Access to special care dentistry, part 7. Special care dentistry services: seamless care for people in their middle years – part 1

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IN BRIEF

- The dental team needs to be familiar with the main features of rheumatoid arthritis.
- For those with progressive neuromuscular conditions, instigation of rigorous preventive regimes and comprehensive restorative treatment is essential.
- Patients with well controlled Type 1 and Type 2 diabetes can be treated similarly to non-diabetic patients provided that the normal regime of food, drugs and/or insulin is not disturbed.

PRACTICE

VERIFIABLE CPD PAPER

Children and older people have been relatively well served by specialist dental care. Despite increasing disability amongst people in their middle years, there have been no or few dedicated dental teams with responsibility for provision of their oral care. This article explores the ethos and practicality of seamless care across the age groups and the primary/secondary care interface, with a focus on embedding oral health into general healthcare plans through the multidisciplinary team approach. The article explores four conditions – rheumatoid arthritis, Huntingdon's disease, multiple sclerosis and diabetes. It considers the features of each condition and how they can impact on both oral health and the delivery of dental services. It also considers the elements of care that contribute to a holistic and seamless approach to oral care services.

INTRODUCTION

Adults with disabilities and additional needs pose numerous challenges to the provision of oral healthcare. To date, children and older people have been well served by specialist care, however, there have been no specific dental teams with responsibility for the provision of oral healthcare for people in middle age. Thus, it has been difficult to ensure the provision of ongoing care as a seamless transition from paediatric or adolescent to adult oral health services. Individuals who have been used to receiving high quality 'paediatric' care (in which they have often remained as young adults) need to be able to access adult services of equal quality. Much of this care can be provided by the general and salaried dental services (primary dental care services). The recognition of the Specialty in special care dentistry will allow the development of posts in the field of middle age care, facilitating the organisation and provision of seamless care for these individuals in both primary and secondary oral health services.

The number of middle age people with disabilities and additional needs is increasing for a number of reasons, including:[1]

- Improved paediatric care – more children born with complex and multiple disabilities are surviving into adulthood
- Life expectancy for people with disabilities and chronic disease is increasing and more of them survive into middle age
- Individuals may acquire a disability or progressive disease in middle age.

As well as increasing numbers of individuals, other challenges include:

- The deinstitutionalisation of adults from large institutions and care homes to smaller community group homes, where clients are encouraged to live more independently and where there may be less rigorous daily oral care, less supervision of diet and less support in accessing oral health services[2]
- The lack of a register for people with disabilities and additional needs makes it difficult to ensure equitable access to oral healthcare
- People with severe disabling conditions may be overwhelmed by the physical, medical, social and financial demands of the disability so that oral care takes a low priority in their life until there is a problem.[3,4]

According to the British Society for Disability and Oral Health (BSDH), the aim of oral healthcare provision to adults with additional needs and disability is to provide a *seamless* approach to care as they move through the age groups.[5] In this article, the acronym 'SEAMLESS' is used to illustrate such an approach to oral healthcare.

ACCESS TO SPECIAL CARE DENTISTRY

1. Access
2. Communication
3. Consent
4. Education
5. Safety
6. Special care dentistry services for adolescents and young adults
7. **Special care dentistry services for middle-aged people. Part 1**
8. Special care dentistry services for middle-aged people. Part 2
9. Special care dentistry services for older people

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S – seamless

All adults with disability should have an opportunity for provision of oral care in mainstream dental services where possible, with or without a shared care approach as required and/or with additional specialist care provision across the age bands, as appropriate. The workforce development in special care dentistry[6] will help to establish a network to provide seamless care between the different elements of dental services.

E – education and training

The provision of oral health information specific to individual needs promotes self-care.[7] For people who are dependent for their oral care there should be emphasis on incorporating oral health into carer training of practical oral care to motivate, encourage, support and assist clients with their oral hygiene. Prevention is the key to maintaining oral health and it is recognised that people with a progressive disability could benefit greatly from the provision of preventive oral healthcare.[8] Preventive dental programmes may have a core element but require modification to tailor them to the needs and functional abilities of individual patients.[3]

At the same time there should be training available for members of the dental team in the skills necessary to provide oral healthcare for people with disabilities and additional needs, including manual handling and competency in handling medical emergencies.

A – access

The ethical obligation to offer the same standard of care to all patients irrespective of their individual status and access underpins this ethos.[9] Equality of access to care, information, advice and accessible dental premises and surgeries[6] promotes early prevention and/or intervention that can minimise future oral disease, pain and the need for operative intervention with any associated use of sedation and anaesthesia.[10]

M – multidisciplinary working

Efforts made to work with other agencies, particularly health and social care professionals, pay off through the development of networks and pathways

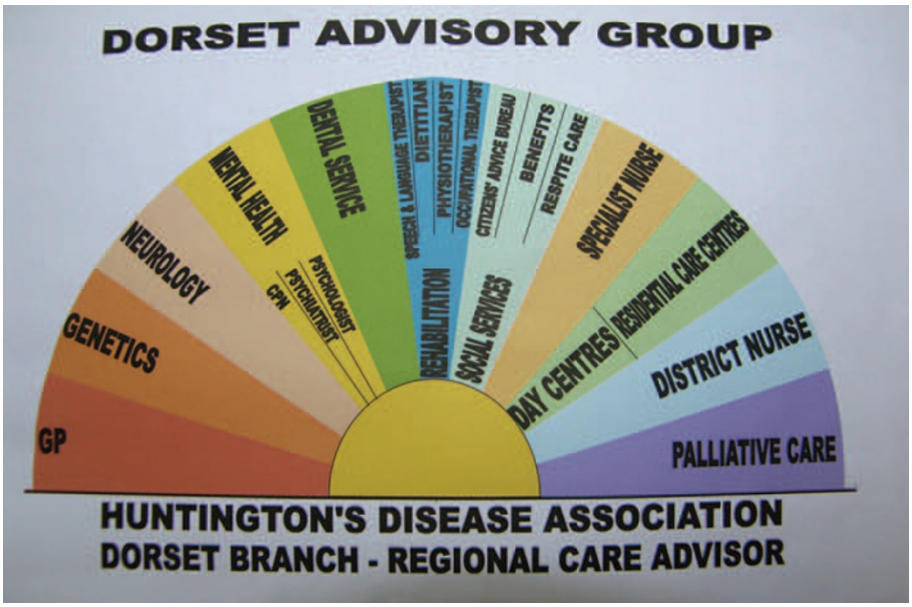

Fig. 1 Membership of the Dorset Branch Huntington's disease multidisciplinary team

Fig. 2 A patient with his personal health record

of care. Communication between the dental team and other disciplines has been shown to be most effective when the dental team provides input into the multidisciplinary assessment and care.[11] Collaborative care planning provides an opportunity to embed and demonstrate the importance of oral healthcare to general health and well being.[11]

Steifel points out that adults needing special care dentistry require an integrated approach to overcome existing barriers.[3] Such an approach requires oral health training to be built into the curricula of the respective health disciplines, and should include training in oral assessment as a mechanism for identifying oral health risk factors, individual care needs and appropriate early referral as well as assisting the development of realistic oral care plans.

