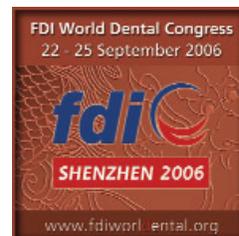


The “Point of Care” section answers everyday clinical questions by providing practical information that aims to be useful at the point of patient care. The responses reflect the opinions of the contributors and do not purport to set forth standards of care or clinical practice guidelines. This month’s responses were provided by speakers at the FDI World Dental Congress, which will be held September 22–25 in Shenzhen, China.



## QUESTION 1

### When should referral for a root coverage procedure be considered?

#### Background

In recent years the roles of esthetics and patient comfort have become increasingly important in dentistry. Paralleling this development, the role of root coverage procedures to treat gingival recession has gained more importance in periodontics. Gingival recession and its corollary, root exposure, may result in several undesirable sequelae, including compromised esthetics; root sensitivity; loss of root structure because of abrasion, abfraction or caries; and compromised plaque control. Resin-bonded restorations are often used to treat these conditions but are less than perfect. They often lead to additional (iatrogenic) recession, do not restore normal gingival architecture and do not facilitate optimal plaque control by the patient. Furthermore, these restorations require periodic replacement, which inevitably results in the removal of additional tooth structure.

Clearly, a more biologically acceptable and desirable outcome in terms of enhancing esthetics, minimizing the risk of further recession, treating dentinal hypersensitivity and arresting the loss of additional root structure would be restoration of the lost gingival tissue. Certainly any procedure that mitigates the risk of further recession is desirable. Predictable coverage of exposed roots is possible in well-defined clinical situations, and several different treatment modalities can be employed with good success.

#### When to Choose Root Coverage

The decision to treat gingival recession with a periodontal approach typically involves the following 2 considerations:

- Is root coverage desirable?
- Is root coverage achievable and predictable?

The answer to the first question involves a careful review of the patient’s chief concerns such

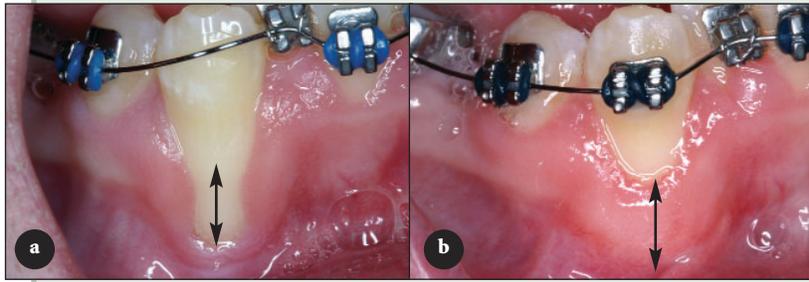
#### Box 1 Indications for root coverage and gingival augmentation

- Sensitivity
- Progressive recession
- Esthetic considerations
- Preparatory to prosthetic or orthodontic treatment
- Conservation of tooth structure
- Facilitation of oral hygiene

as esthetics and sensitivity, difficulty maintaining plaque control, presence or absence of root pathology, restorative and orthodontic considerations, and the practitioner’s evaluation of the likelihood of further recession. If the patient is experiencing symptoms associated with gingival recession or is unhappy with the appearance of his or her gums, root coverage may be indicated (Box 1). Alternatively, root coverage may be indicated where there has been loss of tooth structure, where the remaining gingiva appears thin and prone to further recession or where recession makes routine oral hygiene procedures difficult.

The answer to the second question lies largely in a classification developed in 1985 by Miller, who outlined the conditions under which complete or nearly complete root coverage could be expected and the conditions where only partial root coverage could be expected (Table 1). The critical factor in predicting root coverage was the height of the adjacent interproximal bone. According to Miller, where no interproximal bone loss has occurred, complete root coverage can be expected, whereas only partial coverage can be anticipated where interproximal bone loss has occurred (Figs. 1 and 2).

Once the dentist has determined that root coverage is desirable and possible for a patient, the



**Figure 1:** a. Class I recession treated with a graft of subepithelial connective tissue. b. Note that complete root coverage has been obtained and the width of keratinized tissue has increased.



**Figure 2:** Class III and IV recessions. Limited or no root coverage can be expected in this situation. If recession is continuing or Class V restorations are planned, a procedure to augment the gingiva should be considered.

