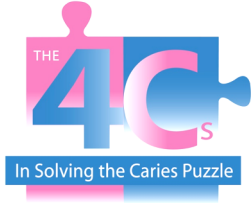


The 4Cs in Solving the Caries Puzzle



CAMBRA
Caries Detection & Assessment System (ICDAS)
Case-based protocol
Calcium/Phosphate & Fluoride

Objectives:

Engaging in this program, the participant will be able to:

- Execute a CAMBRA (risk assessment) within their practice protocol
- Utilize a Caries Detection System (according to the International Caries Detection Assessment System) to assess stages of the caries lesion
- Analyze Cases to individualize their risk level to guide appropriate therapies
- Implement and recommend a Calcium Phosphate Fluoride plan

Course Description:

This program introduces a suggested “caries risk assessment” survey to identify individual patient risk level for dental caries. Mapping a treatment plan is only successful when the dental team understands all factors that influence the caries pattern and prevalence based on medical history, lifestyle changes, behaviors and disease factors.

The program will preview several case studies that begin with CAMBRA and design a mapping to incorporate appropriate therapies and patient-applied practices to reverse early carious patterns. At the final segment of this seminar, the discussion will encourage the participants to inquire and share their successes with all latest remineralization products and how they plan to improve their day to day practice using evidence-based science.



Premier Dental Products Company is an approved
AGD/PACE program provider #216745
FAGD/MAGD Credit
Approval does not imply acceptance by a state or
provincial board of dentistry or AGD endorsement

Approval term is 6/01/10 through 5/31/2014

Course Outline

I. The New Paradigm in Preventive Dentistry

- a. Shift from a “repair model” to a “health-oriented model”
- b. Why do we resist change? How can we accomplish new protocols and gain staff acceptance?
- c. 80% of all dental caries occurs in only 20% of the U.S. Population
- d. Economic Burden: mean spending in dental care in adults ages 55-64
 - i. Spent est. 108 billion dollars in dental – half of this was treating dental caries
 - ii. Projection to \$180 billion within next 10 years.
- e. Balancing the “ethical” treatment decisions with “third party payment” choices?
 - i. ADA center for evidence-based decisions: www.ebd.ada.org/
- f. Achieving the goals set by “Healthy People 2010 and 2020” – U.S. Surgeon General Report

II. CAMBRA (Caries Management by Risk Assessment)

Defined: A caries management by risk assessment represents an evidence-based approach to preventing, reversing and treating dental caries.

- It is an estimation or prediction of an event that may occur in the future.

CAMBRA forms available by download from www.premusa.com/dental/seminars

A Collection of articles in the October 2007 and Oct/Nov 2011 issues:

<http://www.cdafoundation.org/library>

Assessment tool for ages 0 – 5:

<http://www.cdafoundation.org/library/docs/jour1007/ramos.pdf>

Assessment tool for ages 6 – adult:

<http://www.cdafoundation.org/library/docs/jour1007/featherstone.pdf>

Caries Risk Assessment from ADA website: <http://www.ada.org>

a. The CRIES BALANCE CHART

Proposed by Featherstone in 1999 - Recognized the caries process as:

- Multifactorial
- Balance between factors (BAD) **Pathological** and (SAFE) **Protective** factors
- Balance is delicate and swings either way several times daily in most people
- If Pathological factors outweigh the Protective factors, the risk is greater that caries will initiate/progress
- The **RISK FACTORS** tell us “HOW” it happened?

b. What clinicians **NEED** to know:

- i. Creating an individualized risk assessment on every patient
- ii. Evaluate early enamel changes using non-invasive detection
- iii. Becoming more proactive in reversing demineralized or carious lesions
- iv. Utilizing an evidence-based approach in selecting effective remineralization plans
- v. Building a “staff approach” in caries management for your practice setting

c. Implementation of CAMBRA is process in managing dental caries prevention:

- i. Initial patient visit – correlate to health/dental history documentation
- ii. Update on periodic visits to reassess current state of risk level

d. Minimally-invasive technology

- i. Diagnostics: Laser, infra-red fluorescence or light-induced fluorescence, digital radiography
- ii. Chairside tests: salivary, bacteria assays, oral cancer screening tools
- iii. Home-applied Rx or Professionally-applied remineralization therapies
- iv. Professional and home-applied (antibacterial) chemotherapeutics

e. Caries is a multi-factorial disease “process” that involves:

- i. Time, Microflora, Host and Diet
 - ✦ Current attention focused on **3** other dynamics in this model: **Salivary flow, saliva buffering capacity and fluoride exposure**
- ii. **Role of Saliva:**
 - ✦ Buffering capacity
 - ✦ Preserves integrity of dental and oral tissues
 - ✦ Antimicrobial activity
 - ✦ Immune surveillance
 - ✦ Natural reservoir for fluoride, calcium and phosphate ions
 - a. Fluoride is LESS effective in the absence of CA and P ions in saliva
- iii. **Impact of Fluoride:**
 - ✦ Supports natural remineralization
 - ✦ Inhibits bacterial metabolism
 - ✦ Inhibits demineralization
 - ✦ Promotes remineralization
 - ✦ Fluoridated drinking water adds a strong “protective value” on CAMBRA
 - ✦ Some bottled waters now contain fluoride – check bottles for labeling
 - a. Reference: Nelson T. “Consequences of Convenience” Dimensions of Dental Hygiene, Feb 2012: (10)2; 31-34. *Chart on page 32 of all bottled water*
 - ✦ **JADA Reprint on Professionally-applied Topical Fluoride:**
Executive Summary of Evidence-based Clinical Recommendations
(*in your course handouts* JADA 2006*)
 - a. Recommendations based on patient risk level
 - b. Patients classified as “low risk” receive no additional benefit with routine 2x/year fluoride applications (*in-office*)
 - c. **4 Minute fluoride application** is only acceptable therapy when gel/foam is used (1 minute is NOT recommended any longer)
 - d. Fluoride varnish is highly effective in caries prevention and suggested every 6 months (or less) for higher risk children

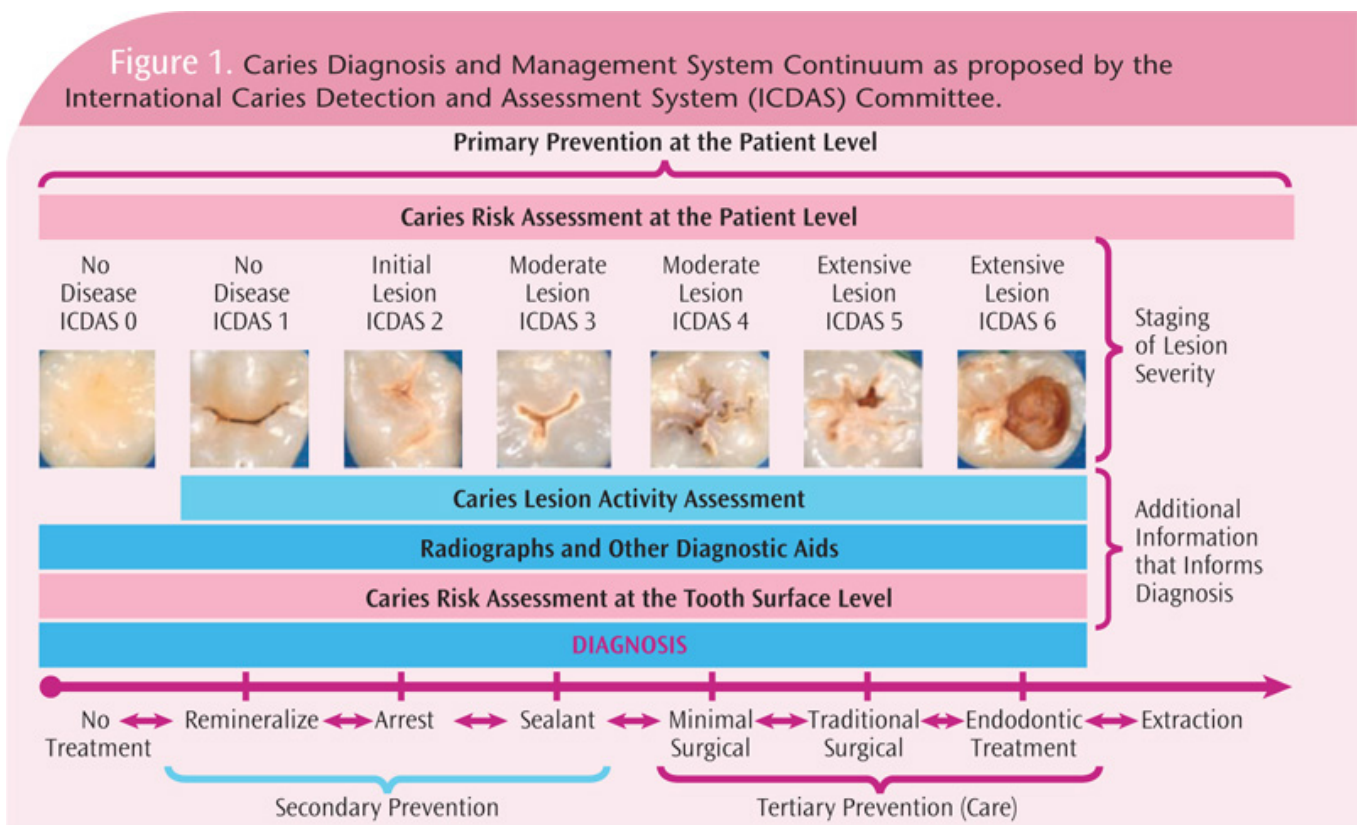
III. Review of Case Studies – utilizing CAMBRA and Evidence-based Protocol