L – liaison and linkwork

Liaison and linkwork enables individual patients, their families and carers, voluntary groups and other agencies to work in partnership in order to facilitate access to oral healthcare. An example of 'good practice' is a Huntingdon's disease multidisciplinary clinic in Dorset. This clinic takes place quarterly and includes members of several disciplines to whom

the individual person or family has access for advice, support and treatment as required (Fig. 1).

The medical consultant sees people by appointment and other services work more informally. Other professionals include a dietician, speech and language therapist, specialist nurse, occupational therapist, psychologist, genetic counsellor and an oral health promoter who is available for advice and to help facilitate access to oral healthcare. With the input from patients of the service and their families/carers, the oral health promoter and her team have developed an information leaflet specifically for people with Huntingtdon's disease and their carers.[12] Many of these patients have received preventive oral health advice with the aim of establishing good habits early on in the disease process. They have also been supported with accessing oral healthcare and have been able to 'close the loop' by providing feedback to the oral health team at follow-up clinics.

E – empowerment

It is easy for people with disability to feel disempowered, for example they are often dependent, to varying degrees, on others to make oral healthcare decisions for them, to transport them to the dentist and to perform or assist with daily oral care. Patient-centred care planning enables an individual to have inclusion and involvement in the decisions made about their oral care needs and how they are met. This can be helped by the use of a personal health record and user involvement in service development and delivery.

A 1998 Government report, *Signposts for success*,[13] looked at the ways in which people with a learning disability could have better access to healthcare and recommended that each person should have a 'personal health record' which they would keep. It should include essential medical information and healthcare needs as well as information about likes and dislikes, communication and every day needs. The personal health record should also include details of other health and social care professionals who are part of the person's support team. It provides an opportunity to include an oral health section with an oral care plan and tooth-brushing and other preventive advice (Figs 2-4).

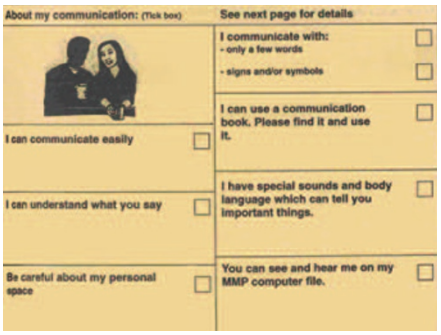

Fig. 3 A sample page from a personal health record

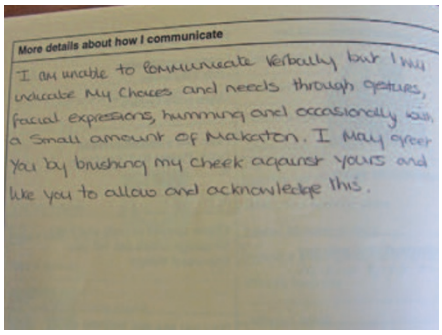

Fig. 4 A page from a personal health record indicating the person's communication needs

S – special care dentistry

Special care dentistry includes the skills, knowledge and teamwork required to provide oral healthcare for people with additional needs and disability. The lynch pin is to develop a written oral care plan, with involvement of the individual, family and/or carer, which facilitates communication between the patient, carers and the dental team and helps to ensure that all involved in the individual's care are aware of her/his needs. The general principles of such a plan are to maintain comfort, dignity and self-esteem and whenever possible to encourage independence and self-care. Factors such as general health, medical condition and prognosis, medication and therapeutics as well as previous standard of oral hygiene and oral care skills should be taken into account.

Treatment plans may be modified by an individual's ability to co-operate with treatment, which may fluctuate, but should retain the overall physical and psychological well being of the patient as the prime considerations. Careful assessment and treatment planning will take account of all associated factors, including the skills required to manage delivery of care.[5] Treatment planning which endorses a patient-centred, realistic and flexible approach, whilst taking account of perceived needs and problems or required modifications associated with the person's disability or medical condition is more likely to be both acceptable and successful.

S – service provision and development

Service provision and development are also required if the barriers to seamless care are to be overcome. Provision of oral care can take place in a number of settings, and all should have facilities for maintenance of patient privacy and dignity. Research has shown that people with disabilities vary in their views on the type of service they want. Whilst some prefer to use mainstream services, others want more specialised services.[14] The latter need to be available for some patients, but on the whole these people are a small proportion of the population requiring special care dentistry. There is certainly a place for shared care between general dental practice and a special care service. General dental practice offers advantages that include continuity of care, the opportunity to access mainstream service, a wider choice of service providers, the opportunity to attend the dentist with the rest of the family, and a service that probably has a more convenient location than a specialist centre is likely to have.

If some items of management or treatment are complex, then the support of a special care service may be necessary. Facilities for sedation and general anaesthesia, or access to these services, are essential for some people with disability.[15] Inhalation and intravenous sedation are indicated as the next line of treatment when an individual is unable to co-operate for care with local analgesia because of anxiety, learning disability or physical disability such as a movement disorder. Additionally, its use may be required when treatment is likely to be unpleasant or prolonged (such as oral surgery procedures) or where the patient has a medical condition such as hypertension or angina that benefits from stress being kept to a minimum.

Multiple agencies may take the opportunity to provide care at the same sedation session, for example dental treatment and chiropody (Fig. 5).

For some patients, sedation will not be suitable or sufficient to manage necessary care, and treatment under general anaesthesia is indicated.[16] Again, multiple agencies may take the opportunity to provide care at the same session. Ultimately service provision needs to be integrated and well co-ordinated to provide a seamless service across all the organisations that need to be involved in the care of an individual.[5]

Adults in their middle years requiring oral healthcare may have additional needs due to congenital disability; developmental disability; acquired disability from brain injury, trauma or progressive neurological conditions, and/or disorders such as cardiac or respiratory disease. This article, part 1 of middle years, will consider rheumatoid arthritis, Huntingdon's disease, multiple sclerosis and diabetes mellitus. Part 2 will consider Down's syndrome, cerebral palsy, cardiovascular disease and respiratory disease. In doing so, the ethos and philosophy of seamless care will be referred to.

