Multiple Sclerosis and Oral Care

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Abstract: **Multiple sclerosis is a complex neurological condition affecting sensory and motor nerve transmission. 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, plus symptoms of 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. Also, many of the medications used in the symptomatic management of the condition have the potential to cause dry mouth and associated oral disease. There is no cure for multiple sclerosis, and treatment focuses on prevention of disability and maintenance of quality of life. Increasingly a multi-disciplinary team approach is used where the individual, if appropriate his/her carer, and the specialist nurse are key figures. The dental team plays an essential role in ensuring that oral health impacts positively on general health.**

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Clinical Relevance: **The dentist may be the first person to suspect a possible diagnosis of multiple sclerosis, as trigeminal neuralgia can be a presenting diagnostic symptom in people under the age of 40 years. Referral for appropriate neurological investigation must be considered in such circumstances. An understanding of the variability and progression of the symptoms of the condition enables the dental team to provide empathic and appropriate dental treatment and oral health advice.**

Multiple sclerosis (MS) is a complex neurological condition that occurs as the result of damage to the myelin sheaths within the central nervous system. The damaged areas, or plaques, result in inflammation and interference in both sensory and motor nerve transmission.

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EPIDEMIOLOGY

MS is the most common neurological disorder and the most common cause of severe disability among young adults in the UK. It has an incidence of 0.1% (1:1000) in the general population and affects around 85 000 people nationwide. Between five and eight new cases of MS develop per 100 000 people per year, and for a health district of 500 000 people this translates to 24–40 new cases each year and 500–850 existing cases.[1] Diagnosis of MS is usually made between the ages of 20 and 40 years. It is more common in women than men, with a ratio of 3:2.[2]

Most people with MS will be able to lead near-normal lives for many years despite a gradual progression to measurable disability and sensory, motor or cognitive dysfunction.[1]

TYPES OF MS

Four main types of MS are recognized:[2,3]

1. *Benign MS* – around 20% of people with MS have this form. It starts with a small number of mild attacks followed by complete recovery and does not progress to permanent disability. It is only diagnosed when there has been little sign of disability 10–15 years after its onset.
2. *Relapsing/remitting MS* – most people start with this form, and around 25% of confirmed cases are relapsing/remitting MS. Relapses are unpredictable: new symptoms occur or previous ones return, varying from mild to severe, and lasting from hours to months. Remissions occur spontaneously and last for variable periods. In the early stages, the periods of remission are usually symptom free but after a number of relapses, as demyelination progresses, there may be some residual damage resulting in the person being slightly more affected than before. This can be likened to bouncing a ball at the top of a flight of stairs – every so often the ball goes down a step but does not return quite so far as it did previously.

3. *Secondary progressive MS* – approximately 40% of people develop this form. It starts as relapsing/remitting MS but after repeated attacks remissions cease to occur and the disease moves into a progressive phase. The time taken to move into this phase is generally 15–20 years from the onset of symptoms.
4. *Primary progressive MS* – about 15% of people with MS have this form. Symptoms steadily worsen and disability progresses, and distinct relapses and remissions are absent. It may level over time or continue to progress.

AETIOLOGY

The cause of MS is not understood. Although no single causative agent has been identified, a number of probable causes have been postulated.[2,3]

Environmental Factors

Factors in the environment such as viral or bacterial infection that disturbs the immune system or indirectly triggers an autoimmune process may be responsible for some cases of MS. It is believed that exposure to a common virus in the first 15 years of life may act as a delayed trigger. Viral illnesses such as measles, chicken pox, flu, herpes and glandular fever have all been suggested.

