

# The Evidence-Based Clinical Decision Support Guide: Mucogingival/Esthetics.

Making Clinical Decisions in the Absence of Strong Evidence

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## Abstract

Although evidence-based decision-making in dentistry is quickly evolving, large gaps remain in our clinical knowledge base regarding every day decisions and procedures. Especially in the absence of strong evidence, as is the case with mucogingival conditions, risk assessment and identification are important components of the clinical decision-making process. Utilization of clinical decision support (CDS) guides, frameworks and systems enhances chairside decision-making and improves delivery of patient care. This article introduces an Evidence-Based Clinical Decision Support Guide for mucogingival/esthetic situations. This CDS guide delineates treatment strategies based upon evidence-based risk assessment and when possible, risk management. It provides the clinician with a framework that will support decision-making at the point of care. Recommendations for consultation, treatment and referral are reviewed.

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Patients and clinicians want reassurance that treatment decisions and procedures are routinely supported by strong scientific evidence. However, there are still large gaps in our clinical knowledge base regarding every day decisions and procedures.<sup>1</sup> Recognizing the insufficiencies in the scientific literature and its translation to clinical practice outcomes, the American Dental Association (ADA) initiated an active role in Evidence-Based Dentistry (EBD) in February 1999.<sup>2</sup> Although EBD is still in a formative stage, it is quickly serving to strengthen the scientific foundation of clinical practice.<sup>3</sup>

In 2005, the National Coordinator for Health Information Technology in the United States commissioned the American Medical Informatics Association to develop a plan that would help advance Clinical Decision Support (CDS).<sup>4</sup> CDS includes a variety of printed and electronic tools, systems, products and services that give the user quick access to up-to-date knowledge and information helping him or her make more informed and individualized health care recommendations.<sup>4</sup> The result of this effort was the publication of

the *Roadmap for National Action on Clinical Decision Support*.<sup>5</sup> CDS complements evidence-based decision making in dental practice. The use of CDS will reduce errors, avoid over- or undertreatment and give the clinician and patient satisfaction that the best care has been provided.<sup>4</sup>

Applying weak evidence to daily clinical practice must be tempered by consideration of individual risk factors and circumstances.<sup>6</sup> The individual clinical situation will invariably be more complex, because individual patient's present additional information related to their condition.<sup>6</sup> Several examples illustrate this point:

- Regarding early occlusal caries and suspected dentinal caries, Bader and Shugars in 2006, reported that there is a lack of strong evidence supporting most of the currently available management strategies.<sup>6</sup> With respect to the diagnostic performance of available methods for detecting early occlusal caries, they determined that only weak evidence was available to support current methodologies.<sup>6</sup> Further, the strength of the evidence describing progression of suspicious areas in the absence of any intervention was weak.<sup>6</sup> Individual caries risk assessment should be performed, including past and current caries experience, current dietary, oral, and caries preventive behaviors, and physiological factors, as these may signal an increased

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likelihood for departure from the usual course of progression.<sup>6</sup>

- When considering the management of temporomandibular disorders (TMD) today, there is insufficient evidence to advocate that irreversible occlusal treatments, such as occlusal grinding, are efficacious.<sup>7</sup> The scientific literature has not convincingly demonstrated a definitive relationship between static occlusal factors and TMD.<sup>7</sup> There are many etiologic factors yet to be scientifically validated.<sup>8</sup>
- Clinical decision making with respect to choosing between endodontic therapy and restoration or to extract the tooth and replace it with an implant and restoration is also beleaguered with weak evidence and multiple risk factors.<sup>9</sup> At present, choices between implant and endodontic therapies cannot be solely based on outcomes measurement evidence.<sup>9</sup> The evidence is inadequate and not amenable to direct comparison. White, et al reports that the identification and quantification of specific [risk] factors that affect rehabilitative prognosis in individual patients would be extremely useful in formulating standardized protocols and individual treatment plans.<sup>9</sup>

Central to evidence-based practice is individualizing treatment based both on the strongest available evidence and a patient's particular circumstances<sup>10</sup> [risk factors]. The key question for many clinicians should not be whether a given management strategy works in general, but how well it works for a specific individual. To address that question, many more studies, incorporating and comparing subjects with a variety of sociodemographic and risk factors are needed.<sup>6</sup>