Fig. 5 Multi-agency working (dentist and podiatrist) utilising the maximum benefit of a sedation session

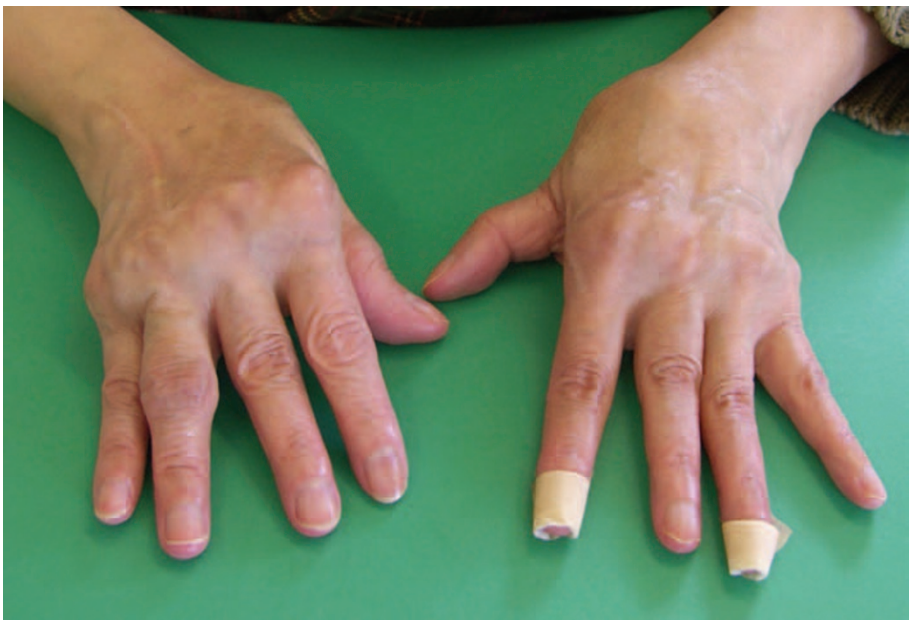

Fig. 6 The effect of rheumatoid arthritis on hands, in this 40 year old woman, impinges on her ability to carry out oral hygiene

1. RHEUMATOID ARTHRITIS

Rheumatoid arthritis (RA) is a chronic, progressive, multi-system disorder which is thought to be auto-immune in nature.[17] Some people are genetically susceptible to rheumatoid arthritis and in these cases stress, infection or trauma may trigger its development.[18]

RA is characterised by periods of flares and remissions. The disease can progress rapidly, with any joint being affected, usually in a symmetrical distribution. Commonly the hands, feet and wrists are affected first, followed by the elbows and shoulders. Joint damage causes deformities leading to disability, embarrassment and depression, as well as difficulty in carrying out everyday tasks, including oral hygiene procedures. Weight loss, fatigue and anaemia may also be experienced. Anaemia is common, with 33-60% of people with RA having mild anaemia, of which about 77% will be anaemia of chronic disorders and 23% iron deficiency anaemia.[19] Rheumatoid inflammation can also affect the lacrimal and salivary glands causing dry eyes and dry mouth, and is known as secondary Sjögren's syndrome.

About 1 in 100 people has RA, with a male to female ratio of 1: 2-3. RA can occur at any age but commonly affects women between the ages of 20 and 50, with a mean age of onset between 30 and 40.[17] There is currently no cure and the treatment goal is to reduce joint inflammation and pain, maximise joint function and prevent joint destruction and deformity.[18] Optimally, treatment involves patient education, rest and exercise, joint protection, medications and occasionally surgery.[18] Several different types of medication are used. The first-line drugs, such as aspirin, non-steroidal anti-inflammatory drugs (NSAIDS) and corticosteroids, are used to reduce pain and inflammation. The second-line, slow-acting drugs or 'disease-modifying anti-rheumatic drugs', such as methotrexate[20] and the newer biologics such as infliximab, promote remission and prevent joint destruction.[21,22]

Oral health

Studies in children and adults with juvenile idiopathic arthritis (JIA or early

onset RA) demonstrate a higher incidence of mandibular dysfunction, which is attributed to the direct effect of RA in the temporomandibular joint (TMJ),[23] and a higher incidence of ginigival and periodontal destruction, which are considered secondary effects of arthritis on oral health.[23-26] Findings have varied in relation to caries, with one study in JIA finding a low caries rate[27] which was attributed to the combination of early preventive dental care and use of sugar-free medicines. Other studies report a higher incidence of caries in the RA population of both children and adults than in the general population.[24,25]

Secondary Sjögren's syndrome (SS) has been described in 39% of the RA population,[25] however salivary flow is reduced in the RA population as a whole. Dry mouth increases the risk of dental disease as well as increasing susceptibility to oral infections such as candida in this immune-compromised group.[28] Anaemia of chronic disease is associated with oral ulceration, burning mouth and glossitis. Also, methotrexate can cause oral ulceration and caution needs to be exercised when prescribing other medications, notably NSAIDS and some antibiotics.

Seamless care

The factors that need consideration in establishing and maintaining oral health for people with RA are:

Education and training – the main features of RA that the dental team need to be familiar with are limited mobility, the high level of pain experienced and the presence of dry mouth. The latter is a combination of the RA itself and the medication used to manage it. All these factors impact on oral health and the individual with RA needs early information, prevention and assistance with oral hygiene aids to have a chance of retaining oral health.

Access – many people with RA have restricted mobility and difficulties with activities of daily living. This can involve difficulties with access to the dental surgery and the dental chair. Joint stiffness can be severely limiting and tends to be worse earlier in the day, so appointments may be better attended later in the day. Where possible wheelchair users should be treated in their chair as moving from it can be very painful. These factors may contribute to the reported lower use of dental services by people with RA, who are particularly less likely to receive preventive care.[29]

Multidisciplinary care – people with RA need support from a wide range of health and social care professionals to ensure that they can remain as active and independent as possible. If there are difficulties with managing oral health or xerostomia is present, it is important that the dental professional is part of the team. Additionally, good oral health allows proper dietary intake and the dietician and dentist can work together to ensure the diet is healthy from both a general and oral health perspective.

Empowerment – the occupational therapist helps retention of independence by advising on household device modifications and may also advise on toothbrush adaptations (see part 4 of this series).[7] Early signs of finger stiffness, later signs of joint swelling, ulnar deviation of the fingers (Fig. 6) and associated pain impact on the ability for self-care, including oral hygiene. Toothbrush handle adaptation or use of an electric brush may enable the individual to retain independence for oral hygiene.

Special care dentistry – young adults with RA may develop periodontal destruction and these patients require professional attention.[26] The risk of muco-gingival infections and the increased risk of dental disease from dry mouth can be reduced by ensuring the patient fully understands the risks and has appropriate information and support regarding prevention.[30] Oral infections should be treated rigorously using local agents (such as good mechanical cleaning, chlorhexidine mouthwash) and systemic agents (such as antibiotics) as needed. People with RA may become easily fatigued and should be allowed frequent rests during treatment. They are also at risk of pathological fractures in the cervical spine area and care should be taken with manual handling and neck position during extractions.

