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The Care and Management of the Primary and Mixed Dentitions in Children with Cleft Lip and Palate

Abstract: Patients with cleft lip and palate present a number of potential management issues. They may have increased caries risk which, if not managed, may compromise their overall care. It is important that the paediatric dentist is involved as part of the cleft team. All cleft patients should have optimal caries prevention from birth.

Clinical Relevance: This article reviews how the presence of a cleft lip or palate may affect dental health. It outlines the care of these patients, particularly in terms of caries prevention.

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The role and aim of the paediatric dentist is to prevent disease by arming the patient and his/her carers with the knowledge to maintain oral health and to apply preventive and restorative interventions when required. Although this is a simple statement it is often, in reality, a challenge to achieve and particularly, for a number of reasons, where patients with cleft lip and palate are concerned. The basis of our care should be the Department of Health/British Society for the Study of Community Dentistry Prevention Toolkit¹ and the Scottish Intercollegiate Guidelines caries prevention guidelines 47 and 83,^{2,3} together with the Scottish Clinical Effectiveness Programme's document on the prevention and management of caries in children.⁴

A PubMed (US National Library of Medicine) search looking at the evidence base behind factors such as caries prevalence, which may influence oral health in patients with cleft lip or palate, is presented in Table 1. Although

this is not an exhaustive search, and a number of papers may not have been included, the relatively low number of papers looking at these issues is surprising and certainly shows the need for more research in all these areas.

Oral health of patients with clefts of the lip and palate

Figure 1 presents a patient

whose caries is not controlled. It is generally felt that children with cleft lip and palate have higher caries prevalence than their peers. However, this belief is not substantiated by the systemic review by Hasslöf and Twetman,⁵ which included six papers and concluded that they were unable to find firm evidence for the assumption that cleft lip and palate children have increased prevalence of dental caries. However, they did note a tendency for higher caries

Subject	No. of Papers
Cleft lip palate	9602
Caries	100
Oral hygiene	60
Enamel defects	30
Bacteria counts	38
Attitudes	35

Table 1. Results of a PubMed search looking at the evidence base for factors relating to oral health in the primary and mixed dentition.

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Figure 1. A patient with a long-standing history of uncontrolled caries.



Figure 2. A patient with ectopic eruption of the incisors; the upper left permanent lateral incisor is hypoplastic.



Figure 3. The alignment of this patient's anterior teeth makes oral hygiene more difficult.

prevalence in pre-school children. As the authors of this review note, the problem in drawing valid conclusions may be the quality of the evidence base. Certainly, most more recent reports all tend to report higher caries prevalence in cleft lip and palate patients.^{6,7}

Certainly, British data suggest a higher caries prevalence in the child cleft lip and palate population. A recent study conducted in the West of Scotland reported only 37% of 5-year-old patients attending a cleft clinic being caries experience free, compared to 58% of children without a cleft.⁸ The same group had a mean dmft of 3.24 compared to a National Scottish figure of 1.86. A similar study looking at patients in the North-East of England again reported high disease levels, with these increasing with age.⁹

Children with clefts have altered patterns of delayed oral clearance. The

longer oral clearance times of foods and the consequent generation of fermentable sugars from starches may contribute to the higher caries prevalence observed in children with cleft palates.¹⁰ The number of caries-associated organisms, such as *Streptococcus mutans* and *S. lactobacillus* are reported to be greater in the saliva of the cleft palate children, which may again contribute to higher caries levels. However, this may be an association with other factors such as cariogenic diet and poor oral hygiene, rather than the direct cause of increased caries prevalence. The wearing of pre-orthopaedic plates appears to lead to earlier infection with cariogenic bacteria, however, it is questionable as to whether this is significant in the development of caries as, by 18 months of age, there is no difference in bacterial counts between those who had and those who had not worn such plates.¹¹

Linked to caries is oral hygiene and this is generally reported to be poorer in cleft patients. The reasons for this are multifactorial: alignment of the teeth making oral hygiene measures more difficult; in younger children parental concerns about brushing near the site of the cleft; together with other behavioural issues.¹² Although poorer oral hygiene and increased prevalence of gingivitis is found in patients with cleft lip and palate, there is no conclusive evidence of increased levels of periodontal disease in adulthood.¹³

Dental anomalies may be a complicating factor in the care of patients with cleft lip and palate. Akcam and co-workers found 97.7% of their sample of 122 patients to have a dental abnormality.¹⁴ Anomalies are more prevalent in the permanent than primary dentitions. The most frequently occurring abnormality being agenesis of a tooth or teeth, usually in the region of the cleft site. Disturbances of tooth shape or form are the next most frequent anomaly with microdontia being the most common of these. Developmental defects of enamel, such as opacities, occur not only at the site of the cleft, but also distant from it. Enamel hypoplasia areas where the enamel surface is missing or abnormal are prevalent (Figure 2).⁹ As well as being of possible aesthetic concern, these areas of hypoplasia can also be caries predilection sites.