When high-level scientific evidence is not available to provide definitive support for clinical decision-making, the clinician needs a practical clinical model to translate complex multifaceted interrelationships. Introduced in 2006, the Translational Clinical Practice System (TCPS) was developed to support clinical decision-making.<sup>11</sup> TCPS is an example of a CDS tool that helps the clinician put into context the best available scientific evidence, associated risk factors, patient preferences and values, clinician experience and judgment, clinically relevant outcomes and ethical practice parameters (minimizing risk of harm; maximizing safety, effectiveness and long term value).<sup>4</sup>

As with other CDS tools, the TCPS assists clinician decision-making at the point of care. Central to its core is the concept of risk assessment.

## RISK ASSESSMENT

Critical to effective decision-making, especially in the absence of strong evidence, is the utilization of risk assessment which considers the many individualized factors that may influence decision-making. As illustrated above, consideration and application of risk assessment to improve clinical decision-making is now strongly encouraged in clinical practice. Today, it is increasingly important in periodontal treatment planning and should be part of every comprehensive

dental and periodontal evaluation.<sup>12</sup> In its evidence-based clinical recommendations for professionally applied fluoride, the American Dental Association encourages dentists to employ caries risk assessment strategies in their patients.<sup>13</sup> Although in its early stages of adoption, a variety of risk assessment tools are increasingly being used in clinical dentistry today.<sup>14</sup>

Busy clinicians and their patients can well benefit from evidence-based and risk-adjusted clinical decision support guides designed to be used chairside at the point-of-care. The clinical conditions of narrow band of attached gingiva, no attached gingiva and gingival recession are very common. In most practices there is an every-day need for chairside mucogingival clinical decision-making.

## GINGIVAL RECESSON – DESCRIPTION, PREVALENCE, ETIOLOGY AND RISK FACTORS

Gingival recession is the term commonly used to describe the apical shift of the surrounding soft tissue (keratinized or non-keratinized mucosa) of the tooth resulting in root exposure.

It is estimated that half of the U.S. adult population has gingival recession and on average about a quarter of the dentition is affected.<sup>15</sup> The presence of gingival recession in young adults ranges from 62-72% and may reach 100% in the elderly.<sup>16</sup> No convincing evidence has been presented for a physiologic shift of the gingival attachment.<sup>17,18</sup>

Given its prevalence, gingival recession requires daily decisions on the part of the clinician. Once a narrow band of gingiva or no attached gingiva has been identified, when should the clinician recommend a “wait & watch” strategy and when is surgical revision the more appropriate course of action?

The mechanism by which gingival recession occurs is not well understood but seems to be inflammatory in nature.<sup>15</sup> The main etiologic factor for gingival recession appears to be inflammation caused by dental plaque biofilm &/or mechanical irritation due to oral hygiene techniques.<sup>19-30</sup> However, other risk factors have also been implicated (see Tables 1, 2 & 3) and it is generally accepted that gingival recessions can in fact be caused by many etiologic factors, acting in combination.<sup>16</sup>

Thus, all factors causing recession should be analyzed so that planning and treatment of this clinical condition may be established for achievement of optimal outcomes.<sup>16</sup> Frequently, an association of factors determines the occurrence of gingival recession, and one factor may be the main factor, but not the only factor, causing the lesion.<sup>16</sup>

Specific risk factors for gingival recession gleaned from population studies will not apply to each and every patient the clinician treats in clinical practice. However, common sense dictates that the presence of multiple risk factors for any particular patient should cause concern, especially if gingival recession has already occurred. Especially given the

