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Embracing neurodiversity-informed dentistry. Part two: Oral health considerations

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By **Jasmine Murphy**,[1] **Fiona Andrews**[2] and **Maria Morgan**[3]

Key points

- Neurodiversity refers to the infinite variation of brain functioning within the population.
- This is the second article aimed at all members of the dental team to consider oral health implications and neurodiversity.
- Enabling a neuro-inclusive culture within dentistry could support reductions in oral health inequalities.

Introduction

This series on neurodiversity-informed dentistry is intended for all members of the dental team, aiming to promote a more accessible and inclusive culture where neurodivergence is understood, accepted, and destigmatised for the benefit of neurominority patients and staff. This second article introduces important considerations that may impact on the oral health status of neurominority patients. If you are joining this series for the first time, please visit article one for a general introduction to neurodiversity (https://go.nature.com/3JpieH5).

Further articles in the series will cover reasonable adjustments which can be made for patients, the increased vulnerability to trauma, intersectionality, as well as considering the impact of the workplace and educational settings on neurominority staff and students. These articles also take direction from Bruggermann[1] to move away from person-first language eg 'people with ADHD', and instead use identify-first language, such as 'ADHD people' as it has been reported there is wider preference for this, for it shows allegiance and pride in disability or neurodiverse culture.

Brief recap

Neurodiversity is short for neurological diversity. It refers to the biological fact that brains are unique and have many different ways in how they process information and interact with environments. The totality of oral health research suggests that there are higher levels of unmet dental needs across multiple forms of neurodiversity.[2]

Although some neurominorities can find toothbrushing and flossing challenging due to reduced dexterity,[3] this article discusses how executive functioning, sensory processing, and oral health literacy may impact on oral health outcomes for neurominorities.

Executive functioning

'Difficulties in executive functions can increase the odds of developing dental caries in neurominorities, independent of socio-economic status.'[4,5]

Executive functioning (EF) is a term used to describe the part of the brain that manages the skills we need to complete tasks in our daily lives.[6,7,8] In short, EF is the management system of the brain. It involves three major types of brain functions (flexible thinking, working memory and self-control) which are responsible for a set of skills that are necessary for independence and self-sufficiency.[9,10,11,12,13]

Executive function

See Figure 1.

Most neurominorities tend to have distinct differences in EF compared to the neurotypical (general) population. Studies have demonstrated that when EF is affected, health-enhancing intentions can fail.[14,15,16] It can also be more difficult to override impulses that engage with health damaging

Author information

[1]Consultant in Dental Public Health, NHS England – Midlands, Leicester; [2]GDP Leadership Fellow, NHS Education for Scotland, Edinburgh; [3]Immediate Past President, BASCD, Cardiff

behaviour.[10,17] In the context of oral health, EF differences can therefore impact on making healthy lifestyle choices (this would include choices relating to tobacco, alcohol, substance use, diet), undertaking self-care (including oral hygiene) and attending dental appointments. A 'better' performance of EF (symbolic of neurotypical functioning) has been reported as a protective factor against dental caries.[18,19] It is therefore important to understand and recognise when an individual is struggling with EF (Fig. 2).

