in the United Kingdom 1 million people are expected to be living with dementia by 2021.^{1,2} In global terms, the cost of dementia is estimated at \$604 billion.³

Caused by damage to brain cells, dementia encompasses a wide range of symptoms such as loss of memory, mood changes, and problems with communication and reasoning. Confusion is also very common with individuals finding it difficult to engage and interact. This inability to place people, places or time is a major challenge for caregivers—and one where fragrance may have a key role to play.

Fragrance and Memory

A growing body of scientific research supports the use of fragrance to help memory recall; it is also acknowledged as a strong trigger for emotions and reactions.^{4,5} Given this evidence—and despite the fact that declining sense of smell is often used as a diagnostic for dementia—recent involvement in two study projects enabled researchers to explore whether carefully controlled use of fragrance could be of benefit to this vulnerable audience.

Multisensory Experience

Pendine Park Care Home is a purpose-built residential home in the United Kingdom offering specialist care to those suffering from dementia and recognized as a center of excellence. An established partnership with the Hallé Orchestra meant residents already enjoyed regular music sessions as part of the arts-based therapy program. Seven Scent was invited to create specific fragrances around a chosen theme in order to find out:

- Whether combining fragrance with music triggered a greater reaction among residents.
- To what extent residents connected fragrance with events and/or memories.
- How the multisensory approach affected behavior among residents.
- If the use of fragrance helped to encourage conversation and shared experience.

Thirty residents aged 60 to 90 took part in the sessions and were divided into three mixed groups of 10. The artist-in-residence



Williams working in the lab developing scents for the Ode project.

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based at Pendine Park chose “holidays” as the main topic and requested familiar fragrances and music that worked together to evoke this environment. Within this overarching topic, three themes were chosen and associated fragrances developed:

- *Seaside pier*: Fragrances included the sweet aroma of cotton candy and toffee apple, as well as a contrasting salt, sand and seaweed-filled smell of the beach.
- *English garden*: Evoked by lavender and freshly cut grass.
- *Spanish fiesta*: Created through the refreshing, sweet smell of oranges.

Key to the success of the aromas was the need to make each one obvious, to over-exaggerate certain notes so that it almost became a caricature of itself in order to help residents process the information and make the link. The aim was to help stimulate the brain and encourage engagement with the topic. Equally important was the need for a high concentration to overcome a potential decline in the sense of smell. By creating each fragrance as a spray for a blotter, participants were able to choose to hold the blotter and control their level of interaction.

During each 60-minute weekly session, the same music was played and fragrance presented to residents. Each of the three

themes ran for 10 weeks. Results are based on observation by care staff and those involved with the multisensory sessions. It should be noted that the approach was experimental as dementia presents unique challenges that vary day-to-day and between individuals:

- Residents generally became more engaged and vocal.
- Involvement triggered conversation and engagement with other people.
- The Spanish theme provoked a noticeable buzz—a particularly positive reaction.
- Lavender created a calm atmosphere with some participants falling to sleep.
- A number of participants who said they couldn't smell anything kept hold of the fragrance stick and engaged with the associated topic.
- Introducing fragrance to the music-based sessions proved to be an effective support and of clear benefit to residents.

Given the success of this project, the team is planning further sessions around a new topic. Associated fragrances will be created and refined so that the care staff can introduce and use them to maximum effect. Fragrance therapy is now part of a wider project to create new arts-based training modules for Pendine Park's care staff.

Appetite Stimulation Project

Given the scale and long-term impact of dementia on an aging population, it presents a clear challenge to find innovative products and services to maximize the quality of life for those affected—and simultaneously reduce the burden and cost of care. This was the thinking behind a U.K. initiative launched and seed-funded by the Department of Health and the Design Council. The “Living Well with Dementia” national design challenge seeks to find ways of harnessing innovative design to create products that benefit caregivers and people with dementia and address key questions:

- How can their lives be made easier?
- How can caregivers and those with dementia prepare so as to maintain quality of life and deal with crises?
- How might designers help dementia sufferers to make the most of life?

Knowing that olfactory cues play a central role in stimulating appetite as well as eating enjoyment, scent specialist Lizzie Ostrom (Scratch+Sniff) saw this as an opportunity to harness the power of food aroma to tackle a common concern for people with dementia—weight loss and malnutrition. Together with Ben Davies,

managing director of Rodd Design, Ostrom founded a team tasked with creating a fragrance release system to stimulate appetite among people with dementia. The result is a patent-pending, discreet, mains-powered product—known as *Ode*—which releases

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three food fragrances a day in short bursts and is adjustable to coincide with the user's mealtimes.

Ode is based on the understanding that people with dementia can be particularly vulnerable to the risk of weight loss and malnutrition, particularly as their condition advances. They may often miss experiencing the aromas that could stimulate appetite, either because their meals are cooked from frozen or, in the case of residential care homes, prepared elsewhere in the building.