Although antibiotic cover is not normally considered necessary for people with RA who have multiple joint replacements, it is wise to avoid procedures known to cause high bacteraemia, such as inter-ligamentary injections. For patients on corticosteroids, thought needs to be given to prophylactically increasing the dose for invasive procedures (Table 1), particularly if the patient is anxious about dental treatment.[31]

Table 1 Steroid cover regime for immunocompromised patients

	Prophylactic steroid cover	Route of administration
<10 mg	None	N/A
Normal daily steroid dose	Double dose or 25 mg	Orally
>10 mg	100-200 mg hydrocortisone	Intramuscularly or by slow intravenous injection

Source: Parfitt K, Dickinson C. Allgrove's syndrome and oral health care. *J Disabil Oral Health* 2007; **8:** 129 131

2. HUNTINGTON'S DISEASE

Huntington's disease (HD) is an inherited, progressive, degenerative neurological disorder experienced by around 8 in every 100,000 people in the UK. It is an autosomal dominant disorder caused by a faulty gene, which produces a protein called Huntingtin, on chromosome 4, which means there is a one in two chance of inheriting the disorder from an affected parent.[32] The faulty gene leads to damage of the nerve cells in specific areas of the brain, including the basal ganglia and cerebral cortex, leading to a complex mixture of physical, cognitive and emotional problems and resulting in profound disability.[33]

HD affects both males and females equally. Its onset is commonly between the ages of 30 and 50, although there are about 10% of juvenile cases where onset is before the age of 20. Generally, the condition begins in mid-adulthood and progresses slowly to death 15 to 20 years after onset of the 'classical' symptoms of the disorder. Secondary illnesses such as pneumonia are usually the cause of death.

Table 2 sets out the early and later symptoms of HD. The most obvious symptoms are abnormal body movements or 'chorea' and a lack of co-ordination. There is a progressive decline rather than a sudden loss of abilities. Physical signs are usually noticed first and are almost always visible. Most people with HD eventually exhibit jerky, random, uncontrollable 'choreiform' movements, although some exhibit bradykinesia (slow movements) and dystonia (stiffness). These abnormal movements are initially exhibited as general lack of co-ordination and unsteady gait, gradually increasing as the disease progresses. They eventually cause problems with loss of facial expression and exaggerated facial gestures (called 'masks in movement') and inability to sit or stand stably.

Cognitive and psychiatric deficits generally manifest later, leading to psychopathological problems which exhibit differently from person to person. They may include anxiety, depression, reduced display of emotions ('blunting'), decreased ability to recognise negative expressions in others, egocentrism, aggressive behaviour and compulsivity which can cause addictions such as smoking, alcoholism, gambling or hypersexuality.

Pre-symptomatic testing to identify the presence of the HD gene is available. A negative result means that the individual does not carry the expanded copy of the gene, will never develop symptoms and cannot pass it on to children. A positive result means that the individual will develop the disease and has a 50% chance of passing it on to children. However, a pre-symptomatic positive blood test is not considered a diagnosis because it may be decades before HD onset, and it is generally diagnosed through recognition of characteristic uncontrollable movements. However, these may be preceded by the cognitive or emotional symptoms which are not always recognised as HD, and diagnosis may require a combination of psychological and physical examination.

There is currently no proven cure for HD and symptoms are managed with various medications and care methods. Medication is used to alleviate emotional symptoms and involuntary movements and includes the use of antidepressants, sedatives and antipsychotics. Speech therapy can significantly improve speech and swallowing problems. A high calorie diet is advised to prevent weight loss and improve symptoms such as involuntary movements and behavioural problems.

Table 2 Early and late symptoms of HD

Symptoms	Early onset	Later onset
Physical	Slight, uncontrollable muscular movements Stumbling and clumsiness	Pronounced, abnormal body movements or 'chorea' and lack of co-ordination More severe stumbling, clumsiness and unsteadiness Difficulty in speech and swallowing Weight loss
Cognitive	Lack of concentration Short-term memory lapses	Loss of concentration Short-term memory lapses Loss of drive, initiative and organisational skills Difficulty in concentrating on more than one activity at a time Loss of interest in personal appearance, hygiene and self-care
Emotional/ psychological	Depression Changes of mood, sometimes including aggressive or antisocial behaviour	Depression Mood swings, including aggressive or antisocial behaviour Emotional blunting and disinhibition Frustration Loss of flexibility, often misinterpreted as stubbornness

Source: Huntington's Disease Association website and fact sheets

Table 3 Speech and language difficulties associated with HD

Speech and language difficulty	Consequence
Communication cognition	Impairment of what is said and the thought processes to plan what is said
Speech production	Speech becomes unintelligible. Individuals are often non-verbal by the advanced stages of HD
Speech difficulties due to impaired breathing	Poor speech production Hoarse, harsh, strained or strangled vocal quality
Inappropriate rate, rhythm and pitch of speech	Speech is too fast, too slow, monotone and/or inappropriate stress on words making it difficult to listen to and interpret
Imprecise articulation	Unclear pronunciation of sounds
Cognitive and language skills	Multiple problems including difficulties beginning conversation; lack of spontaneity in communication; difficulty putting thoughts into words; reduced number of available words; limited ability to respond within a conversation; specific word finding difficulties; difficulty understanding complex information; slow response time; impaired skills in reading and writing ranging from physical difficulties to comprehension difficulties

Source: Huntington's Disease Association Factsheet 9. Communication Skills. http://www.hda.org.uk/download/acrobat/hdafs009.pdf

Oral health

There is little information on the oral health of people with HD in the literature. Whilst they are not innately more susceptible to dental disease, the features of HD put them at greater risk of developing periodontal disease and caries.[34]

Risk factors include physical features of HD such as random uncontrollable movement and lack of co-ordination; cognitive factors such as short term memory lapses, loss of concentration and organisational skills and loss of interest in self care; and emotional factors such as depression.[34] Additionally, there may be the risks associated with xerostomia as a side-effect of medication,[35] and with the consumption of a high calorie diet which may lead to frequent consumption of sugar-containing foods.

Seamless care

The factors that need consideration in establishing and maintaining oral health for people with HD are:

Seamless care – the onset of HD is later in life and ideally an individual should remain in the care of their primary care dentist for as long as possible, with referral to or support from special care services when necessary.