One further problem is impactions, which occur in both dentitions in the anterior and premolar regions. These can cause aesthetics problems and can present stagnation areas predisposing to caries (Figure 3).

The primary care practitioner or

specialist paediatric dentist caring for these patients therefore has the following broad aspects to deal with:

- Aesthetics;
- Avoiding pain and sepsis;
- Caries prevention and management;
- Function;
- Maintaining space and bone; and
- Most importantly of all, giving the patient a positive attitude to dental health.

The paediatric dentist works as part of a larger cleft team and must therefore try to work in a co-ordinated manner. Patients with clefts of the lip or palate have multiple visits and significant interventions by various health professionals and therefore may, at times, in effect lose patience with medical interventions and therefore become less compliant with advice and treatment. This response is in no way universal and varies from individual to individual. To address this, however, clinicians should listen to the voice of the child and give him/her the opportunity to make active decisions with regard to care.¹⁵

A number of patients with clefts will have additional medical problems such as cardiac anomalies which affect treatment choices. For example, pulpotomies would not be indicated in these patients. Patients with cleft lip and palate frequently suffer from recurrent middle ear infections because of alterations in the function of the soft palate and its effect on the Eustachian tube. This may result in the frequent prescription of antibiotics.¹²

Dental care of patients

Parents of babies with cleft lip and palate will receive advice on short- and long-term management. This will normally include dental advice. The family will receive support, including with feeding, which can be a significant problem. It is important that dental advice continues, particularly at the time of weaning.

Cleft teams will all include a paediatric dentist who will work to ensure that patients have access to dental care which, in most cases, will be with other members of the family in primary dental care. The paediatric dentist will co-ordinate care and provide help and advice as required.

The key to management of all patients is prevention; all patients with cleft lip and palate should be considered as high caries risk. The advice in the Department of Health/British Society for the Study of Community Dentistry Prevention Toolkit should be followed and is summarized below.¹

Toothbrushing and other sources of fluoride

Children's teeth should be brushed twice per day and one of these occasions should be last thing at night. It is generally accepted that a child cannot adequately brush his/her own teeth until seven or eight years of age. Therefore, toothbrushing in young children should be assisted and, as the child grows, supervised by an adult. The upper lip can be tight following surgery and accessing the upper labial segment can be difficult. Parents and carers may need specific advice about brushing this area, if only to re-assure them that they will not cause harm. Related to this issue of access, it is important that individuals of all ages choose an appropriately-sized brush, generally with a small head. The patient in Figure 3 might benefit from having the use of a single-tufted brush demonstrated.

All children should use a toothpaste containing over 1,350 ppm fluoride and, in children under three years, this should be applied as a smear and, in the over three-year-olds, as a pea-sized amount. Children should be encouraged to spit out excess paste but not to rinse. Once a child reaches the age of ten, it may be appropriate to prescribe toothpaste containing 2,800 ppm fluoride.

Fluoride supplements in the form of drops or tablets can be prescribed and these are best taken at a different time from toothbrushing to maximize the fluoride availability. As the action of fluoride tablets is principally topical, they should be dissolved in the mouth rather than swallowed whole. Table 2 presents fluoride tablet/drop prescribing regimes.

Once a child can spit out reliably, which is around the age of eight years, fluoride mouthwash can be prescribed. The most readily available mouthwashes are for daily use and contain 0.05% F. Weekly mouthwashes (0.2% F) are also available and, although no difference in caries preventive effect as been demonstrated between these two products, anecdotal evidence would suggest that there is more compliance



Figure 4. Fluoride varnish should be applied four times per year.

with the daily regime. As with the fluoride tablets, mouthwash should be used at a different time from toothbrushing to increase the fluoride availability. A logical regime is to brush morning and night and use the mouthwash when coming in from school.

The dentist should also apply fluoride varnish four times per year (Figure 4). Fissure sealants are another caries preventive treatment with a strong evidence base. All at risk pits and fissures should be sealed in patients with a cleft lip or palate.

Diet

Healthy eating is crucial to development in general and in the prevention of caries. Families should be encouraged to eat a balanced diet, restricting cariogenic foodstuffs to meal times; overall sugar should not be eaten more than four times a day. Diet diaries play a role in helping to give dietary advice and all families should complete one of these. When given advice remember the three 'Ps'; ie make the advice:

- Practical to a family's circumstances;
- Positive (eg advise eating fresh fruit rather than saying don't eat sweets);
- Personal, which is a key role for the diet diary.

Advising adolescent patients to chew sugar-free gum may be a simple but effective intervention. Sugar-free medicines should be prescribed whenever possible.