Genetic Factors

MS is not an inherited condition; however, particular genes that appear to be linked with a predisposition to its development have been identified. As many as 20 locations that may contain genes contributing to MS have been identified. No single gene has been shown to have a major influence on susceptibility, which is probably dependent on inheriting a combination of alterations in several genes. There have been reports linking some immune-system genes to MS.[2]

Family Link

Whilst MS is not an inherited disease, the chances of a child of an affected parent developing it are 20–40 times greater than for the general population. The lifetime risk in such cases is estimated to be 1–2% for

Medication	Prescribed for	Oral side effects
Amantadine	Fatigue	Occasional dry mouth
Anticholinergics	Incontinence	Dry mouth
Antidepressants (tricyclics, MAOIs, SSRIs)	Depression	Dry mouth
Antihistamines	Dizziness and vertigo	Dry mouth
Azathioprine	Delaying progression of disability	Blood dyscrasias
Baclofen	Spasticity	Dry mouth
Benzodiazepines	Dizziness and vertigo	Dry mouth
Beta-Interferons	Delaying progression of disability	Possible blood dyscrasias
Botulinus toxin	Spasticity	Possible dry mouth, dysphagia and pooling of saliva
Cannabis	Alleviating spasticity, spasm and tremor; bladder control	Xerostomia, 'fiery red gingivitis', white gingival patches, papilloma, candidosis, epithelial dysplasia, oral and pharyngeal carcinoma
Carbamazepine	Pain relief, trigeminal neuralgia	Blood dyscrasias, Stevens-Johnson syndrome
Capoxone	Delaying progression of disability	Not in BNF or ABPI
Corticosteroids	Acute exacerbations of MS	Oral candidosis
Cyclophosphamide	Delaying progression of disability	Ulceration
Cyclosporin	Delaying progression of disability	Ulceration
Desmopressin	Nocturnal enuresis	
Diazepam	Muscle spasm	Salivation changes
Isoniazid	Tremor	Blood dyscrasias; Rarely dry mouth
Methotrexate	Delaying progression of MS	Blood dyscrasias, ulcerative stomatitis
Oxybutinin	Incontinence	Dry mouth
Phenytoin	Pain relief, trigeminal neuralgia, epilepsy	Dry mouth, gingival hyperplasia, rarely Stevens-Johnson syndrome
Pyridoxine	Countering side-effects of isoniazid	
Scopolamine	Dizziness and vertigo	Dry mouth
Sildenafil	Impotence	Not in BNF or ABPI but other drugs for impotence cause dry mouth
Tizanidine	Spasticity	Dry mouth

NB Many of the above have other side effects that give physical symptoms which may influence dental management.
Data obtained from *Dental Practitioner's Formulary 1998–2000* and *ABPI Compendium of Data Sheets and Summaries of Product Characteristics 1998-1999.*

Table 1. *Medications used in the management of MS.*

siblings and children and 33% for identical twins.

Climatic and Geographical Factors

Countries with temperate climates have a higher incidence of MS, and it is more common in areas in northern latitudes such as Scotland and Scandinavia. The reason for this is unknown. Interestingly, individuals migrating to or from areas with a temperate climate after the age of 15 retain the likelihood of developing MS corresponding to their country of origin, rather than developing the likelihood associated with the region to which they have moved.

DIAGNOSIS

MS is not easy to diagnose as there are no specific or conclusive tests for the condition. Clinical diagnosis cannot be made until there have been at least two 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.[2,3] The clinical diagnosis needs to be backed up by tests which include:

- Neurological examination – to establish abnormalities in motor and sensory pathways, particularly changes in eye movements, limb co-ordination, balance, sensation, speech and reflexes.
- Magnetic resonance imaging (MRI) scan – to pinpoint the location and size of plaques. However, this is not diagnostic of MS: although over 90% of people with MS have plaques that show up on MRI scans; some people diagnosed with MS do not reveal any myelin damage.
- Evoked potentials – the time taken for the brain to receive and interpret messages is increased if demyelination has occurred.
- Lumbar puncture – to test cerebrospinal fluid for particular antibodies.
- Other tests to exclude conditions that mimic MS.