Education and training – establishment of prevention in the at-risk family before HD develops and for the individual with early stage HD helps to institute good habits which, hopefully, remain automatic as HD progresses, thus reducing the risk of oral disease later when it may be difficult to access and tolerate dental treatment. The Huntington's Disease Society (HDS) has developed a factsheet on the importance of dental care in HD.[36] Maintenance of teeth is important, as involuntary tongue and facial movements make managing dentures problematic.[34] Rigorous preventive regimes including use of high fluoride toothpastes should be instigated early on.[15]

Access – possible financial difficulties, transport problems, access to dental surgeries and apathy or resentment in the patient and/or the family have all been cited as contributing to lack of access to dental care.[36] HD associated movements and ability to tolerate dental treatment may also impact negatively on access to dental care.[36]

Multidisciplinary care – difficulties with eating, swallowing and maintaining a constant body weight are among the most challenging complications of HD. Development of a voracious appetite means people with HD always seem to be hungry and have a tendency to cram food into their mouths to try to satisfy their hunger, causing problems with choking.[37] Choreiform movements of the mouth, face and neck and deterioration of the muscles involved in swallowing cause frequent choking episodes during eating and drinking. Weight loss attributed to the involuntary movements means nutrition and increased calorie intake play an important role in treatment. Collaboration with the nutritionist is important to ensure that oral health is considered when dietary advice regarding frequent high calorie snacks is given. As HD progresses, speech is impaired with slurred words and uncontrollable movements of the mouth, making communication difficult (Table 3). Early input from the speech and language therapist (SALT) can improve speech and swallowing methods and provide advice on communication methods.[37] The SALT will constantly reassess the changing communication needs of the individual with HD and plan effective management strategies throughout the course of the disease. Where a neurologist is involved in an individual's care, they should be informed of any oral health problems.

Liaison and linking – linking with family and carers ensures that good oral health and access to oral healthcare is facilitated. Liaison with local and national HDS groups facilitates access to care, information and fact sheets.

Empowerment – agitation and aggressive behaviour can be part of HD but can also be due to frustration from difficulties with communication. Adequate time is needed for effective communication, allowing the individual time to formulate and express thoughts, make her/himself understood and take part in the decision-making process. Reduction of environmental noise and distraction will help an individual's concentration.

Special care dentistry – in advanced HD, people find it difficult to co-operate with dental treatment. They are unable to stay still and may also have difficulty opening their mouth. Success of dental treatment has been attributed to the dental team approach and short-duration appointments to limit patient stress.[35] Both the provision and acceptance of dental treatment can be very challenging and may require specialist input. Conscious sedation can be used to help control movements and to manage swallowing problems and reduce the risk of aspiration (Fig. 7).

3. MULTIPLE SCLEROSIS

Multiple sclerosis (MS) is a complex neurological condition which occurs as the result of damage to the myelin

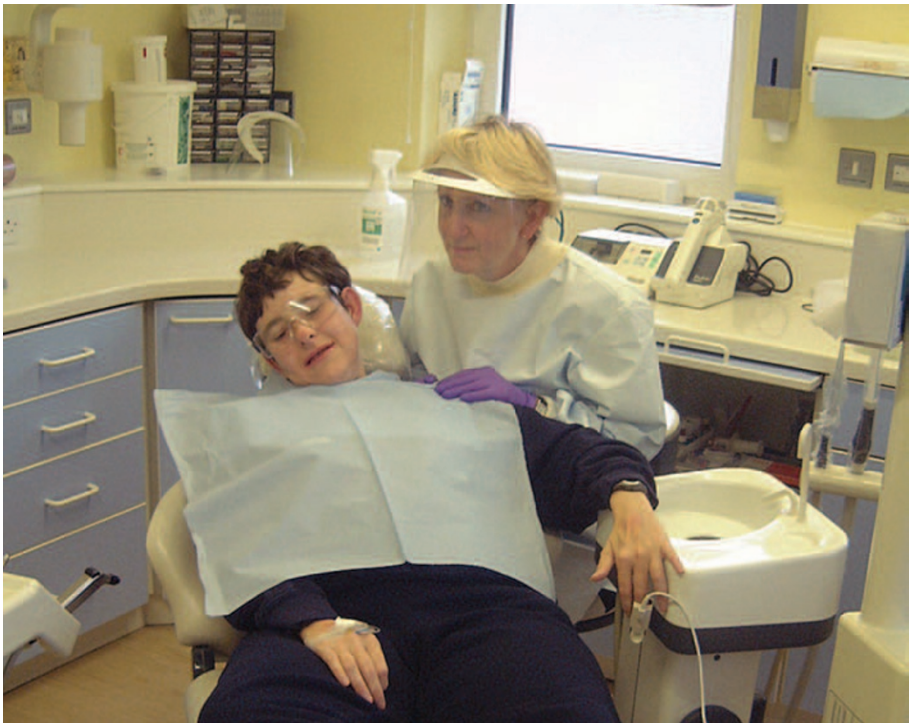

Fig. 7 Person with Huntington's disease sedated with intravenous midazolam to control movements and allow dental treatment

sheaths of the nervous system. The damaged areas or plaques result in inflammation and interference with both sensory and motor nerve transmission. There are several different types of MS, with different patterns of disease, and new symptoms occur either in discrete attacks (relapsing forms) or slowly accumulating over time (progressive forms). Between attacks, symptoms may remit completely, but permanent neurological problems often persist, especially as the disease advances. One in five people with MS has a benign form with mild attacks and no permanent disability, while another 15% have a progressive disease that steadily worsens and can lead to profound disability.[38]

MS is the most common neurological disorder among young and middle-aged adults, affecting 85,000 people in the UK with 2,500 newly diagnosed cases each year. Onset is usually between 20 and 40 years of age[38] and it is more common in women than men, with a ratio of 3:2.[38]

Its cause is not understood and no single causative agent has been identified. A number of probable causes have been postulated[38], including: environmental factors, such as viral or bacterial infection, which trigger an auto-immune process; genetic predisposition; a family link, with the child of an affected parent having a 20-40 times greater chance of developing MS than for the general population; and climatic and geographical factors, being more common in temperate than tropical climates, with Scotland and Canada having the highest incidences.