**Table 1** Miller classification of gingival recession

Classification	Characteristics		Anticipated root coverage
	Interproximal bone	Recession	
Class I	Normal levels	Coronal to mucogingival junction	Complete root coverage possible and predictable
Class II	Normal levels	Apical to mucogingival junction	Complete root coverage possible and predictable
Class III	Loss of height	Apical to interproximal tissue levels	Partial
Class IV	Lower levels	At the same level as interproximal tissue	None

patient's medical suitability for undergoing a minor periodontal procedure should be assessed. Basic dental care should be completed, including prophylaxis, caries control and any necessary endodontic treatment. Final restorations and especially full-coverage restorations or restorations extending onto the root surface should be delayed until after the root coverage procedure is complete. Areas affected by abrasion, abfraction, erosion or caries can be covered using root coverage procedures, provided existing restorations or caries have been removed and provided the areas of recession meet Miller's criteria. Furthermore, where the gingiva is very thin or where keratinized tissue is absent or minimal, the placement of full-coverage restorations or restorations impinging on the gingiva is likely to result in additional recession.

When root coverage has been achieved, recurrence of recession is very unlikely. Before contemplating restoration of exposed root surfaces, the dentist should therefore consider the option of root coverage as a more biologically acceptable procedure with a predictable and stable long-term outcome. ♦

### THE AUTHORS



*Dr. Sheilesh Dave is in private periodontal practice in Calgary, Alberta.*



*Dr. Thomas E. Van Dyke is director of post-graduate periodontology at Boston University, Massachusetts. Email: tvandyke@bu.edu.*

*Dr. Van Dyke's session at the FDI Congress, titled "Management of the host response to prevent and treat periodontitis," will be presented on Sunday, September 24.*

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## QUESTION 2

An 8-year-old patient presents with an anterior crossbite and skeletal Class III malocclusion. How can I be sure that early orthopedic treatment will be successful?

### Background

Patients with Class III malocclusion who present with an anterior crossbite and mild to moderate maxillary deficiency can be treated successfully with protraction headgear or face mask therapy.<sup>1-3</sup> The dental and skeletal effects of such appliances include advancement of the maxilla by 2–4 mm over an 8- to 12-month period, correction of the anterior crossbite, proclination of the maxillary incisors, downward and backward rotation of the mandible, improvement of the facial appearance and more harmonious lip relationships.<sup>4-6</sup> Early treatment of such patients can prevent progressive, irreversible soft-tissue or bony changes; eliminate centric occlusion/centric relation discrepancies; prevent abnormal incisal wear; minimize excessive dental compensation due to the skeletal discrepancy; and improve lip posture, facial profile and self-image during children's growth years.

The factors associated with success in intercepting a Class III malocclusion include good facial esthetics, presence of an anteroposterior functional shift, mild skeletal disharmony, convergent facial type, young age (i.e., growth remaining), symmetric condyle, no familial prognathism and good cooperation.<sup>7</sup>

### Predicting Mandibular Growth

One of the reasons that clinicians are reluctant to render early orthopedic treatment for Class III patients is the inability to predict mandibular

growth. Patients who undergo early orthodontic or orthopedic treatment may need surgical treatment at the end of the growth period. The ability to predict mandibular growth early in life can therefore help clinicians to plan for future orthodontic care or the need for surgical treatment. Bjork<sup>8</sup> used a single cephalogram to identify 7 structural signs of extreme mandibular rotation during growth: inclination of the condylar head, curvature of the mandibular canal, shape of the lower border of the mandible, width of the symphysis, interincisal angle, intermolar angle and height of the anterior lower face. Discriminant analysis of long-term results of early treatment identified several variables that had predictive values. Franchi and others<sup>9</sup> found that inclination of the condylar head, the vertical maxillomandibular relationship and the width of the mandibular arch could predict the success or failure of early Class III treatment. Ghiz and others<sup>10</sup> found that the combination of position of the mandible, ramal length, corpus length and gonial angle predicted successful outcome with 95% accuracy but predicted unsuccessful outcome with only 70% accuracy. We propose the use of serial cephalometric radiography and a growth treatment response vector (GTRV) analysis to predict excessive mandibular growth. The GTRV ratio can be calculated from the following formula:

$$\text{GTRV} = \frac{\text{horizontal growth changes of the maxilla}}{\text{horizontal growth changes of the mandible}}$$



**Figure 1:** An 8-year-old boy who presented with Class III malocclusion and an anterior crossbite.



**Figure 2:** The patient was treated with a banded expansion appliance and a protraction face mask.



**Figure 3:** The degree of overjet improved after 8 months of treatment with the protraction face mask.

Normally, the mandible outgrows the maxilla each year by 23% and the GTRV ratio for individuals with Class I skeletal growth pattern is 0.77. A ratio smaller than 0.77 indicates greater horizontal mandibular growth and the likelihood that the patient will need surgery.

In a study of patients with Class III malocclusion, the mean GTRV ratio was  $0.49 \pm$  standard deviation 0.14 (range 0.33 to 0.88) for patients who were successfully treated with protraction headgear and  $0.22 \pm 0.10$  (range 0.06 to 0.38) for patients whose treatment was unsuccessful.<sup>11</sup> Clinicians can use the GTRV ratio to determine whether a Class III malocclusion can be camouflaged successfully with orthodontic treatment or if surgical treatment will eventually be necessary.