Recall intervals should be made as felt appropriate, taking into account a family's circumstances and the number of

appointments a child may already have. However, as fluoride varnish is being applied every three months, this would seem an appropriate interval to choose.

At these recalls, as well as a thorough clinical examination, bitewing radiographs should be taken to identify approximal caries.

Operative management

If caries is identified, this finding should be discussed with the patient or parent and preventive measures increased. It is vital that caries is not ignored and that cavitated lesions are restored, if pain and sepsis are to be avoided and space loss avoided.¹⁶

In addition to points raised above, there are specific issues facing the clinician caring for these children including:

- The oral mucosa is often tightly bound down, especially following surgery, and this can make injections particularly painful. It is therefore important that the clinicians use good technique using topical anaesthetic, inject slowly and, where possible, injecting initially at a distant site, using a stepwise approach.
- Similarly, in patients with clefts of the alveolus and palate, extractions in the upper arch can be uncomfortable because of the lack of buttressing across the arch to spread and absorb the pressure. To overcome this, the clinician must try to support the alveolus as much as he/she can.

Both of these situations may also be helped by the use of inhalation sedation.

Conclusion

Approximately 700 children per year are born with a cleft of the lip or palate. This is a relatively small number and, using the tools we already have at our disposal, the dental health of these children could be excellent. Helping these children to maintain their dental health will improve their quality of life and simplify their care by other specialties. The paediatric dentist's role is therefore to motivate these patients and their carers and provide high quality preventive and operative care.

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Age of Child	Water F Level		
	≤0.3 ppm	0.3–0.7 ppm	>0.7 ppm
6 months–3 years	250 µg	Not advised	Not advised
3–6 years	500 µg	250 µg	Not advised
Over 6 years	1 mg	500 µg	Not advised

Table 2. Daily regime for prescribing fluoride supplements.

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Book Review

Lingual Orthodontics: A New Approach Using STb Light Lingual System and Lingual Straight Wire.

By Giuseppe Scuzzo and Kyoto Takemoto. London: Quintessence Publishing Co Ltd, 2010 (264 pp; £154). ISBN 978-1-85097-192-4.

The demand for invisible orthodontic appliances is ever increasing and, in response to this, significant advances have been made in the design of lingual appliances to simplify their use, increase the predictability of results, shorten treatment times, decrease the amount of laboratory work and to improve patient comfort. This textbook (or probably more correctly named manual) gives a comprehensive overview of the two principal authors Giuseppe Scuzzo and Kyoto Takemoto's latest advances in the lingual technique using the new STb Light Lingual System and Lingual Straight Wire. The new STb (Scuzzo-Takemoto bracket) bracket is named after its inventors and is key to their new treatment philosophy.

Following a brief introduction in Chapter 1, the next seven chapters discuss the design of the STb bracket, and support this with scientific evidence comparing the bracket and the system with other lingual systems. This is covered in a logical manner, first looking at the mechanical aspects of STb and other lingual brackets, progressing onto the 'Biomechanical Considerations of Light Wire Lingual Orthodontics', followed by 'The Effect of Force Levels on Tissue Reaction to Orthodontic Load'. A small number of typographical errors

were noted: dataset labelling in Figures 4-21 and 4-22, Table 4-3 two errors in the calculated difference and in Chapter 7 relating to the incisal margin measurement in relation to the resting upper lip. Chapter 9 comprehensively compares the biomechanics of lingual and labial systems with a series of clear diagrams and supporting discussion describing both techniques in three planes of space.

Chapter 10, with input from Didier Fillion, provides a detailed account of the laboratory procedures and is clearly illustrated with excellent diagrams and photographs to demonstrate the process.

The second 'half' of this manual is dedicated to the clinical use of the system. Extraction and non-extraction mechanics are comprehensively described using STb brackets with 'mushroom'-shaped archwires. A wide range of malocclusions are shown from mildly crowded cases to those requiring orthognathic surgery. The system is shown in combination with lingual arches, the pendulum appliance and mini-screw implants. The treated cases in this section illustrate the versatility of the appliance and are finished to a high standard.

A short, well-illustrated chapter describes the STb Social 6 Light Lingual System which has been developed for aesthetically demanding patients in need of minor to moderate corrections in the anterior dental arch segments. This is followed by another short chapter describing the Lingual Straight Wire Method. Given the title of the book, I

expected that the proportion of the book dedicated to the Lingual Straight Wire system would be greater and was disappointed in this. The manual concludes with a chapter describing 'KommonBase' a recently developed precise direct bonding system.

Given the specialized nature of the book, I would expect it to appeal to orthodontists or dentists, with a special interest in orthodontics, who wish to find out about the latest advances in lingual appliances and/or are looking to invest in a lingual appliance system. This book is logically presented and the science behind the system, the procedures and techniques are comprehensively described with relevant clear illustrations and excellent photographs to complement the text.

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