There are no specific or conclusive tests for MS. A clinical diagnosis is made on the basis of at least two neurological episodes involving at least two areas of the central nervous system on at least two separate occasions. The episodes must be at least one month apart and last for at least 24 hours.[38] Clinical diagnosis needs to be backed by neurological examination, evoked potential tests to confirm demyelination, magnetic resonance imaging to pinpoint the location and size of plaques, cerebrospinal fluid testing for particular antibodies and other tests to exclude conditions that mimic MS.[39]

There is no cure for MS and treatment focuses on prevention of disability and maintenance of quality of life.[38] Increasingly, a multidisciplinary team approach is used to ensure a co-ordinated and comprehensive approach to rehabilitation. The MS specialist nurse, who is generally based in a neurology unit, is central to the team and can be a useful information source. Drugs, physical therapies, psychological techniques and alternative therapies are all used in the symptomatic management of MS.[38] Many of the medications used have the potential to cause dry mouth and associated oral disease.[39]

Table 4 Common symptoms of multiple sclerosis

Symptom	General impact	Impact on oral health and/or dental treatment
Numbness or paraesthesia in arms and hands	Difficult to hold items such as a pen or toothbrush	Decreased ability to carry out effective oral hygiene
Spasticity and spasm	Effects balance and mobility Spasms can be severe	Impacts on safe delivery of dental treatment and oral hygiene Defer treatment to period of remission Medication causes dry mouth
Tremor	Affects limbs, trunk, head, jaw, lips, tongue and speech Causes ataxia and loss of co-ordination	Aggravated by stress and fatigue of dental treatment. Dental treatment more difficult to deliver Decreased ability to carry out tooth brushing
Speech disorders	Abrupt, jerky, explosive speech and/or dysarthria	Difficult to understand May require use of pace board or other communication device
Dysphagia – occurring in 30-40% of people with MS	Eating problems, weight loss and dietary adjustments Choking or aspiration pneumonia	Increased risk of caries Treat in semi-reclined position, use rubber dam and high volume suction behind dam
Changes in cognition	Changes in thought, memory, judgement, ability to concentrate, mood and emotions	Requires quiet with minimal distractions to concentrate Provide written information and reminders
Depression	Decreases motivation for self-care	Decreases motivation for oral care Medication causes dry mouth
Dizziness and vertigo	Difficulty with standing or walking Light headedness with sudden postural changes	Difficulty attending dental appointments Upright dental chair slowly from the reclined position Medication causes dry mouth
Cannabis use	Alleviation of spasticity, spasm and tremor and improved bladder control	Possession is illegal so may not disclose use Affects drug dose required for IV sedation

Source: Fiske J, Griffiths J, Thompson S. Multiple sclerosis and oral care. *Dent Update* 2002; **29:** 273 283.

Clinical features

MS has a wide range of symptoms. Both its progression and symptoms are unpredictable and vary from person to person as well as over time. Common early symptoms include visual disturbances, facial pain or trigeminal neuralgia and paraesthesia or numbness of feet, legs, hands and arms. These symptoms plus spasticity, spasms, tremor, fatigue, depression and progressive disability impact on the individual's ability to maintain oral health, cope with dental treatment and access dental services.

Symptoms are dictated by the areas of the central nervous system (CNS) affected by demyelination. Involvement of the cerebrum can affect memory, motivation, insight, personality, touch, hearing, vision and muscle tone, while involvement of the cerebellum affects co-ordination of movement and balance. Cranial nerve involvement can affect vision, speech, swallowing and hearing. Certain triggers, such as over-exertion, heat, humidity, fever, infection and anxiety, can produce or exacerbate symptoms. A case where radiotherapy triggered an exacerbation of MS has been reported.[40]

Chronic pain is experienced by 20-50% of people with MS and may present as paraesthesia, dysaesthesia (burning, throbbing or shooting), hyperaesthesia so that non-painful touch becomes painful, and/or anaesthesia. As a result, it can be difficult to interpret and diagnose pain from dental disease and infection and difficult to deliver dental care if the facial and oral tissues are affected.[39]

Trigeminal neuralgia occurs in 2% to 32% of people with MS,[41] and when other facial muscle and joint pain is included the prevalence of facial pain increases to 40%.[41,42] Trigeminal neuralgia can be diagnostic of MS, particularly if bilateral in people under the age of 40 years.[43] Dentists should be aware of this and refer the individual for a neurological assessment via their general medical practitioner.

Facial palsy has been described in up to 25% of people with MS, usually occurring 4-7 years after the onset of MS, but in 5% it has been the presenting symptom, preceding the next MS symptom by 0.5-3 years.[44-47] MS should be considered in the differential diagnosis of Bell's palsy.[44]

Fatigue can be severe, impacting on daily living activities, reducing the ability to cope and decreasing motivation. Individuals deal with it mainly by planning everyday tasks in an energy efficient way, using labour saving devices, recognising their limitations and stopping to rest when needed. One of the difficulties of coping with dental treatment is the extreme fatigue that can be experienced as a result of coping emotionally and physically with the situation. Short, stress-free appointments, made for the person's best time of day, help to minimise stress and thus fatigue in the dental setting.[39] Other common symptoms of MS, their general impact and their impact on oral health and/or dental treatment are set out in Table 4.

Oral health

There is conflicting evidence relating to dental disease in people with MS. Symons *et al.* found that the dental treatment needs of people with MS were not significantly different from those of the general population.[41] In contrast, McGrother *et al.* found a significant relationship between MS and dental caries and a relationship between the severity of dental caries and MS incidence that translated into a 21% increased risk.[48] Most recently, Kovac *et al.* showed an increase in decayed and missing teeth and a decrease in filled teeth in an MS population, indicating difficulty accessing restorative care.[49]

Seamless care

The variability, transience and invisibility of symptoms can make MS difficult to understand[50] and consequently the difficulties in accessing dental services can be underestimated. Baird *et al.* found that although people with MS were more likely to be registered with and attend a dentist than the general population, they reported difficulties in attending the surgery and maintaining oral health.[8] This supports earlier findings that people with MS have difficulty with transport (36%), access to the dental surgery (41%) and sitting in the dental chair (53%), as well as limited access to domiciliary dental care.[51]

People with MS express more difficulty in cleaning their teeth. McGrother *et al.*[48] and Griffiths and Trimlett[51] reported that around 25% of them were unable to clean their own teeth or dentures and a third had difficulty with oral hygiene, with 30% changing their dominant hand as a result of their MS symptom.[48,51] Early instigation of rigorous preventive regimes, including liaison with their doctor regarding prescribing of medicines without a xerostomic effect, is essential.[8] It is worth remembering that dental hygienists can make home visits unaccompanied by the dentist and this could be a realistic way of maintaining periodontal health for the individual with MS.