TREATMENT

There is no cure for MS – the focus of treatment is on prevention of disability and maintenance of quality of life.[1] 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. Symptomatic treatments are used to minimize and control specific symptoms. Drugs (Table 1), physical therapies and psychological techniques are used and interest in alternative therapies is increasing.[4]

Treating Relapses

Steroids are often used to help a person over a severe relapse, usually short courses (3–5 days) to reduce the inflammation and the effects of acute relapses. Long-term use of steroids does not seem to alter the course of MS.[2] Beta-interferon and capoxone may be useful in treating the level of relapses in people with relapsing/remitting MS and trials suggest that beta-interferon may slow secondary progression.[2] However, it can cause depression, anxiety and emotional lability.

SYMPTOMS

The component of the central nervous system that is affected by demyelination determines the symptoms:

- Involvement of the cerebrum can affect memory, motivation, insight, personality, touch, hearing, vision and muscle tone.
- If the cerebellum is affected, co-ordination of movement and balance are disturbed.
- Cranial nerve involvement can cause difficulty in vision, eye movement, speech, swallowing and hearing.
- Involvement of the medulla oblongata affects eye movements and autonomic functions such as breathing, sweating, micturation and defecation.
- Demyelination of the spinal cord causes disconnection so that instructions to limbs and organs become partial, distorted or lost.

The relationship between loss of myelin and message impairment is not simple and no two people with MS match symptomatically. Symptoms are diverse and individual. They can be severe or mild, temporary or indefinite, with both their impact and duration being unpredictable.

Although some symptoms are very common, there is no typical set that applies to everyone. Common early symptoms are double or blurred vision, pain at the back of the eye, facial pain or trigeminal neuralgia and tingling or numbness in the legs, feet, arms or hands. Some people experience giddiness, loss of balance, difficulty in concentrating, forgetfulness, anxiety or depression. Other symptoms may include fatigue, weakness, difficulty in walking, muscle spasms, pain, speech problems, and poor bladder or bowel control.

Certain triggers, such as over-exertion, heat, humidity, fever, infection and anxiety, can produce or exacerbate symptoms.

SYMPTOMS RELEVANT TO ORAL CARE

The variability, transience and invisibility of symptoms can make MS difficult to understand.[5] A number of symptoms affect oral care or access to dental services.

Pain and Numbness

Chronic pain is experienced by 20–50% of people with MS. The pain from MS is often different in nature from

pain due to an injury or infection and may present as:

- paraesthesia – pressure, pins and needles or tingling;
- dysaesthesia – burning, throbbing, shooting electric or shock-like pain along a nerve;
- hyperaesthesia – increased sensitivity (e.g. a non-painful touch may become painful);
- anaesthesia –numbness, complete loss of sensation including touch, pain and temperature.

There is a tendency in chronic conditions to attribute any symptom to the condition, and pain that is due to injury or infection may be neglected as a result. All of the above types of pain and numbness can make it difficult to interpret and diagnose pain from dental disease and infection: numbness may mean that dental pain goes unnoticed; paraesthesia, dysaesthesia and hyperaesthesia may lead to atypical presentation of pain, which can challenge a dentist's diagnostic skills. They can also make it difficult to deliver dental care if the facial and oral tissues are affected.

Numbness and paraesthesia in the arms and hands can adversely affect a patient's ability to carry out effective oral hygiene.

Trigeminal Neuralgia

Trigeminal neuralgia is commonly associated with MS, with a reported prevalence of between 2% and 32%.[6,7] When other facial muscle and joint pain is included the prevalence of facial pain can increase to 40%.[7] The trigeminal neuralgia of MS is atypical in that patients are younger and the pain may be bilateral and unstimulated:[8] indeed, the development of trigeminal neuralgia in people under the age of 40 can be diagnostic of MS.[8] Dentists should be aware of this and refer affected individuals for a neurological assessment via their general medical practitioner.