Figure 1 shows an 8-year-old patient with a skeletal Class III malocclusion and an anterior crossbite. The patient was treated for 8 months with a maxillary expansion appliance and protraction face mask (Fig. 2). A positive overjet was established after 8 months of treatment (Fig. 3). Figure 4 is the post-treatment cephalometric radiograph of the patient. The patient was followed until age 15 for growth analysis. Figure 5 shows the cephalometric radiograph of the patient at age 15. The 2 radiographs were superimposed (Fig. 6) to measure the growth changes and thus calculate the GTRV ratio. The calculated ratio of 0.9 indicated that this patient had parallel growth of the maxilla and mandible during the observation period and that future surgical treatment may not be warranted. For this patient, the clinician could elect to initiate comprehensive orthodontic treatment to camouflage the malocclusion.

### Conclusion

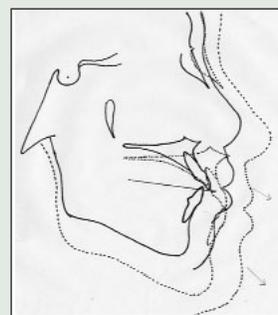
The use of serial radiographs and GTRV analysis may help clinicians to predict excessive mandibular growth in patients with Class III malocclusions and decide whether to camouflage the malocclusion or proceed with surgery. ➤



**Figure 4:** Post-treatment lateral cephalometric radiograph after 8 months of treatment.



**Figure 5:** Lateral cephalometric radiograph obtained 7 years after completion of the face mask treatment.



**Figure 6:** The radiographs obtained at 8 and 15 years of age (Figs. 4 and 5, respectively) are superimposed to measure height growth of the maxilla and mandible and hence to determine the growth treatment response vector ratio.

### THE AUTHOR



*Dr. Peter Ngan is professor and chair of the department of orthodontics, West Virginia University, School of Dentistry, Morgantown, West Virginia. Email: [pngan@hsc.wvu.edu](mailto:pngan@hsc.wvu.edu).*

*Dr. Ngan's session at the FDI Congress, titled "The biologic basis for early treatment," will be presented on Sunday, September 24.*

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## QUESTION 3

## How can I recognize and manage salivary hypofunction in children?

**Background**

Salivary hypofunction and associated xerostomia are usually recognized when they occur in adults, especially elderly people and those receiving certain types of medications. However, this condition is not usually considered in children, probably because those affected may not appear xerostomic and may even drool. Yet salivary hypofunction does not refer solely to diminished flow rate; it also encompasses decreased buffering capacity and lower levels of salivary constituents, especially proteins.

Although reductions in the quantity of saliva may be responsible for oral problems such as difficulties in eating and speaking and changes in the sense of taste, xerostomia is highly subjective, and unstimulated saliva flow may fall below 50% of its normal value before symptoms are observed.<sup>1</sup> Many children with special needs may drool because of poor oral motor function, but this does not rule out the possibility of salivary hypofunction. Furthermore, children with oral motor dysfunction have reduced salivary clearance rates and may even store food in the buccal sulci.<sup>2</sup> Therefore, reported symptoms and apparent flow rates are poor indicators of salivary hypofunction, and a thorough clinical examination is essential. Infection, trauma, neoplasia, radiation therapy and medications may all be responsible for salivary hypofunction. The condition may also be developmental and can be present in children with various syndromes such as hemifacial microsomia, Treacher Collins syndrome and other anomalies of

the first branchial arch. Recent research has associated salivary hypofunction with other conditions, including velocardiofacial syndrome (VCFS),<sup>3</sup> Prader-Willi syndrome and ectodermal dysplasia.

**Saliva as a Risk Factor for Caries**

The causes of tooth decay are of course multifactorial and include such environmental factors as dietary habits and oral hygiene methods. However, salivary function has important effects on oral health, and many patients with salivary hypofunction have rampant dental caries (Fig. 1).

When rampant dental caries are diagnosed in a child, the parents are often told that the problem is dietary, which frequently leads to feelings of guilt. Although diet is undoubtedly the culprit in many cases, there are also many children who continue to have very high rates of caries despite changes to their diets and oral hygiene practices. This suggests that clinicians should consider the possibility of other contributory factors.

Salivary hypofunction in children is often diagnosed by the pattern of caries. Although many of these children belong to special needs groups, salivary hypofunction may also affect otherwise healthy children. In a recent audit of records for children who underwent salivary scintiscanning in Sydney, Australia, one-third of those with confirmed salivary hypofunction had VCFS and one-third had a range of other medical conditions, but the remaining third had no contributory medical history.