As MS progresses, mobility is affected and wheelchair access to the surgery may be necessary. A wheelchair reclining device will facilitate treatment of the individual in their chair. Whilst general dental practitioners may not have access to such a device, a growing number of salaried primary dental care practitioners do (Fig. 8) and some people do have

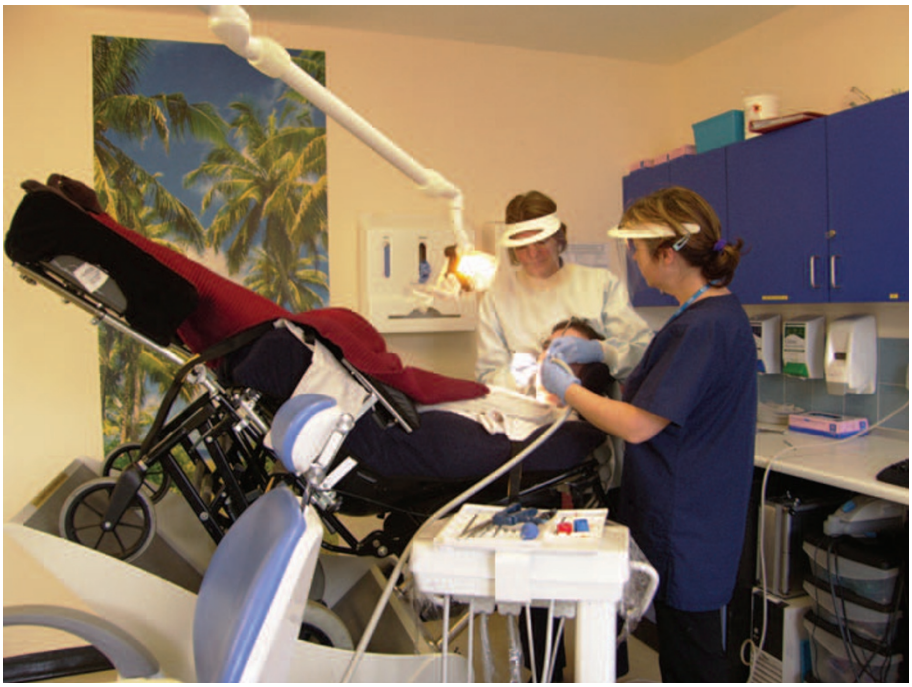

Fig. 8 Diaco ramp used to recline a patient being treated in their wheelchair

wheelchairs that recline to a certain extent (Fig. 9). Also, it may be necessary to use a finger guard or mouth prop to overcome the fatigue and/or muscle spasm associated with lengthy periods of mouth opening (Fig. 10).

Dental anxiety and the proportion of people who have received dental treatment with intravenous sedation or general anaesthesia are high in the MS population (75% and 86%, respectively).[8] Sedation and general anaesthesia are treatment options that can be used to manage anxiety and/or some of the associated MS symptoms.

Oral health can have a profound impact on the quality of life of someone with MS, particularly if they use mouth-held devices to help with everyday living activities.[39] A dental team with an understanding of the symptoms and progression of MS and that liaises with the MS nurse specialist involved in co-ordinating the individual's care can provide the necessary advice, care and support that is required to maintain good oral health and to contribute to good general health.[39]

There have been allegations that mercury in dental amalgam may be linked to MS. Case control studies have failed to demonstrate an association between either the number of dental amalgam fillings or the duration of exposure to mercury amalgam and MS.[48,52-54] Therefore, wholesale replacement of amalgam fillings is not justified. Posterior composites are more difficult to maintain and do not have the longevity of amalgam. However, gold onlay and inlay restorations are the preferred choice when placing new restorations in posterior teeth for people with MS. Preferably this should be an elective choice between patient and dentist before the disease progresses and treatment becomes more difficult to provide.

4. DIABETES MELLITUS

Diabetes mellitus (DM) encompasses a heterogeneous group of disorders with the common characteristic of altered glucose tolerance or impaired lipid and carbohydrate metabolism. DM develops from either a deficiency in insulin production or an impaired utilisation of insulin. There are two main types:

Fig. 9 Woman with MS in her reclining wheelchair

- Type 1 or insulin dependent diabetes mellitus (IDDM)
- Type 2 or non-insulin dependent diabetes mellitus (NIDDM)

Table 5 sets out the characteristics of both types of DM. Type 2 is more common, affecting 85-95% of the diabetes population. There are currently over 2.3 million people diagnosed with diabetes in the UK and an estimated further 750,000 with undiagnosed DM.[55]

Risk factors for Type 2 DM are well recognised and include: age (white and >40 years old; and black, Asian or from a minority ethnic group and >25 years of age); ethnicity (African-Caribbean and South Asian people living in the UK are five times more likely to develop diabetes than the white population); family history; obesity; high blood pressure or circulatory problems; pregnancy; and impaired fasting glycaemia or impaired glucose tolerance.[56]

The classical triad of diabetes symptoms is polyuria, polydipsia and polyphagia, together with fatigue, weakness, pruritis and blurred vision. In Type 2, symptoms develop slowly so that the individual may not be aware of them, and a third to one half of people already have signs of complications by the time of diagnosis.[57] The complications of diabetes are caused by tissue damage from prolonged exposure to raised glucose

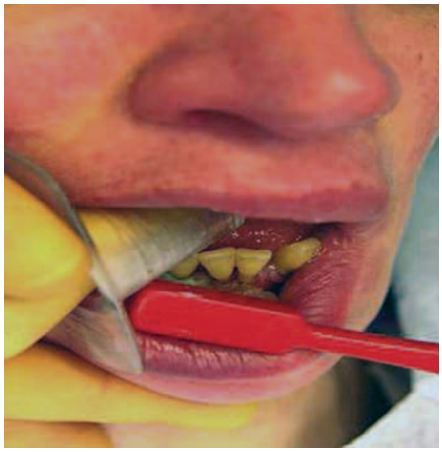

Fig. 10 Dentocare finger guard being used to facilitate mouth opening

levels. Microvascular complications lead to retinopathy and possible subsequent blindness, and neuropathies causing renal disease and loss of peripheral sensation. The latter can result in foot ulcers, poor wound healing, gangrene and amputation. Macrovascular complications result in coronary heart disease, cerebrovascular disease, peripheral arterial disease and hypertension.[57] Diabetic complications such as a heart attack, stroke, neuropathy, poor wound healing of a foot ulcer or eye problems may lead to the diagnosis.

Diabetes can be managed successfully through the achievement of near normal blood glucose and blood pressure levels.[56] The principal treatment of Type 1 is replacement of insulin (either

subcutaneously or by infusion pump) combined with careful monitoring of blood glucose levels. Type 2 is controlled by reduction of refined sugars and high fat foods in the diet, weight control and oral hypoglycaemic drugs that stimulate insulin release from pancreatic β cells and promote insulin uptake in body tissues. Diabetes is a public health concern and The *National service framework for diabetes: standards*[58] sets out 12 standards that focus on prevention of Type 2 DM, its early identification, appropriate management and prevention of complications. Additionally, the *National service framework for diabetes: delivery strategy* offers a framework for the NHS to deliver the national targets.[59]

Table 5 Characteristics of diabetes mellitus Type 1 and Type 2

	Type 1 (IDDM)	Type 2 (NIDDM)
Insulin dependent	Yes	No
Proportion of diabetes population affected	5-15%	85-95%
Underlying cause	Auto-immune destruction of pancreatic β cells	Insulin resistance in target tissues
Age of onset	Usually <40 years	Usually mid or later life
Speed of onset	Rapid	Gradual
Management	Insulin – subcutaneous or pump Lifestyle changes	Dietary control Oral hypoglycaemics Lifestyle changes