The primary purpose of *Ode* is to improve and/or maintain the nutritional status of older people who are struggling with eating and mealtimes. It has been designed to be appropriate for people with dementia and also support a wider profile of users experiencing symptoms of weight-loss or reduced uptake of food.

Working closely with the team and using experience gained from working with Pendine Park residents, Seven was commissioned by the founders to create food aromas specifically for delivery by the *Ode* unit. Six fragrances were taken to the stage 1 test phase:

- Bakewell tart
- Cakes
- Curry
- Orange
- Mint humbugs
- Chocolate

In formulating the fragrances used in the device, consideration was given to:

- Diffusion rates: Size of a room, how long the aroma would take to reach the individual and air flow.
- Concentration: To overcome a potential decline in sense of smell.
- Post-use effect: How long did the fragrance linger in the room and was it a pleasant smell? Despite its popularity as an appetite stimulant, the aroma of fish and chips was discounted on this basis.
- Realism of aroma: Each smell needed to be obvious and instantly recognizable. Bread, for example, proved extremely difficult to replicate, coming across as too wet or doughy, and was also discounted.

The founders' product design research priority was to determine the effects on eating attitudes and behaviors of potential end users of the fragrances in conjunction with the release mechanism. The research also addressed a number of peripheral areas, including:

- Do the scents only provoke a reaction when food is visible?
- Does the device need to be visible?
- Does the end user need to recognize what the scent is?
- What are the most appealing food scents in the target age group?



Author Kate Williams working with study participants.

- What are the most effective scents in terms of provoking desire to eat?
- What is the most effective/appropriate time for the device to switch on?
- Does a particular food scent promote appetite for a particular food (i.e., orange scent = eat oranges)?
- What form does the device need to take (i.e., portable, static, interactive, ambient, etc.)?

Participants

Six scents were tested with 15 participants both in own-home and residential care settings, with a placebo, where possible, of equal duration. Participants included those with:

- Mid to later stages of dementia and identified as having issues with food or who would forget to eat.
- Early stage dementia but not showing any issues with food.

Methodology

At three day care centers for people living with dementia, research began with group discussions around scent and food and how they relate to each other. Each session introduced a wide variety of food fragrances in order to understand preferences, monitor associations with eating and identify any issues.

A device that emitted a food scent prior to mealtimes was then installed at consenting participants' homes for different periods of time:

- One week test: Feedback was provided by participants and, where possible, their caregivers to validate comments.
- Two week diary test: Participants were asked to record their eating habits. A placebo was used for the first week to establish if a change occurred as a result of the fragrance in the second week.
- Two week food bowl and diary test: A bowl of snack foods (identical for each) was placed in each participant's living space. Amount of food eaten at the end of week one (placebo) and week two (food scent) was recorded. A different scent was used for each participant to establish if one resulted in the corresponding food being eaten.
- Day care center: A device was placed in the communal areas of day care centers and National Health Service (NHS) wards for patients with early to mid-onset dementia. Each device released the scent before lunchtime and again mid-afternoon when people would typically have a snack. Staff members recorded any change or reactions.

Results

Overall the results were encouraging. The relatively small test base provided individual examples of changes in behavior by participants when the device was present:

- At home: A professional caregiver for a couple living with dementia noticed the effect of the device on three occasions at lunchtime when he was asked when the food would be ready. This had never happened before.

- NHS hospital room: A malnourished individual with dementia was admitted weighing around 40 kg. Over the course of three weeks she put on 5 kg. According to staff, the average for this period was 2 kg. The ward manager was so impressed with this improvement that he wanted to keep the device beyond the test period as he believed it had been integral to recovery.
- At home with food present: The presence of an orange scent resulted in an increase in food intake of around 20% and a fivefold increase in intake of oranges compared to the placebo for one individual.
- Day care center: One participant who never consumed food out of his normal routine was observed taking and eating a cake; this action was considered highly unusual by his caregivers and correlated with a cake scent being present in the center.

Based on these positive outcomes and an overwhelming number of approaches from care home managers, ward matrons and relatives of older people with weight loss, the *Ode* project has progressed to second stage evaluation. The aim is to further investigate the efficacy of different food aromas in reviving interest in eating and provide more robust evidence of the benefits, while readying the product for volume production during the early part of this year.

Enriching Lives

Olfactory information has a direct path to the limbic system in the brain that supports a number of functions including behavior, emotion, memory and motivation. It is this influence that makes fragrance therapy such a potentially positive development for people living with dementia and their caregivers. By combining it with other creative disciplines or harnessing fragrance's effect on important physical and emotional reactions, studies such as these show growing evidence to support its value. Further research in this area and collaboration with innovative partners will enable us to fully explore how carefully formulated fragrances can be used in a structured context to help reach people who otherwise struggle to engage with everyday life.

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