Pain Relief

Standard painkillers have no effect on the sort of pain that arises from the severe nerve damage in MS and individuals may be referred to a pain clinic for a specific management programme. Medications commonly used to relieve the discomfort of the dysaesthesia are tricyclic antidepressants and anticonvulsants such as carbamazepine or phenytoin. Anticonvulsants may also be taken for epilepsy as people with MS have a three-fold higher risk of developing epilepsy than the general population.[9,10] Amitriptyline is effective in treating a variety of MS symptoms such as headache, diffuse pain and chronic pain.

These drugs can cause dry mouth and thus be detrimental to oral health.[10] Also, in the absence of adequate oral hygiene, phenytoin can cause gingival hyperplasia.[11]

Spasticity and Spasms

Transient or indefinite spasticity is one of the most common symptoms of MS. It occurs when opposing muscles contract or relax at the same time and leads to an increase in muscle tone, muscle stiffness, lack of co-ordination, clumsiness, muscle spasm and related discomfort or pain. Muscle spasms, which are due to the involuntary contractions or extensions of spastic muscles, occur most frequently in the legs and can affect balance and mobility. Tonic or paroxysmal spasms occur when an entire limb pulls up into a rigid, clenched position or is pushed out to an extended, stiff position. These spasms can be so severe that a person may be thrust from his/her chair.

Spasms are managed with exercise, massage and medication: baclofen is the most commonly prescribed drug. Botulinus toxin is also used to reduce spasm and trismus. Spasticity and spasm can interfere with the safe delivery of dental treatment and, where possible, treatment should be deferred until the individual is in remission.

Spasm of the bladder can cause frequency, a feeling of urgency, and difficulty in emptying and controlling urine flow: anxiety, as often occurs in the dental setting, can exacerbate this. Treatment is commonly with oxybutynin or intermittent self-catheterization.

Use of Cannabis

The recreational drug cannabis is used by some people to alleviate spasticity, spasm and tremor and to help bladder control. Although there has been anecdotal evidence for some time that cannabis provides MS symptom relief, it is only recently that this has been confirmed using an animal model.[12] This recent research has provided a firm basis for the human trials of cannabis and MS begun in 2001.

Cannabis is a mood-altering drug and it is important to know if patients have used it before a dental appointment, even though the average medicinal dose is unlikely to be enough to produce the mood change that is the goal of recreational users.[13] However, its possession and use are illegal and people may not wish to disclose that they use it for fear of retribution.

Cannabis is smoked, used as 'tea' or baked in biscuits to alleviate the symptoms of MS. Regular smoking of cannabis can affect oral health. Reported effects include:[14]

- xerostomia;
- 'fiery red gingivitis';
- white gingival patches;
- papilloma;
- candidosis;
- epithelial dysplasia;
- oral and pharyngeal carcinoma.

An increased stress response to the administration of adrenaline-containing local anaesthetic agents that could exacerbate the tachycardia associated with cannabis intoxication has been reported. Whilst this is unlikely to occur with medicinal use, it may be prudent to avoid such an agent if the patient has recently used cannabis.[14] Also, regular cannabis use may affect the drug dose required for intravenous sedation and careful titration of the intravenous agent is recommended.

Tremor

Tremor occurs when the cerebellum or brainstem (which control balance, co-ordination of movement and skeletal muscle activities) are involved in the demyelination process. Tremors vary in speed, severity, location and duration – they may affect the limbs, trunk, head, jaw, lips, tongue and speech, at rest or during purposeful movement. Like many of the symptoms of MS, tremor tends to be aggravated by emotions, stress and fatigue. Thus the dental situation may exacerbate the condition, in turn making dental treatment more difficult to deliver.

Ataxia associated with tremor can result in loss of co-ordination and reduction in ability to carry out simple tasks such as toothbrushing.

Speech Disorders

Tremor can interfere with the ability to pronounce sounds and control the loudness of speech, and patients may talk in an abrupt or jerky fashion and voice words in an explosive manner. Additionally, dysarthria can cause slurred speech, which can be misinterpreted as the result of alcohol intoxication.