**TABLE 1.** Group 1 mucogingival/esthetic risks: assess & manage

- Total health - Lifestyle
  - Diabetes: if not well controlled, refer for medical management<sup>39, 40</sup>
  - Smoking: recommend and refer for smoking cessation<sup>15, 19, 32, 41-45</sup>
- Site-specific
  - Oral jewelry: recommend removal if contributory<sup>17, 46-48</sup>
  - Gingival inflammation associated with visible plaque & calculus<sup>15, 19, 20-23</sup>
    - Instruct in effective oral hygiene procedures
    - Prescribe non-surgical periodontal therapy (scaling, polishing, root planning) as needed
  - Gingival inflammation (irritation) associated with “good” oral hygiene<sup>17, 21, 23-28</sup>
    - Modify toothbrushing
    - Decrease force, frequency, duration as needed
    - Eliminate use of hard bristle brush
    - Correct horizontal, vertical & rotary movements
    - Modify flossing: avoid tissue laceration
    - Toothpaste assessment: minimize abrasiveness and quantity applied
  - Subgingival restorations causing tissue irritation: change/revise<sup>41, 49, 50</sup>
  - Oral appliances causing tissue irritation: change/revise<sup>41, 51</sup>
  - Injurious oral habits and/or eating habits: counsel<sup>17</sup>

weak scientific evidence available to guide mucogingival clinical decisions today, as well as the bewildering number of risk factors as noted above, gingival recession makes for an appropriate candidate for a CDS tool to enhance clinical decision-making (see Diagram 1).

**THE EB-CDS GUIDE: MUCOGINGIVAL-ESTHETICS**

Given the prevalence of gingival recession and the multiple risk factors that have been identified, a practical clinical decision support tool will aid the clinician at the point of care. The EB-CDS Guide: Mucogingival/Esthetics was developed for this purpose (see Diagram 1). As with early and suspected caries; TMD and irreversible occlusal treatment; and endodontic therapy versus extract (see above), the currently available scientific evidence guiding mucogingival decision-making is weak.

However, many mucogingival/periodontal risk factors have been identified in the scientific literature. The treatment recommendation decision pathways in the EB-CDS Guide: Mucogingival/Esthetics are based upon risk assessment and when possible, risk management. As with all evidence-based decision-making, clinical judgment and experience factors into the process. This guide is no exception. Given the current lack of strong scientific evidence supporting mucogingival decision-making, the development of this guide also relied upon the author’s clinical experience and judgment in order to stratify the multiple risk factors as well as provide guidance along the decision pathway.

Currently available treatment procedure decision guides can be readily implemented within the context of the EB-

CDS Guide: Mucogingival/Esthetics decision pathway. For example, the Miller classification system of denuded roots is excellent for helping determine surgical protocols.<sup>31</sup> It enhances the clinicians’ ability to determine the predictability of root coverage surgery outcomes and is utilized during the surgical decision-making phase of case management. (See Figure 1)

The EB-CDS Guide: Mucogingival-Esthetics expands upon and updates earlier decision pathway models that pre-date the era of evidence-based and CDS decision making.<sup>32</sup> The EB-CDS Guide (Diagram 1) is a framework designed to support the clinician in making appropriate mucogingival treatment recommendations such as “Wait & Watch” and surgical revision. Risk factors are categorized into 3 groups which support the decision-making process.

- Group 1 Mucogingival/Esthetic Risks (see Table 1)
- Group 2 Mucogingival/Esthetic Risks (see Table 2)
- Group 3 Mucogingival/Esthetic Risks (see Table 3)

**WHEN TO RECOMMEND “WAIT & WATCH”**

Refer to Diagram 1. For patients who, by way of periodontal examination are found to have a narrow band of attached gingiva or no attached gingiva, a recommendation for “Wait & Watch” is given when:

- Root exposure is not evident for the tooth/teeth in question (see Figure 2)
- Root exposure is evident for the tooth / teeth in question *and* the patient presents with no Group 2 Mucogingival/Esthetic Risks (see Table 2)

**TABLE 2.** Group 2 mucogingival/esthetic risks

Total health - Life style

- Diabetes<sup>39, 40</sup>
- Smoking<sup>15, 19, 32, 41-45</sup>
- Compromised immune function<sup>32, 52, 53</sup>
- Excessive stress<sup>32, 54</sup>
- Root decay risk: moderate-high<sup>41</sup>
- Root sensitivity: moderate-high and unresolved by non-surgical strategies<sup>41</sup>
- Patient is concerned about tissue recession risks

Dental history

- Younger age/long-life expectancy<sup>32, 55, 56</sup>
- Missing teeth: moderate-high<sup>32</sup>
- Periodontal attachment loss: significant<sup>32, 52</sup>
- Genetic predisposition for periodontitis and/or mucogingival conditions<sup>57</sup>
- Past history of periodontal disease, mucogingival problems and/or periodontal surgery<sup>52</sup>