Fig. 1 Executive function

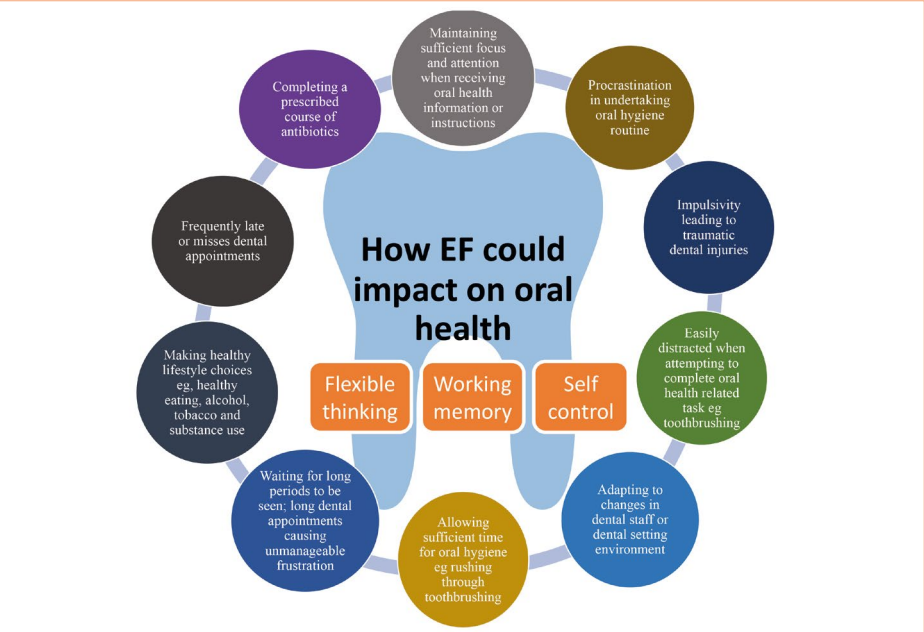

Fig. 2 How EF could impact on oral health

Sensory processing

'Some neurominorities can find toothbrushing difficult due to sensory processing difficulties.'[20]

Sensory processing (SP) is a subconscious and automatic neurological process in receiving and responding to sensations. For the majority of people, most sensory input is filtered by the brain in order for selected information to reach their conscious awareness. For those with SP differences, the brain can find it challenging to filter input to the extent that it can be distracting and potentially confusing. Certain noises, lights, tastes, movements, positions, touch and/or smells can be experienced as painful or even be regarded as a threat. This, in turn can cause a person to become easily overwhelmed. In a dental setting, such patients could be harshly labelled as being non-compliant, uncooperative, or even challenging.

Individuals with SP differences fall into two main categories, hyposensitivity and hypersensitivity (Fig. 3).

Current estimates indicate that 5% to 16.5% of the general population have some issues associated with SP challenges.[21,22] These estimates are disproportionately higher for neurominorities, particularly autistic[23] and ADHD people.[24] In the context of oral health, just like EF, SP issues can also affect lifestyle choices, undertaking self-care (including oral hygiene), attending dental appointments as well as receiving dental treatment or instructions. It is therefore important to understand and recognise when an individual is affected by SP differences.

SP differences for those who are hyposensitive may not be as apparent. For those with hyposensitivity, oral hygiene measures could lead to dental abrasion (by needing to use harder pressure when toothbrushing), or dietary preferences could cause dental erosion and/or dental caries (by the need for intense flavours which are highly acidic or sweet). These are examples and do not present an exhaustive list.

Issues with SP hypersensitivity may be encountered in the home environment, where it could have a direct impact on how oral hygiene measures are undertaken. It is reportedly quite common for those with SP hypersensitivity to go for days, weeks or even years without appropriate oral hygiene,[21] as they may struggle with the sensation of toothbrushing and/or flossing, the taste, smell and/or texture of toothpaste as well as sounds/noises that toothbrushing makes. Dietary choices may also be affected as some may have very limited dietary preferences due to olfactory (relating to smell) and gustatory (relating to taste and texture) differences. The dental environment can also cause sensory overload. This increases stress and anxiety and serves to create barriers for communication and engagement with the dental team. As a result, some neurominorities can become isolated and choose not to access dental care because they find the dental environment too challenging.[3,20,25,26] Some examples are below.

Visual sensations that could be challenging at a dental practice:

1. Busy reception and waiting room
2. Sudden movements of people or hand gestures

3. Bright, flashing/blinking and/or glaring lighting
4. Reflective and/or shiny surfaces
5. Bright colours, busy décor and cluttered workspaces.

Hearing sensations that could be challenging at a dental practice:

1. Noisy reception and waiting room
2. Music, TV, children playing with toys, phones ringing
3. Humming or buzzing of fluorescent lights
4. Sporadic loud sounds, such as dental hand pieces
5. Contact noise of dental instruments as they are retrieved and returned.

Touch sensations, position and movement of the body, as well as those affecting balance that could be challenging at a dental practice:

1. Sitting in the dental chair
2. Placing instruments in the mouth
3. Percussion of teeth
4. Feather-like or very light touches
5. Going back suddenly in the dental chair.

Smell and taste sensations that could be challenging at a dental practice:

1. Cleaning and disinfectant fluids
2. Materials used during dental treatment
3. Clothing detergents used by dental team
4. Fluoride varnish
5. Mouth rinses.

Oral health literacy

'Oral health literacy is a critical concept in our efforts to reduce oral health inequalities.'[27]

Health literacy (including oral health literacy) and functional literacy are not the same, but they are related. Functional literacy is about personal skills to read, write, calculate, speak, and comprehend information in order to participate in society. Oral health literacy (OHL) is the extent to which individuals are able to obtain, process and understand oral health information, as well as to navigate health/dental services, in order to make appropriate decisions to support their oral health.[28,29]

A person could therefore have a good level of functional literacy but could also struggle to comprehend health information they are receiving ie, have a lower level of oral health literacy. This does not mean that they lack intelligence, but rather the information is not being communicated in a manner/method/format that is suitable for them to process and understand. Patients cannot engage with information if they cannot understand it. This can happen to anyone, and is not specific to neurominorities.