Management includes exaggerating speech to slow it down, using a 'pace board' to improve rhythm and, in severe cases, using a communication board or electronic speech system.

Cognition and Depression

MS can alter cognitive capacity and function, leading to changes in thought, memory, judgement, ability to concentrate, mood and emotions. Problems are usually minor, typically resulting in the need to take a little more time to recall a thought or a name with concentration and making organization more difficult. People tend to manage these symptoms by making notes or lists and doing only one thing at a time. In the dental surgery, the creation of a quiet and comfortable atmosphere, where distractions are minimized, helps to promote concentration. Giving information in small amounts and providing written reinforcement is also helpful.

Depression is common in people with chronic, progressive conditions of uncertain outcome, including MS. It can decrease motivation for self-care, with a detrimental effect on oral hygiene and dental care that can be compounded by the xerostomic effect of antidepressant drugs.

Fatigue

Fatigue is one of the most difficult symptoms of MS for other people to understand, as it is invisible.[5] Fatigue can be severe, affecting 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, recognizing their limitations and stopping to rest when they need to. Drugs, such as amantadine, are sometimes prescribed to combat fatigue.

One of the difficulties of coping with dental treatment is the extreme fatigue that patients can experience as a result of dealing emotionally and physically with the situation.

Dizziness and Vertigo

Both of these conditions can be uncomfortable and cause difficulties with standing or walking – and thus, on occasions, with attending dental appointments. Light-headedness can occur with sudden postural changes and, to combat this, individuals should be moved slowly from a reclined or semi-reclined dental chair. Medications used to control dizziness and vertigo include antihistamines, scopolamine and benzodiazepines – all of which can cause xerostomia.

Dysphagia

Dysphagia may occur as the result of a delay in the swallowing reflex, inco-ordination of muscles, loss of strength of muscle activity and loss of sensation in the mouth or throat. Difficulties in swallowing food may result in eating problems, choking, weight loss or aspiration pneumonia. Dietary adjustments to compensate for these occurrences may include eating little and often and the consumption of high-energy foods or supplements that have a high sugar content.

In such instances it is important that aggressive preventive regimes are implemented to prevent dental decay. If dental treatment is required, individuals with dysphagia should be treated in a semi-reclined position.

DENTAL TREATMENT NEEDS

People with MS experience the same oral and dental problems as the rest of the population. For instance, Symons *et al.*[7] found that the dental treatment needs, determined by the DMFT and CPITN indices of a group of people with MS were not significantly different from those of an age-matched group. In their small sample of 22 people, there was no apparent increase in susceptibility to caries or periodontal disease in the MS group. In contrast, McGrother *et al.*[15] found a significant relationship between MS and dental caries and a relationship between the severity of dental caries and incidence of MS. This translated into a 21% increase in risk of developing dental caries in the people with MS in their study population. McGrother *et al.*[15] allude to the possible role of cross-reactivity of *Streptococcus mutans* in the aetiology of MS but acknowledge that more research is required to investigate this possible aetiological link. However, the converse situation may be true – that people with MS are more prone to dental caries because of the xerostomic effects of medication and/or increased intake of sugar in high-energy food supplements.

Although they found no difference in dental hygiene or attendance at the dentist, McGrother *et al.*[15] pointed out that people with MS expressed more difficulty in cleaning their teeth. They claimed to clean their teeth

Case Study 1. *Replacement of amalgam restorations.*
A woman with MS presented complaining of pain from a number of teeth. Several years earlier she had been advised by her dentist to have her extensive amalgam restorations (Figure 1) replaced as they could be a contributory factor to her MS. Consequently, she underwent their wholesale replacement with composite restorations but experienced no improvement in her medical condition. When she presented in pain it was difficult to pinpoint the cause as many of the restorations were leaking and caries was evident on radiographs (Figure 2). Some of the restorations were large and composite was not the optimal material for these technically demanding situations (Figure 3). The patient's dental pain was resolved by replacing a number of restorations, some with amalgam, without any detrimental effect on her general health.