Site specific soft tissue factors

- Marginal tissue irritation despite effective toothbrushing and/or flossing.<sup>17, 21, 49</sup>
- Marginal tissue clefting with cleft extending to the mucogingival junction.<sup>41</sup>
- Subgingival restorations (otherwise clinically acceptable) are associated with persistent gingival inflammation.<sup>41, 49, 50</sup>
- Persistent inflammation and/or bleeding on probing despite appropriate control for plaque and/or calculus.<sup>49, 52</sup>

Especially in the presence of inflammation:

- Free gingiva margin movement by stretching of lip or cheek.<sup>49, 58</sup>
- Encroaching frenum compromises plaque control.<sup>16, 17, 49, 59</sup>
- Frenum tension opens the tissue sulcus.<sup>16, 17, 49, 59</sup>
- Shallow vestibular depth restricts access for effective toothbrush placement.<sup>49</sup>

Site specific hard tissue factors

- Prominent position of root to the buccal<sup>17, 32, 60-63</sup> or mandibular lingual.
- Furcations, root concavities, developmental grooves, and/or enamel projections/pearls.<sup>32, 39</sup>
- Root dehiscences through alveolar bone<sup>49, 64</sup>
- Diminished root length<sup>32</sup>
- Overly tapered/spindly root anatomy<sup>32</sup>

A treatment plan is then developed to manage any presenting Group 1 Mucogingival/Esthetic Risks. (See Table 1)

**WHEN TO RECOMMEND SURGICAL REVISION**

Refer to Diagram 1. For patients who, by way of periodontal examination are found to have a narrow band of attached gingiva or no attached gingiva, a recommendation for surgical revision is given when:

- There is documented increased root exposure

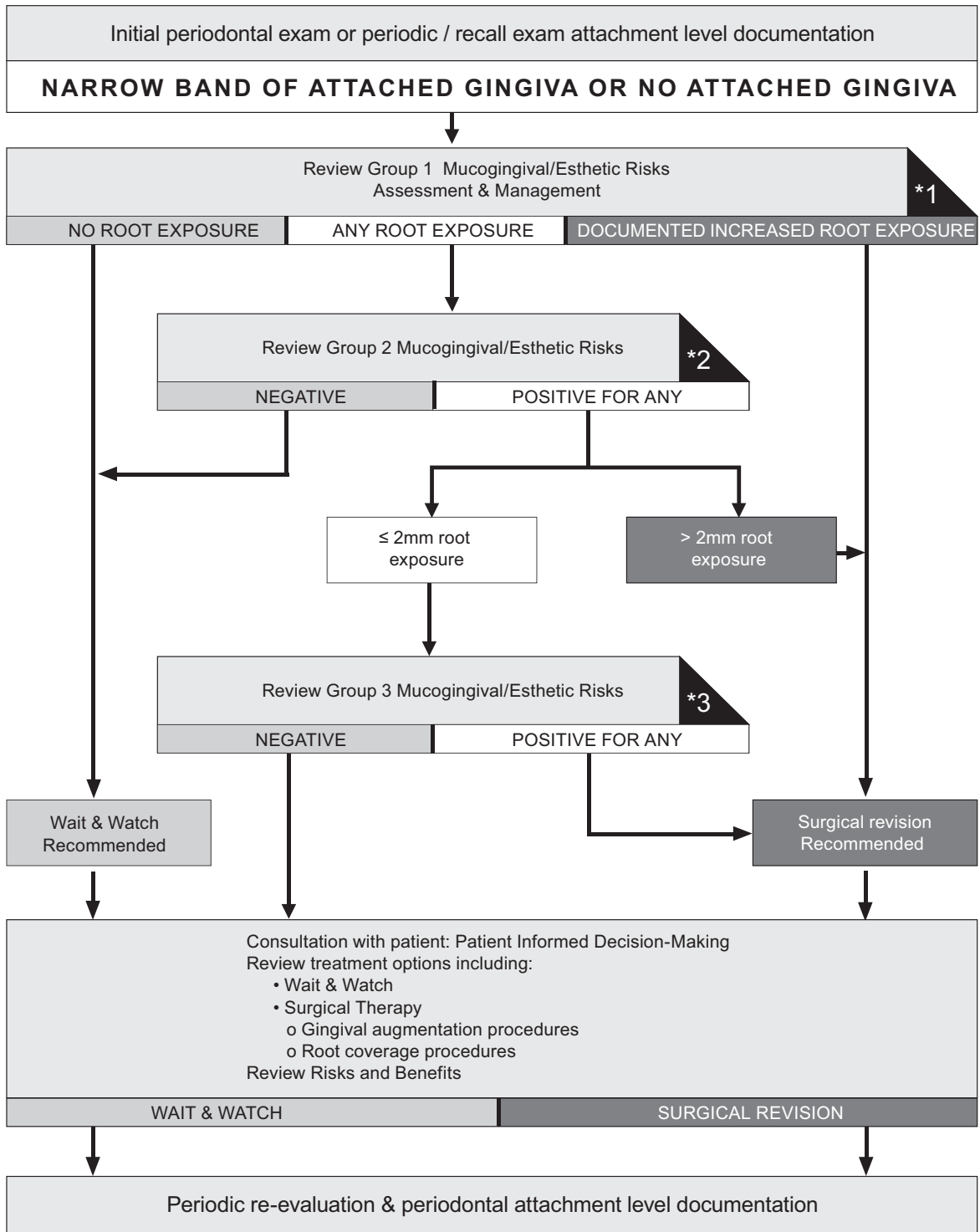
- The patient / site in question is positive for any Group 2 Mucogingival/Esthetic Risks (see Table 2) *and* the amount of tooth root exposure is more than 2 millimeters
- The site in question demonstrates less than or equal to 2 millimeters of tooth root exposure *but* the patient / site in question is positive for any Group 3 Mucogingival/Esthetic Risks (see Table 3)