Oral health

Oral manifestations of diabetes have been described as xerostomia, burning mouth, candidiasis, altered taste, progressive periodontal disease, dental caries, oral neuropathies, parotid enlargement, sialosis and delayed wound healing.[60-62]

Dental caries and advancing periodontal disease generally occur in direct correlation with the degree of metabolic control achieved.[63,64] The increased glucose concentration in saliva and gingival/crevicular fluid contributes to increased caries incidence.[65-67] Hintao *et al*. report that Type 2 DM is a significant risk factor for root surface caries but not for coronal caries, and suggest that periodontal disease is treated early to decrease the risk of subsequent root caries.[68]

Periodontal disease progresses more rapidly in people with DM, and the poorer the diabetic control the more severe the periodontal disease.[69] While the increased susceptibility does not correlate with increased levels of plaque and calculus, periodontal disease has been associated with both DM duration and the presence of DM complications.[70] It has been suggested that periodontal therapy can have a positive impact on glycaemic control in Type 2 DM,[71,72] however Jones *et al*. did not find this was the case for insulin users.[73]

The delayed healing associated with DM leads to an increased risk of oral infection.[60] A reduction in salivary flow and altered composition may be the predisposing factors.[60] Recently it has been suggested that DM may be a risk factor for bisphosphonate-related osteonecrosis, and all people with DM treated with bisphosphonates should be monitored carefully.[74]

Seamless care

Sandberg *et al*.[75] reported that up to 85% of people with diabetes had never received any information about the relation between diabetes and oral health, despite diabetes being a risk factor for oral health and that oral health may impinge on DM control.[75] Managing the person with diabetes can require effective communication among multiple healthcare providers depending on the degree of DM control, DM complications and the type of oral care required.[76] Dentists can reduce the morbidity and mortality associated with diabetes by maintaining oral health[77] and through liaison with the specialist diabetes nurse so that oral/dental care is integrated into the individual's care plan.[78] It is imperative that people with DM receive oral care information early on, with good preventive advice ensuring awareness of risk factors for oral disease and regular oral examinations with an emphasis on the diagnosis and effective management of periodontal disease[60] and root caries.[68]

Patients with well controlled Type 1 and Type 2 DM can be treated similarly to non-diabetic patients. Most routine dental needs and minor oral surgery can be carried out under local anaesthesia, inhalational sedation or intravenous sedation, provided that the normal regime of food, drugs and/or insulin is not disturbed.[79] It is important that people with DM presenting with complaints of oral discomfort which deter them from eating are treated promptly to avoid hypoglycaemic episodes.[60] Routine administration of prophylactic antibiotics to prevent post-operative infection should be considered only in situations where they would be used for a non-diabetic patient.[80]

The patient should be asked to bring their regular blood monitoring device to each dental appointment so that blood glucose levels can be monitored and any necessary remedial action taken prior to treatment. However, the practice should have a back-up monitoring device. A current medical history, account of diabetes treatment regime and stability of control is important, as well as consideration of any DM complications such as hypertension, renal failure and heart disease. Dental procedures should be short, atraumatic and as stress-free as possible, with attention paid throughout for early signs of hypoglycaemia. Patients should be encouraged to communicate any perceived changes in their condition with the assurance that the dental team will support them as needed. General anaesthesia should be avoided if possible in this patient group and if conscious sedation is used, clinical signs should be monitored closely as sedation can mask the appearance of hypoglycaemia. If the clinic does not have a blood glucose measuring machine to check this, the patient can be asked to bring their own.

Dental treatment under general anaesthesia should be carried out in a hospital environment to allow modification of the diabetes treatment regime in liaison with the diabetes care team.[57] People with poorly controlled diabetes and/or additional medical problems should be referred to a specialist centre for treatment. In some instances treatment may be postponed until diabetic control is improved.[57]

As the long-term complications of diabetes can lead to disability, particularly neuropathies, impaired vision and lower limb amputation, some people with DM use wheelchairs. They will either need a surgery with wheelchair access or domiciliary care. Those with visual impairment may require the provision of information in large print, Braille or audio-tape formats. Also, the effects of diabetic retinopathy and peripheral neuropathy can affect a person's ability to carry out adequate oral hygiene procedures and this needs to be taken into account when giving preventive advice.

Hyper- and hypoglycaemia

The main concern about treating people with DM is their potential for collapse due to hypoglycaemia or hyperglycaemia. The dental team must always be alert to signs and symptoms of developing diabetic emergencies and be prepared to provide treatment as necessary.

Hyperglycaemia, due to insulin deficiency, has its onset over a number of hours with symptoms of thirst, drowsiness, blurred vision, weak pulse and hypotension. If there is any doubt about the cause, glucose should be administered as a diagnostic test as it will cause no harm in the hyperglycaemic individual and improves hypoglycaemia. If uncertain, do not administer insulin, as this can cause death in hypoglycaemia. Medical help should be summoned.

Hypoglycaemia, triggered by a fall in blood glucose, is more likely than hyperglycaemia in the dental setting. It may be related to anxiety or missed meals related to oral discomfort or inconvenient appointment times. Hypoglycaemic episodes have been categorised as asymptomatic (biochemical), mild (self-treated), severe (requiring assistance) and very severe (coma or convulsions) requiring medical assistance.[81] Characteristic symptoms include pallor, sweating, facial and lingual paraesthesia, hunger, confusion, agitation and poor co-ordination. These symptoms usually alert the individual to the falling plasma glucose concentration, allowing them to take corrective action. However, if the warning symptoms are impaired or go unheeded, the individual may become drowsy, progressing to coma if untreated. Thus, it is prudent to determine if patients with DM are usually aware or unaware of these early signs. If they are unaware of them, the dental team needs to be extra vigilant in recognising hypoglycaemic signs.

Early intervention may take the form of oral glucose or Hypostop. If consciousness is altered or lost, management necessitates prompt recognition and immediate access to appropriate drugs. The regime is 1 mg glucagon given intramuscularly (providing recovery within 15 minutes) or intravenous administration of either 120 ml of 20% glucose or 50 ml of 50% dextrose diluted to 25% to reduce its viscosity. The last two options result in immediate recovery. Whichever regime is used, when conscious, the individual should be given oral glucose to prevent rebound hypoglycaemia. If recovery is delayed, the emergency services should be called.

Uncontrolled DM may be associated with increased frequency and severity of oral infections, including periodontal disease, dental caries and candidal infection both intraorally and at the labial commisures. Patients suspected of having uncontrolled diabetes should be referred (with their consent) to their general medical practitioner for investigation and diagnosis.

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