Figure 1. *Radiographs from 1985, showing evidence of extensive amalgam restorations.*

Figure 2. *The patient's radiographs from 1990 show extensive replacement of amalgam restorations.*

Figure 3. *Marginal breakdown of large composite restoration in lower second molar.*

satisfactorily by taking compensatory action but, even so, all the markers for dental cleanliness and gingival health were a little lower than in the controls.

In a study of 73 people with MS, Griffiths and Trimlett[16] reported that about 25% were unable to clean their own teeth or dentures and over 30% had difficulty with oral hygiene. A third of people had changed their dominant hand as a result of their MS symptoms. Difficulties with oral hygiene may also contribute to the seemingly increased caries risk in MS.

DENTAL AMALGAM AND MS

Following reports of 'miracle cures' coincident with the replacement of amalgam fillings with non-mercury-containing materials,[17,18] the possibility was raised in 1985 that mercury in dental amalgam may initiate MS or aggravate its symptoms. This debate was strengthened by earlier reports linking dental amalgam to body mercury levels and linking low-level mercury toxicity to foetal health.[15,18]

There is no scientific evidence to support the contention that exposure to mercury in amalgam fillings can cause neurological disorders.[19,20] Indeed, a case-control matched study examining the relationships between MS, dental caries and amalgam fillings found no difference between the MS cases and the controls in the number of amalgam fillings or in blood levels of mercury or lead.[4,15] Whilst there was a relationship between body mercury and the number of teeth filled with amalgam, the blood mercury levels were well below accepted toxicity levels.[15] Although it is unlikely that mercury poisoning is the basis of MS, excessive sensitivity to mercury has yet to be excluded. It is more likely that the 1985 'miracle cures' were linked to incidental resolution of incipient infection or a placebo effect.[15]

People with MS who are concerned about exposure to mercury can be tested for sensitivity, but tests do not take into account the mercury source (diet, occupational exposure or environmental levels). The routine replacement of amalgam restorations with mercury-free alternative material is not advocated except in persons with proven sensitivity, as the permanency and durability of amalgam outweighs the, as yet, theoretical risk of systemic toxicity.[20] Even the MS Society advises that there is lack of proof that mercury is a factor in MS. It is reasonable to use mercury-free materials such as composites as the material of choice, where it is clinically appropriate to do so but these materials are not exempt from possible harmful actions. Used indiscriminately they can be detrimental to the dentition (see Case Study 1), and, although sensitivity to composites is uncommon, it has been reported.[21]

ACCESS TO DENTAL CARE

Preventive and practical oral hygiene advice and access to appropriate dental services are central to maintaining oral health for people with MS.

Advice on Oral Hygiene

Preventive regimes must be based on the nature of the individual's MS. Where possible, independence in self-care should be encouraged and advice on tools to aid independence given. The value of custom-made toothbrush handles to improve grip[22] and the use of electric toothbrushes to compensate for loss of manual dexterity and co-ordination[8] have been advocated. It is of concern that, in one study, 80% of people with MS had not received any advice on how to care for their teeth or dentures.[16]

When personal care is provided by carers, whether personal or professional, the individual is largely reliant on the carer's knowledge and

Case Study 2. *Maintenance of independence.*
Plans were made to replace an upper, acrylic, mucosa-supported partial denture (Figures 4–7) with a tooth-supported denture (designed to keep the gingival margins free) for a 40-year-old woman with MS. The denture replaced an anterior tooth and, as the patient believed that her husband was unaware that she wore a denture, she always wore it at night. However, owing to a manual tremor, the patient had difficulty inserting and removing the tooth-supported denture and reverted to wearing the old one, refusing its replacement for social reasons. She remains reluctant to have any form of denture that requires assistance from anyone (particularly her husband) and declined an adhesive bridge as she could not be given a guarantee that it would not debond.