It is also of interest that salivary hypofunction, in particular a reduction in salivary proteins, has been associated with malnutrition.<sup>4</sup> Many children with early childhood caries are below their ideal body weight and may be malnourished.<sup>5</sup> It would therefore be worthwhile to investigate the possibility of a link between early childhood caries, malnutrition and salivary hypofunction.

Thus, we should perhaps be thinking more



**Figure 1:** Extensive incisor caries in a child with velocardiofacial syndrome.



**Figure 2:** Cervical carious lesions in a child with thick, mucinous and bubbly saliva.

about the role of saliva in children with a high risk of caries and including methods of saliva stimulation in their preventive regimens.

### Danger Signs

The following signs may help to identify children in whom salivary hypofunction may be a significant factor contributing to their risk of caries.

#### Pattern of caries, including caries at abnormal sites

- Severe and rapid carious breakdown of mandibular incisor teeth
- Incisal and cuspal caries
- Marked cervical and smooth-surface demineralization and caries

Caries at any of the above-mentioned sites are *always* associated with a very high rate of caries. Mandibular incisal caries in particular may be associated with aplasia or hypofunction of the submandibular glands.

#### Nature of the saliva

- Frothy, bubbly or thick (Fig. 2)

#### Progression of caries

- Progressive and rapid carious breakdown, despite intensive preventive advice and regimens
- Increased rate of loss of noncarious tooth tissue by erosion

#### Soft-tissues changes

- Dryness of the vermillion border of the lip and oral mucosa
- Fissuring and loss of filiform papillae of the tongue

#### Other factors

Salivary flow rate alone is a poor indicator of salivary hypofunction. Flow rate can be affected by a number of factors, including body position, degree of hydration and circadian rhythms; furthermore, the accurate measurement of flow rates in children is extremely difficult.

As already mentioned, many children with poor oral motor function may drool, leading to the impression they have too much saliva. In contrast, however, such children may have a prolonged sugar clearance time, which together with a preference for soft food (to reduce chewing) may significantly increase the risk of caries.

### Preventive Measures

When routine preventive measures appear to be failing, the following additional actions may help to slow or arrest carious breakdown.

#### Modify the Diet

The clinician should strongly reinforce the need to reduce or eliminate snacking and the consumption of sugared, carbonated and caffeinated beverages. In particular, discourage frequent sipping of sugared drinks and encourage consumption of water to maintain hydration. Make sure the child's teacher is informed, so that a bottle of water may be taken into the classroom.

Lip balm or petroleum jelly should be applied regularly, especially at nighttime.

#### Prevent Demineralization and Promote Remineralization

For older children and adolescents, encourage daily use of a fluoride mouth rinse (0.05% NaF) or a high-fluoride toothpaste such as Colgate 5000 ppm.

Custom trays for nighttime application of fluoride gel (1.23% neutral NaF) to the mandibular arches can be particularly useful in cases of lower incisor caries.

Younger children at risk of fluorosis should be seen regularly (at least every 3 months) for application of a fluoride varnish.

Recommend the daily use of remineralizing agents, such as the casein phosphates (casein phosphopeptide and amorphous calcium phosphate or CPP-ACP). These products are marketed in the United States and Canada as Prospec MI Paste (GC America) and have been shown to have powerful remineralizing effects. Recent research also suggests a synergistic remineralizing potential when these products are used with fluoride.<sup>6</sup>

#### Stimulate Salivary Production

Encourage the regular use of sugarless gums, especially those containing xylitol, to stimulate saliva and reduce the acidogenic potential of plaque.<sup>7</sup> CCP-ACP is also available in a sugar-free gum, marketed as Recaldent (GC America).<sup>8</sup>

#### Improve Oral Hygiene

Recommend intermittent use of chlorhexidine gel (0.2%) for chemical control of plaque, and encourage regular tooth-brushing and flossing.

#### Undertake Restorative Management

Seal fissures in molars soon after eruption with a glass ionomer sealant.

If restorative treatment is required, use fluoride-releasing materials whenever clinically feasible, as part of the caries-control strategy.

#### Perform Regular Recall

Set appropriate recall intervals, taking into account the risk of caries. See high-risk children at

least every 3 months to monitor the progression of caries and compliance with preventive regimes.

In severe cases and those with no response to preventive measures, refer the child to an appropriate specialist for further investigation. ♦

## THE AUTHOR



*Dr. Sally Hibbert is a staff specialist in pediatric dentistry at The Westmead Centre for Oral Health in Sydney, Australia, and a visiting specialist at the Children's Hospital, Westmead. Email: [sallyhibbert@bigpond.com](mailto:sallyhibbert@bigpond.com).*

*Dr. Hibbert's session at the FDI Congress, titled "Oral medicine and pathology in children: what to look for and how to manage the common and uncommon," will be presented on Monday, September 25.*

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