- i. Review patient profile: medical and dental histories
- ii. Conduct CAMBRA survey to determine RISK LEVEL for dental caries
- iii. Assess the patient using radiographic survey, diagnostic technology and visual examination of the oral cavity/teeth
- iv. Determine active treatment including fluoride recommendations based on risk level

Instructions in Fluoride Varnish Application: Visit www.premusa.com and click on **Dental Tab/ Enamel Pro Fluoride Varnish tutorial** to observe technique in application

I	Visible only after drying	No enamel breakdown	1 Caries with <i>Or</i> Without Drying
II	Visible wet	No enamel breakdown	
III	Breakdown into dentine	Dentine initial caries	2 Moderate Enamel Caries
IV	Gray area showing through	Dentine involved Only 5%	
V	Cavitation into dentine	Dentinal caries	3 Distinct Cavitation Extensive
IV	Cavitation and breakdown	Severe breakdown	

Figure 1. Caries Diagnosis and Management System Continuum as proposed by the International Caries Detection and Assessment System (ICDAS) Committee.



Reprinted with permission from Elsevier: Zero DT, Ferreira Zandoná AG, Vail MM, Spolnik KJ. Dental caries and pulpal disease. *Dent Clin North Am.* 2011;55:29-46.

IV. **Visual Detection of Enamel and Dentin Changes:**

- a. International Caries Detection and Assessment System (ICDAS)
 - i. See above as the chart outlines changes with associated criteria
- b. ADA Caries Classification System – an alternative system for classifying changes that differentiate early to late stages of the carious process and grouping last four stages of lesion activity

c. **Visual inspection** of coronal aspect of the tooth

- i. Sound surface
- ii. Initial or Primary
 - ✦ No clinically detectable loss of surface
 - ✦ Pits/fissures: discoloration and rough spots but no “catch” – subsurface loss of minerals
 - ✦ Smooth surface: white or opaque area
 - ✦ **TREATMENT:** Remineralization!

d. **Use of Explorers for caries detection:**

- i. 62% sensitivity,
- ii. Eliminates the potential for lesion reversal by disrupting the intact surface layer
- iii. **Recommended use of explorers:**
 - ✦ Clean debris from fissures, along gingival margins and interproximal spaces
 - ✦ Confirm and assess cavitations
 - ✦ Feel margins and defects
 - ✦ Feel texture (roughness) of a white spot lesion
 - ✦ Evaluate previously-placed dental sealants

e. **Diagnostic Technology to evaluate early changes:**

- i. Laser fluorescence (**DIAGNOdent™ Caries Detection Aid** by KaVO®)
 - ✦ Detects up to 2mm/occlusal with 80 sensitivity
 - ✦ Requires a dry field; calibrated to a healthy tooth
 - ✦ Quantifies results from 0-99
- ii. Red-infrared Reflectance (**Midwest Caries I.D.™** by DENTSPLY Professional)
 - ✦ Detects occlusal and interproximal lesions up to 3mm. depth
 - ✦ 80% sensitivity for interproximal
 - ✦ 92% sensitivity for occlusal
 - ✦ Can be used in slightly wet field
 - ✦ Visible and audible signals: GREEN/sound structure; RED/demineralized structure
- iii. Quantitative Light –induced Fluorescence
 - ✦ Products with this source: (**QLF™** by Inspektor™, **SOPROLIFE™** by Acteon Group, **Spectra™ Caries Detection Aid** by Air Techniques®)
 - ✦ 61% sensitivity with detection on occlusal surfaces only
 - ✦ Spectra can be attached to laptop with handpiece; tracks bacterial presence by luminescence shown on monitor
 - ✦ SOPRALIFE is a dual intra-oral camera and caries detection system
- iv. Infrared Fluorescence combined with Photo thermal Radiometry
 - ✦ (**The Canary System™** by Quantum Dental Technologies)
 - ✦ Detection on occlusal and proximal surfaces
 - ✦ Approved in Canada and now awaiting FDA approval for use in the United States.
 - ✦ Can determine carious activity beneath existing restorations
 - ✦ Effective outcome measurement in conjunction with remineralization therapy