Figure 4. *Missing upper right central incisor.*

Figure 5. *The mucosa-supported partial denture replacing the upper right central incisor.*

Figure 6. *Palatal view of the mucosa-supported partial denture replacing the upper right central incisor.*

Figure 7. *Gingival and mucosal damage caused by the mucosa-supported partial denture.*

skill. There is considerable evidence that healthcare professionals are inadequately trained to provide appropriate oral hygiene,[23] and oral health and its impact on holistic health needs to be addressed through a higher profile in the nursing curriculum and the training of carers.[23–25]

However, there are situations when the embarrassment of tooth loss or the desire to keep it secret is paramount[26]and maintaining independence for oral hygiene can take a higher priority than oral health itself (see Case Study 2).

Dental Services

Limited mobility due to muscle weakness, sensory disturbance, ataxia and spasticity can make access to dental services difficult for people with MS. Amongst the 73 people with a high level of chronic disability in Griffiths and Trimlett's study,[16] 60% had seen a dentist in the past year and 75% had received treatment in general practice. Despite regular dental attendance, 20% reported oral pain or discomfort and over 50% felt they were in need of treatment.

A high proportion of people reported problems with transport (36%) and access (41%) to the dental surgery and with difficulty sitting in the dental chair (53%).[16] Only five people had received domiciliary dental care.[16] Where access to the dental surgery is not feasible for people with MS who have mobility restrictions or who use a wheelchair, the dental practitioner is legally bound to deliver the service by another means, namely a domiciliary visit.[27] Whilst there are limitations on the type and quality of care that can be delivered at home, it may be the ideal location in which to provide oral healthcare advice to individuals and carers. Dental hygienists working to a dentist's prescription can make independent home visits and this is a realistic way of maintaining periodontal health for individuals with MS.

A high level (75%) of dental anxiety has been reported in people with MS and a surprisingly high proportion of these people (86%) had received dental treatment with intravenous sedation or general anaesthesia.[16] It is not clear whether this use of sedation and general anaesthesia was as a result of patient choice or whether it was considered clinically necessary in order to manage anxiety or some of the symptoms associated with MS.

MANAGEMENT IN THE SURGERY

It is important to discuss with every patient with MS how he or she prefers to manage their symptoms, as this will vary from person to person. The development of a relationship where patients feel able to do this will, in itself, help to put them at their ease. The following points may be helpful:

- Short, mid-morning appointments when the patient is most relaxed

Figure 8. *A patslide being used to aid transference from the dental chair to a wheelchair.*