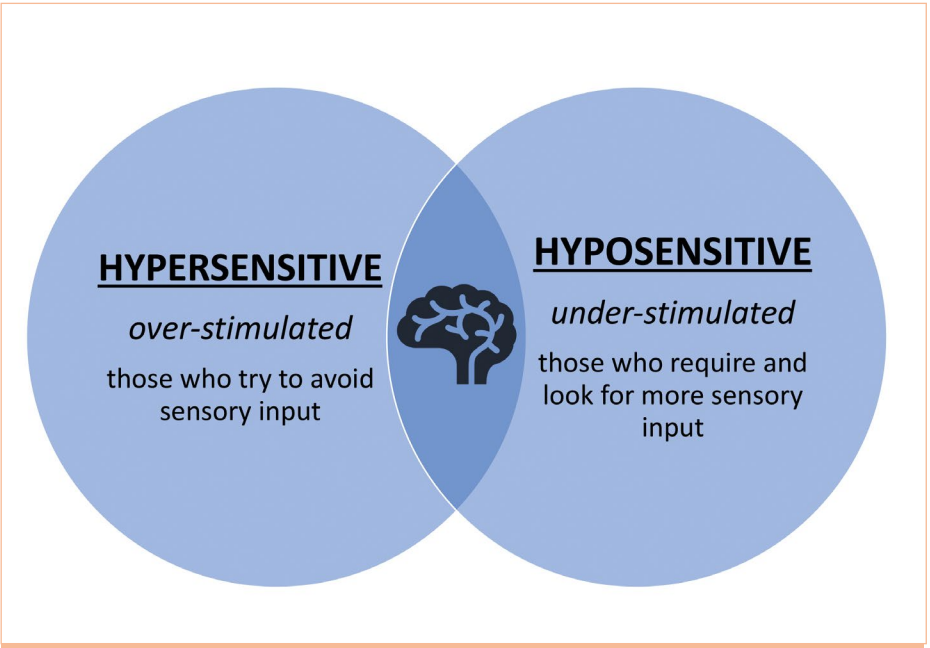

Fig. 3 Individuals with SP differences fall into two main categories

'The dental team should be aware that whilst some neurominorities have received a diagnosis, many are undiagnosed and not even aware of their neurodiversity.'

For neurominorities, the ability to process information can be further negatively affected by their neurodiversity, EF, and SP differences. For example, if the dental environment is causing sensory overload, they are unlikely to be able to process oral health instructions or advice. Those with EF differences may find it difficult to process information due to distractions in the dental environment making it difficult for them to maintain focus or attention. Dyslexia or dyscalculia could cause further difficulties in processing oral health and/or any associated financial information. Dental websites could also cause an issue for those with SP differences due to colour contrasts, schemes, or patterns, as well as busy web pages with lots of text and/or too many graphics. This can make reading and processing on-screen information difficult, creating a barrier. Similar issues can be faced with oral health leaflets.

Neurodiversity-informed dentistry

'Neurodiversity-informed dentistry is about a more accessible and inclusive culture where neurodivergence is understood, accepted, and destigmatised for the benefit of dental patients and all those working within or seeking to join the dental profession' (from part 1 in this series https://go.nature.com/3JpieH5).

The dental team should be aware that whilst some neurominorities have received a diagnosis, many are undiagnosed and not even aware of their neurodiversity. Neurodiverse conditions can therefore be a completely hidden disability causing sufficient impairment, particularly with regards to executive functioning (EF), sensory processing (SP) and oral health literacy (OHL). It is acknowledged that anyone can face EF, SP and OHL challenges. However, neurominorities are disproportionately affected and their struggles are of a higher intensity, magnitude, and severity than the general (neurotypical) population. Furthermore, as some neurominorities may appear to 'communicate well' or may be from highly professional backgrounds, their

neurodiversity may go unnoticed with their needs not being identified or met. This makes it all the more important for dental settings to create neuro-inclusive spaces for all patients to be able to benefit from good oral health.

Next in the series

There are many simple adjustments that can be considered to support neurominority patients. The next article in the series will look at suggested solutions in supporting neurominority patients in gaining improved oral health.

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