CareQuest Institute for Oral Health®

# CareQuest Cariology Curriculum Instructor Guide

## **Session 8:** The Oral Microbiome and Caries: From Dysbiosis to Prevention

### SESSION DETAILS

**Pedagogy:**
*Lecture:* Interactive Presentation
*In-Class Activity:*
1. Group Discussion (Think-Pair-Share)

**Length:** 60 mins

**Description:**
In this session, learners will explore how the quantity and quality of saliva influence oral health. This presentation will examine key factors such as acidity, pH levels, and buffering capacity, and how they shape the oral environment and microbiome. Learners will also consider patient-specific factors affect salivary function and contribute to caries risk.

**Learning Objectives:**
- Explain the functions of saliva in oral health.
- Differentiate how the quality and quantity of saliva affect patients' disease status.
- Describe how saliva influences caries risk.
- Identify factors that alter salivary flow and composition.

### PRE-SESSION PREP CHECKLIST

**Reading:**
- Nový, "Saliva and Biofilm-Based Diagnostics: A Critical Review of the Literature Concerning Sialochemistry," *Journal of Evidence Based Dental Practice*, Volume 14 Supplement, 2014: 27–32, https://doi.org/10.1016/j.jebdp.2014.04.004
- *Saliva and Oral Health* (4th ed.), Edgar *et al.*, chapters 2, 3, 5, 6, and 7

**Asynchronous:**
- CareQuest Institute's Self-Paced Course, "Managing Dental Caries: Evolving Strategies and Proven Techniques"

| SYNCHRONOUS CLASS TIMING LESSON PLAN |
|---|
| • Opening and Framing [5 minutes]<br>• Why Saliva Matters [10 minutes]<br>• Saliva Function and Variability [15 minutes]<br>• Saliva and Microbiome [15 minutes]<br>• Understanding Alkali and Acid Challenges<br>• Buffering Systems and Salivary Defense [2 minutes]<br>• Wrap Up |

| LESSON OUTLINE | INSTRUCTIONAL PROMPTS |
|---|---|
| **Opening and Framing**<br>[Lecture, Discussion, 8 minutes] | **Slide 1:** Welcome and why this topic matters.<br>**Slide 2:** Learning objectives (brief).<br>**Slide 3:** Think-Pair-Share (90 seconds). Prompt:<br>• What do you already know about saliva?<br>• What does saliva do?<br>• What happens when it is reduced?<br>• How might it affect disease?<br>Take 2 to 3 responses for each question. |
| **Why Saliva Matters**<br>[Lecture, 10 minutes] | **Slide 4:** Emphasize homeostasis, protection, repair, and maintenance. Connect to caries prevention<br>**Slide 5:** Define quantity as flow and quality as composition. Emphasize both influence risk.<br>**Slides 6–8:** Address slide notes. Highlight saliva complexity. |
| **Saliva Function and Variability**<br>[Lecture, 15 minutes] | **Slide 9:** Introduce variability in saliva and connect it to disease risk.<br>**Slides 10:** Explain how static is the baseline and dynamic is the repose to challenges.<br>**Slides 11–12:** Address slide notes. Explain antimicrobial role and emphasize no single factor prevents caries.<br>**Slides 13–15:** Keep protein discuss high level. Emphasize its supportive role.<br>**Slide 16:** Explain acid challenge and recovery.<br>**Slide 17:** Emphasize the importance of changes over time rather than single measurements. |

| | |
|---|---|
| | **Slide 18:** Reinforce about co-decision-making and incorporating saliva findings into patient discussions. |
| **Saliva and Microbiome**<br>[Lecture, 5 minutes] | **Slides 19–20:** Explain how saliva shapes the environment and connect to bacterial behavior.<br>**Slide 21:** Highlight key risk factors and include pH, ammonia, and buffering. |
| **Understanding Alkali and Acid Challenges**<br>[Lecture, 15 minutes] | **Slide 22:** Walk through how urea is converted into ammonia and how it raises pH.<br>**Slide 23:** Discuss the arginine pathway.<br>**Slide 24:** Connect alkali production to neutralizing acids. Relate this to maintaining a stable pH.<br>**Slide 25:** Reinforce the diversity of the oral microbiome.<br>**Slides 26–28:** Introduce the ecological plaque hypothesis. Connect environmental changes to disease progression.<br>**Slide 29:** Key takeaway: Alkali generation helps shift the environment toward balance and away from demineralization.<br>**Slide 30:** Position prevention as something that begins before visible disease.<br>**Slides 31–33:** Review critical pH and its role in demineralization. Connect patient factors that contribute to acidity and pH changes. Discuss baking soda as a supportive strategy. |
| **Buffering Systems and Salivary Defense**<br>[Lecture, 5 minutes] | **Slides 34–36:** Clarify the difference between pH and pKa. Identify bicarbonate as the primary buffering system.<br>**Slide 37:** Walk through the Stephan Curve.<br>**Slide 38–39:** Provide strategies to support saliva and buffering. Key takeaway: clinical strategies should focus on improving the oral environment, not just treating disease. |
| **Wrap Up**<br>[Lecture, 2 minutes] | **Slide 40 (final content slide):** Bring the discussion back to saliva's role in modifying the environment. Connect pH, buffering, and flow to caries risk. |