- v. AC Impedance Spectroscopy Technology – ACIST (**CarieScan PRO**)
 - ✦ First diagnostic device to measure changes in tooth mineral density
 - ✦ User – friendly in day to day practice with supplied disposable tips & barriers
 - ✦ Can be recorded directly to software for printed documentation
 - ✦ Caution with recent accounts of false positives (pending further information) 2012.

V. Remineralization Technologies:

ATTACHED CHART: Products formulated to strengthen enamel using Ca/P and Fluoride

- a. ACP: Amorphous Calcium Phosphate (ADA patented ACP)
- b. CPP-ACP: Casein Phosphopeptide; amorphous calcium phosphate (Recaldent)
- c. CSPS: Calcium Sodium Phosphosilicate (Novamin)
- d. TCP: Beta Tri-Calcium Phosphate

Classified by: Mechanism of Action, Solubility/Bioavailability and Professional Brand Products utilizing the technology

Chemistry	ACP Amorphous Calcium Phosphate ADA licensed ACP	CPP-ACP Casein Phosphopeptide - Amorphous Calcium Phosphate (Recaldent®)	CSPS Calcium Sodium Phosphosilicate (Novamin®)	TCP Beta Tri-calcium Phosphate
Mechanism of Action	Specialized salt compounds binds Ca/P ions until delivery (amorphous) No defined or crystalline structure	Casein binds to tooth surface & plaque until pH is lowered (acidic) This creates Ca/P ions to become available	Silica binds Ca/P until sodium elevates pH to free Ca/P ions	Blended beta tri-calcium phosphate encapsulates the Ca/P ions until reactive with saliva
Solubility & Bioavailability	Rapid delivery Highly soluble & Bioavailable Greatest fluoride uptake	Becomes soluble only during lowered pH/acidity More effective with inclusion of Fluoride	Becomes soluble when sodium buffers pH to release Ca/P ions	Low to moderate rate of solubility Highly structured crystalline form
Professional Products	Premier Dental ENAMEL PRO 5% F Varnish/ACP Pro Paste/ACP Na F Gel /ACP Discus (Philips) Day/Nite White/ACP Relief Oral Gel/ACP Arm & Hammer® Complete Care™ /ACP Enamel Care in Canada Bosworth Co. Aegis™ Sealant w/ACP Adhesives w/ACP	GC America MI Paste MI Paste Plus MI Fluoride Varnish Cadbury Trident chewing gum w/ Recaldent	DENTSPLY Professional NUPRO NuSolutions 5,000ppm GSK Sensodyne Repair & Protect	3M Vanish F varnish/TCP Clinpro 950/TCP Clinpro 5000/TCP

Caries Risk Assessment Form (Ages 0-6)

Patient Name:

Score:

Birth Date:

Date:

Age:

Initials:

		Low Risk (0)	Moderate Risk (1)	High Risk (10)	Patient Risk
Contributing Conditions					
I.	Fluoride Exposure (through drinking water, supplements, professional applications, toothpaste)	Yes	No		
II.	Sugary or Starchy Foods or Drinks (including juice, carbonated or non-carbonated soft drinks, energy drinks, medicinal syrups)	Primarily at mealtimes	Frequent or prolonged between meal exposures/day	Bottle or sippy cup with anything other than water at bed time	
III.	Eligible for Government Programs (WIC, Head Start, Medicaid or SCHIP)	No		Yes	
IV.	Caries Experience of Mother, Caregiver and/or Other Siblings	No carious lesions in last 24 months	Cariou lesions in last 7-23 months	Cariou lesions in last 6 months	
V.	Dental Home: established patient of record in a dental office	Yes	No		
General Health Conditions					
I.	Special Health Care Needs*	No		Yes	
Clinical Conditions					
I.	Visual or Radiographically Evident Restorations/Cavitated Cariou Lesions	No cariou lesions or restorations in last 24 months		Cariou lesions or restorations in last 24 months	
II.	Non-cavitated (incipient) Cariou Lesions	No new lesions in last 24 months		New lesions in last 24 months	
III.	Teeth Missing Due to Caries	No		Yes	
IV.	Visible Plaque	No	Yes		
V.	Dental /Orthodontic Appliances Present (fixed or removable)	No	Yes		
VI.	Salivary Flow	Visually adequate		Visually inadequate	
TOTAL:					

