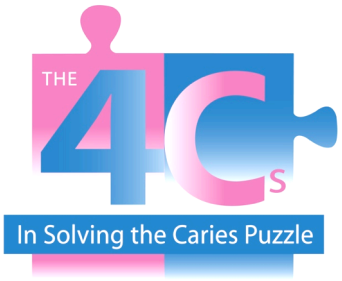
The 4Cs in Solving the Caries Puzzle



CAMBRA
Caries Detection & Assesment 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.

Academy of General Dentistry
PACE Program Approval for Continuing Education
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Approval term is 6/01/10 through 5/31/2014

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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) - *copies in your course handouts**

***Defined*:** A **ca**ries **m**anagement **b**y **r**isk **a**ssessment 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 CDA Journal:
http://www.cdafoundation.org/who_we_are/publications/cda_journal_october_2007
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
CAMBRA from ADA website: **http://www.ada.org/2752.aspx?currentTab=2**

a. The CARIES 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

ICDAS (International Caries Detection & Assessment System **ADA – Caries Classification System**

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

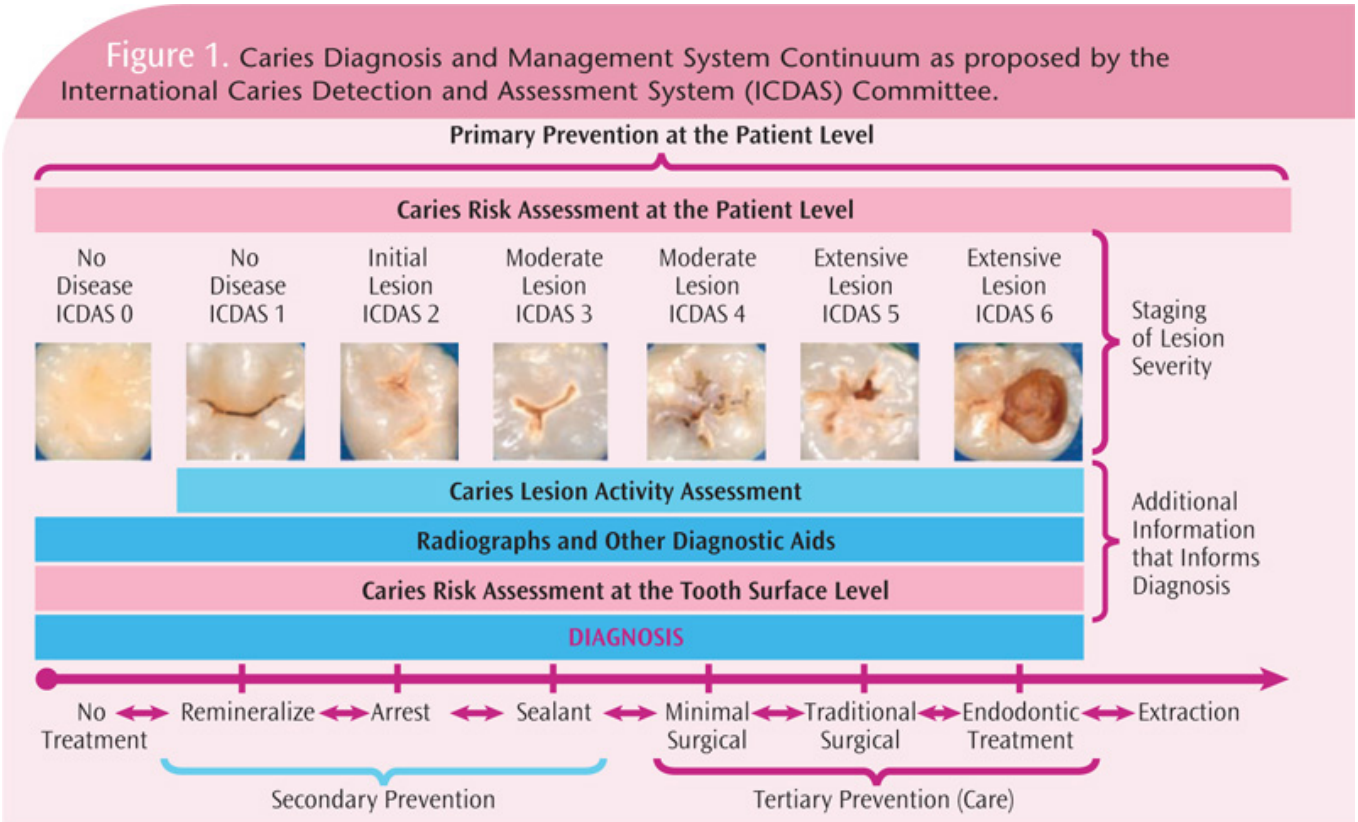

Figure 1. Caries Diagnosis and Management System Continuum as proposed by the International Caries Detection and Assessment System (ICDAS) Committee.

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

Dimensions of Dental Hygiene, September 2011

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

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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 (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.

ADA American Dental Association®