It is important to note that treatment for all presenting Group 1 risks does not necessarily need to precede the recommendation for surgical revision. Prioritizing

**TABLE 3.** Group 3 mucogingival/esthetic risks

- Orthodontic tooth movement (removable or fixed appliances) is planned and involves teeth in question.<sup>16, 64-66</sup>
- Subgingival restoration placement is planned involving teeth in question.<sup>41, 49, 50</sup>
- High strategic value of teeth in question (e.g.: in esthetic zone; abutment for fixed or removable prosthesis).<sup>51</sup>
- Persistent tissue-irritating oral hygiene practices.<sup>17, 21, 23-28</sup>
- Persistent injurious oral habits and/or eating habits.<sup>17</sup>

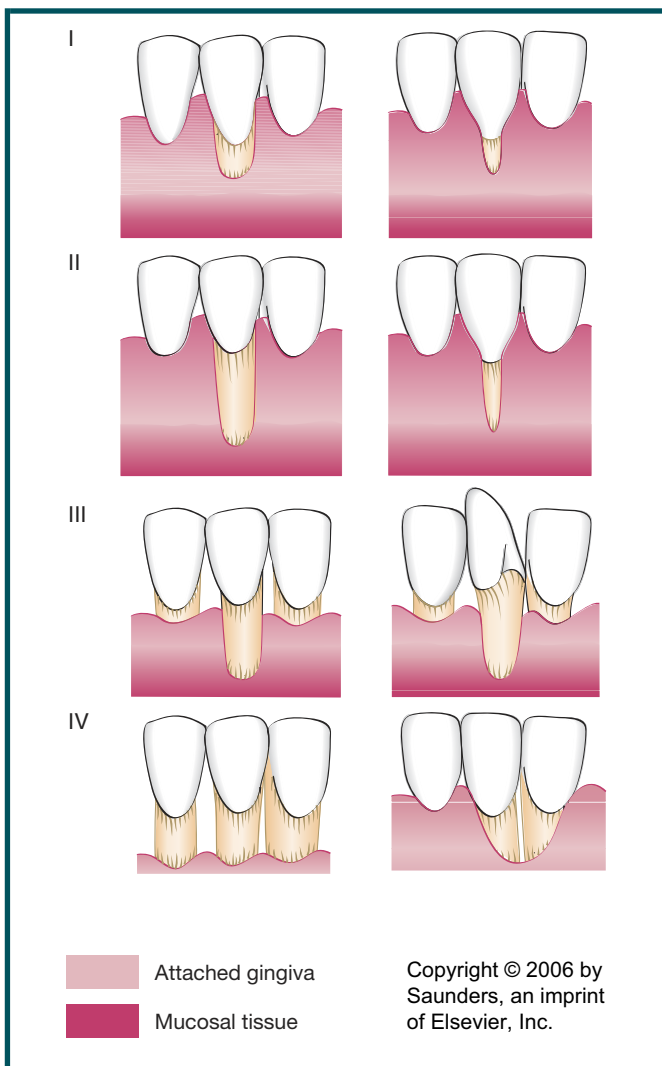
# EVIDENCED-BASED CLINICAL DECISION SUPPORT GUIDE: MUCOGINGIVAL/ESTHETICS



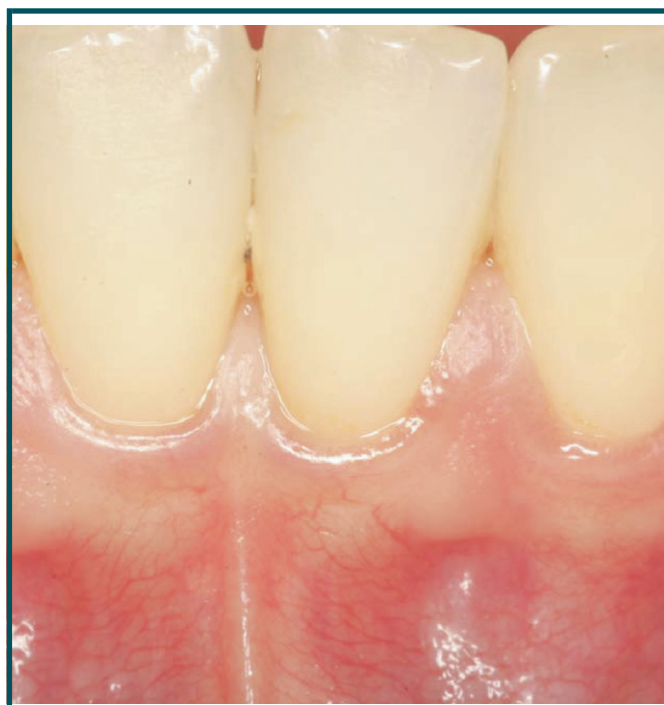
\*1,\*2,\*3: Refers to Tables 1,2,3 respectively

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Diagram 1.



**Figure 1.** The P.D. Miller Classification of Exposed Root Surfaces



**Figure 2.** Teeth #23, 24, 25: No attached gingiva, no root exposure. “Wait & Watch” recommended. Monitored 10 years without change. Courtesy George K. Merijohn, DDS 2007

the treatment sequence is always individualized and based upon the collective experience and judgment of the attending clinicians, the preferences and values of the patient as well as the extent to which the presence of problems listed in Group 1 Mucogingival/Esthetic Risks (Table 1) influence therapeutic decisions.

Surgical treatment for many mucogingival problems is complex. Appropriate education, training, experience and judgment are critical to a functional and esthetic success. (See Figure 3).