Instructions for Caregiver:

*Patients with developmental, physical, medical or mental disabilities that prevent or limit performance of adequate oral health care by themselves or caregivers.

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Caries Risk Assessment Form (Age >6)

Patient Name:

Score:

Birth Date:

Date:

Age:

Initials:

		Low Risk (0)	Moderate Risk (1)	High Risk (10)	Patient Risk
Contributing Conditions					
I.	Fluoride Exposure (through drinking water, supplements, professional applications, toothpaste)	Yes	No		
II.	Sugary or Starchy Foods or Drinks (including juice, carbonated or non-carbonated soft drinks, energy drinks, medicinal syrups)	Primarily at mealtimes		Frequent or prolonged between meal exposures/day	
III.	Caries Experience of Mother, Caregiver and/or other Siblings (for patients ages 6-14)	No carious lesions in last 24 months	Carious lesions in last 7-23 months	Carious lesions in last 6 months	
IV.	Dental Home: established patient of record, receiving regular dental care in a dental office	Yes	No		
General Health Conditions					
I.	Special Health Care Needs*	No	Yes (over age 14)	Yes (ages 6-14)	
II.	Chemo/Radiation Therapy	No		Yes	
III.	Eating Disorders	No	Yes		
IV.	Smokeless Tobacco Use	No	Yes		
V.	Medications that Reduce Salivary Flow	No	Yes		
VI.	Drug/Alcohol Abuse	No	Yes		
Clinical Conditions					
I.	Cavitated or Non-Cavitated (incipient) Carious Lesions or Restorations (visually or radiographically evident)	No new carious lesions or restorations in last 36 months	1 or 2 new carious lesions or restorations in last 36 months	3 or more carious lesions or restorations in last 36 months	
II.	Teeth Missing Due to Caries in past 36 months	No		Yes	
III.	Visible Plaque	No	Yes		
IV.	Unusual Tooth Morphology that compromises oral hygiene	No	Yes		
V.	Interproximal Restorations - 1 or more	No	Yes		
VI.	Exposed Root Surfaces Present	No	Yes		
VII.	Restorations with Overhangs and/or Open Margins; Open Contacts with Food Impaction	No	Yes		
VIII.	Dental/Orthodontic Appliances (fixed or removable)	No	Yes		
IX.	Severe Dry Mouth (Xerostomia)	No		Yes	
				TOTAL:	

Patient Instructions:

*Patients with developmental, physical, medical or mental disabilities that prevent or limit performance of adequate oral health care by themselves or caregivers.

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The following information provides instructions in the application of the previous Caries Risk Assessment Forms issued by the ADA

Indicate 0, 1 or 10 in the last column for each risk factor. If the risk factor was not determined or is not applicable, enter a 0 in the patient risk factor column. Total the factor values and record the score at the top of the page.

A score of 0 indicates a patient has a low risk for the development of caries. A single high risk factor, or score of 10, places the patient at high risk for development of caries. Scores between 1 and 10 place the patient at a moderate risk for the development of caries. Subsequent scores should decrease with reduction of risks and therapeutic intervention.

The clinical judgment of the dentist may justify a change of the patient's risk level (increased or decreased) based on review of this form and other pertinent information. For example, missing teeth may not be regarded as high risk for a follow up patient; or other risk factors not listed may be present.

The assessment cannot address every aspect of a patient's health, and should not be used as a replacement for the dentist's inquiry and judgment. Additional or more focused assessment may be appropriate for patients with specific health concerns. As with other forms, this assessment may be only a starting point for evaluating the patient's health status.

This is a tool provided for the use of ADA members. It is based on the opinion of experts who utilized the most up-to-date scientific information available. The ADA plans to periodically update this tool based on: 1) member feedback regarding its usefulness, and; 2) advances in science. ADA member-users are encouraged to share their opinions regarding this tool with the Council on Dental Practice.