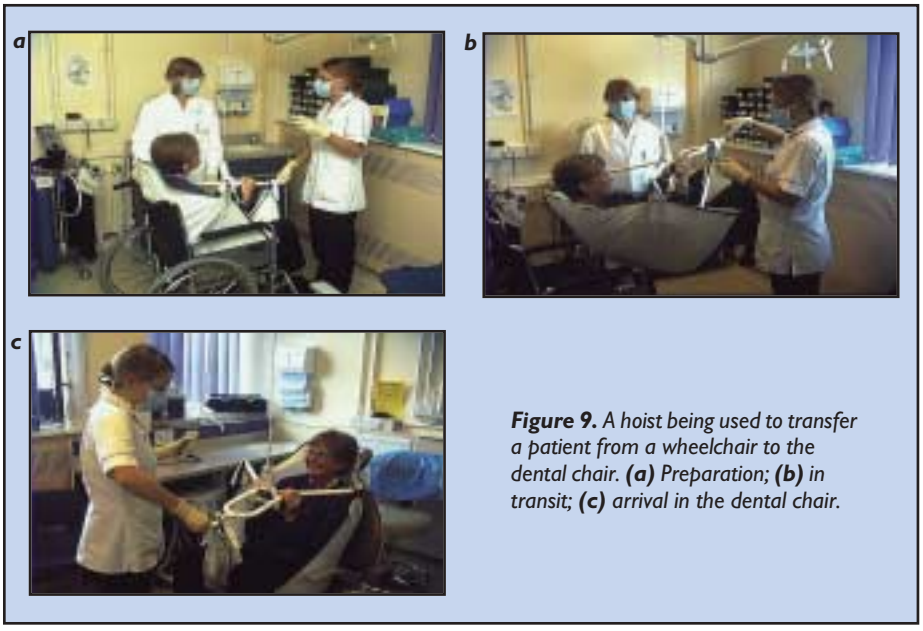

Figure 9. *A hoist being used to transfer a patient from a wheelchair to the dental chair.* ***(a)*** *Preparation;* ***(b)*** *in transit;* ***(c)*** *arrival in the dental chair.*

have been advocated.[7]

- Keeping the environment at a comfortable temperature and reducing anxiety help to minimize fatigue.[7]
- Simple items, such as the use of flexible straws to manage mouthwash, can help to make the dental environment less daunting.
- A patient who experiences muscle spasms may need to get out of the dental chair and move around to relieve them.
- The supine position for treatment should be avoided because of dysphagia and the risk of pulmonary aspiration.
- Some individuals may find it difficult to sit back comfortably in the dental chair, so the dentist should be prepared to adjust his or her position and approach to the patient.[7]
- Patients who use a wheelchair can be treated in their chair if surgery space permits, in which case a wheelchair head rest is useful. Alternatively they can be transferred to the dental chair using a slide board (Figure 8), turntable or hoist (Figure 9). It is essential that staff involved in moving patients have received proper training.

Local anaesthesia is the preferred method of delivery of dental treatment for people with MS but longer procedures may require premedication or sedation to help reduce muscle tremor during treatment.[7] Reports that anaesthetics can trigger an exacerbation of MS are anecdotal and are unsupported;[13] however, it would seem sensible to avoid sedation or general anaesthesia if it is not essential.

GENERAL PRINCIPLES FOR ORAL HEALTHCARE

Long-term planning for optimal oral health requires assessment of the individual's risk of dental disease, and the prognosis of their MS – including their acceptance and management of disability and their pattern of remission and relapse. The oral care plan will need to take into account progression in impairment of mobility, diminishing ability for self-care and increase in dependence and reliance on carers. There may be a need to maintain the dentition or plan treatment to cope with a therapeutic dental aid that assists people with severe manual disability to maintain a degree of independence, for example in writing or using a computer.[28]

The management of oral care requires:

- Early treatment of disease, matching appointment times and lengths to the tolerance level of the patient.
- Preventive advice for individuals and their carers.
- Pragmatic, practical preventive regimes.
- Regular review tailored to the individual's needs, including domiciliary care when appropriate.

Effective preventive regimes (such as dietary advice, use of fluoride mouthrinses and varnishes, chlorhexidine mouthrinses, gels and varnishes and saliva substitutes in dry mouth) are the mainstay of oral health.

The dental team has a role to play in providing advice, skills, motivation and support for an individual throughout the progression of MS.

CONCLUSION

Multiple sclerosis can have a profound impact on a person's quality of life. A dental team with an understanding of the symptoms and progression of the condition can provide the necessary care, advice and support that is required to maintain good oral health and to contribute to good general health.

USEFUL ADDRESSES

MS Society of Great Britain and Northern Ireland
25 Effie Road
Fulham
London
SW6 1EE
Tel: 020 7610 7171
Fax: 020 7736 9861
E-mail: info@mssociety.org.uk
Website: www.mssociety.org.uk
National Helpline: 0808 800 8000

Multiple Sclerosis Resource Centre
7 Peartree Business Centre
Peartree Road
Stanway
Colchester
Essex
CV03 5JN
Tel: 01206 505444
Helpline: 0800 783 0518

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