### WHEN TO RECOMMEND A CONSULTATION FOR PATIENT INFORMED (SHARED) DECISION-MAKING

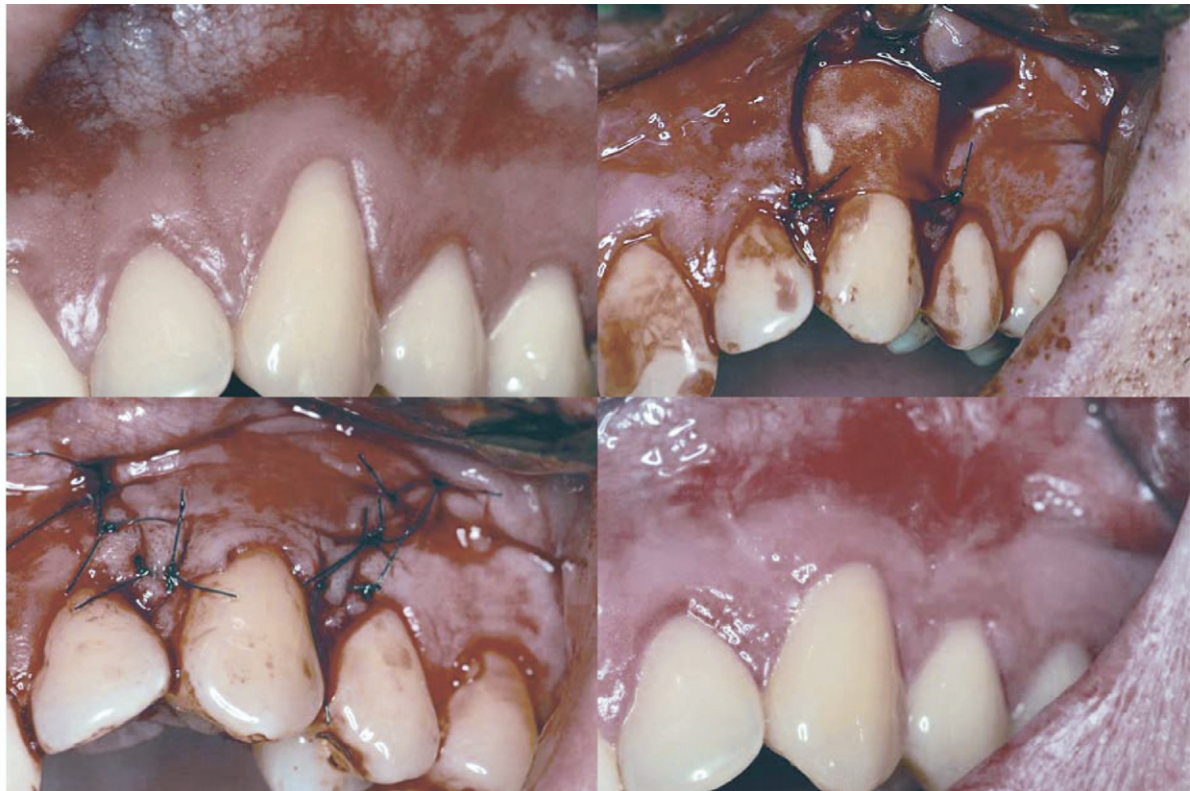
Refer to Diagram 1. For patients who, by way of periodontal examination are found to have a narrow band of attached gingiva or no attached gingiva, a recommendation for a decision-making consultation is given:

- Whenever a recommendation for “Wait & Watch” is given
- Whenever a recommendation for surgical revision is given
- Whenever root exposure is evident for the tooth / teeth in question; the patient is positive for any Group 2 Mucogingival/Esthetic Risks (see Table 2), *but* the amount of tooth root exposure is less than or equal to 2 millimeters; *and* the patient presents with no Group 3 Mucogingival/Esthetic Risks (see Table 3)

*Note: When this set of circumstances occurs, recommending “wait & watch” or surgical revision is less clear cut. A neutral stance by the clinician (“sitting on the fence”) is appropriate. Consultation with the patient for case presentation and informed decision-making is essential. Whenever the primary caregiver does not have the education, training, interest and/or experience to achieve the desired outcomes at the level of an experienced periodontist, it is time to refer for consultation. This will provide additional perspective and aid the decision-making process.*

A treatment plan is then developed to manage any presenting Group 1 Mucogingival/Esthetic Risks. (See Table 1) It is important to note that this treatment plan

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**Figure 3.** Surgical treatment for many mucogingival problems is complex. Appropriate education, training, experience and judgment are critical to a functional and esthetic success.

can and should occur in tandem with the recommendation for patient informed decision-making.

Prioritizing the treatment sequence is always individualized and based upon the collective experience and judgment of the attending clinicians, the preferences and values of the patient as well as the extent to which the presence of problems listed in Group 1 Mucogingival/Esthetic Risks (Table 1) influence therapeutic decisions.

### WHO SHOULD CONSULT WITH THE PATIENT?

For mucogingival-esthetic clinical decisions, a stepwise clinical approach is recommended. For example, in many general practice settings, the condition is first detected by the dentist during the new patient examination. For patients of record, the dental hygienist may be the first clinician to detect the condition which is then followed with the clinical diagnosis by the treating dentist. In specialty practices such as oral surgery, endodontics, pedodontics, or periodontics, the treating specialist may be the clinician who first detects the condition. The complexity of the patient's problem as well as the education, training, interest and experience of the clinician best determines who is involved with

the treatment of the patient. It is recommended that a periodontist be engaged in the decision-making and treatment process whenever the primary caregiver does not have the education, training, interest and/or experience to achieve the desired outcomes at the level of an experienced specialist.

It is understood that there are constrained practice environments which make it difficult to recommend appropriate consultation and care for patients. In some areas beyond metropolitan centers, reasonable geographic access to experienced periodontists may be more difficult. Alternatively, some general dentists and/or periodontists participate in third party contract plans which limit treatment options and referrals. Or, when managed care dental plans act as cost containment systems, they often direct the utilization of health care by a) restricting the type, level and frequency of treatment; b) limiting the access to care; and c) controlling the level of reimbursement for services.<sup>33</sup> If a managed care plan imposes contract limits that inhibit patient access for the most appropriate mucogingival surgical management, the dentist should make the patient aware of the situation and provide an alternative recommendation outside of the covered benefits within the plan.

## WHEN SURGICAL REVISION IS ADVISED OR IS BEING CONSIDERED, DOES THE CONSULTING CLINICIANS' MUCOGINGIVAL SURGERY EXPERIENCE MATTER?

From the patients' point of view, the doctor who has the necessary experience with both "Wait & Watch" and mucogingival surgical revision is in the best position to provide the patient with in-depth review of therapeutic options, risks and benefits.

The American Dental Association Principles of Ethics and Code of Professional Conduct (Section 2.B. Consultation and Referral) states: "Dentists shall be obliged to seek consultation, if possible, whenever the welfare of patients will be safeguarded or advanced by utilizing those who have special skills, knowledge, and experience".<sup>34</sup>

In its revised (June, 2007) General Guidelines For Referring Dental Patients, the American Dental Association Council on Dental Practice states: "Appropriate referrals are an integral part of complete quality health care management. Referrals should be based on the education, training, interest, and experience of the referring dentist and the unique needs of the patient. Dentists are expected to recognize the extent of the treatment needs of their patients and when referrals are necessary".<sup>67</sup>

The literature supports that those surgeons with greater experience and expertise have a better understanding and outcomes from treatment. Large variations in results can be observed between surgeons performing similar operations in the same population.<sup>35</sup> Technically demanding procedures [e.g. mucogingival surgery], in experienced and expert hands is safe and effective.<sup>36</sup>

Surgeons are increasingly overwhelmed with a growing body of literature describing new and innovative diagnostic tests and surgical procedures. It is no small challenge for the general dentist and periodontist to apply evidence-based mucogingival surgical decision making in order to optimize patient care. For example, the Surgical Outcomes Resource Centre (SOURCE) is dedicated to increase awareness of the importance of evidence-based decision making among surgeons and to increase the dissemination of surgical outcomes research findings.<sup>37</sup>

## CONCLUSION

Dentists have been encouraged to implement risk assessment strategies in their practices for caries prevention and management as well as for periodontal treatment planning.<sup>12,13</sup> This article has introduced The EB-CDS Guide: Mucogingival/Esthetics based upon patient risk assessment. It provides the clinician with a new CDS tool that can be implemented immediately at the point of care, where it matters the most.

It is not the intention of this EB-CDS Guide to provide the means to triage each and every mucogingival situation. There will be clinical situations which present as exceptions with respect to any clinical decision support guides, decision-making frameworks, and clinical risk factors and modifiers. The goal of this EB-CDS guide is to augment the practitioner's professional expertise. It covers a majority of common risk factors and provides guidance, serving as a practical point-of-care framework for practicing clinicians to use today. The author believes that its use and the use of evidence-based, risk assessment frameworks like it can contribute substantially to improved patient care and outcomes.

The near future holds the promise of ever more robust, interactive, electronic point-of-care clinical decision support tools that will further optimize individual patient care outcomes. Evidence-based computer decision support systems are now being tested that will enable the dentist to better monitor or treat caries.<sup>38</sup> Dental professionals are encouraged to stay up-to-date with the exciting new developments in this vital emerging area of patient care.

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