

## **The Bacteria Party**

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### **Learning Objectives:**

1. Demonstrate an understanding of the major factors contributing to periodontal degradation and propose viable options to mitigate associated risks.
2. To analyze clinical studies on the effectiveness of probiotics in reducing the risk of oral diseases such as dental caries, periodontitis and halitosis.
3. To assess the importance of integrating strain-specific probiotic bacteria into dental practice and explore their potential as an innovative approach in dentistry.
4. To critically evaluate the scientific evidence and literature supporting existing adjuvant therapy recommendations for oral health management.
5. Formulate effective strategies to implement patient-specific care plans, prioritizing the maintenance of a balanced and thriving oral microflora ecosystem.

- **The transition from oral health to disease, which occurs in oral dysbiosis, leads to a significant change in the oral microbiota composition and functions.**
- **Compared to healthy subjects, people affected by periodontal disease show considerably larger proportions of:**
  - The red complex (*Porphyromonas gingivalis*, *Tannerella forsythia*, *Treponema denticola*)
  - The orange complex species (including bacteria like *Fusobacterium nucleatum* and *Prevotella intermedia*) and
  - The purple complexin significantly lower proportions (comprising *Veillonella parvula* and *Actinomyces odontolyticus*) and *Actinomyces* species.
  - *Di Stefano M, Santonocito S, Polizzi A, Mauceri R, Troiano G, Lo Giudice A, Romano A, Mascitti M, Isola G. A Reciprocal Link between Oral, Gut Microbiota during Periodontitis: The Potential Role of Probiotics in Reducing Dysbiosis-Induced Inflammation. Int J Mol Sci. 2023 Jan 6;24(2):1084. doi: 10.3390/ijms24021084. PMID: 36674600; PMCID: PMC9867370.*

**Symbiosis:** Interaction between two different organisms living in close physical association, typically to the advantage of both.

**Dysbiosis:** A disruption in the homeostasis of the microbiome leading to an imbalance in the microflora.

#### **3 Types of Dysbiosis:**

- 1) Loss of beneficial bacteria
- 2) Overgrowth of potentially pathogenic bacteria
- 3) Loss of overall bacterial diversity

“The oral microbiome is established within a few minutes after birth and consists of stable and multi-species communities that engage in a dynamic equilibrium with the host system. Dental Caries, endodontic infections and periodontal disease are bacterially driven diseases that are caused by dysbiotic microbiomes”

- *Kumar PS. From focal sepsis to periodontal medicine: a century of exploring the role of the oral microbiome in systemic disease. J Physiol. 2017; 595(2):465-76. doi: 10.1113/JP272427.*

### **Why do we need Bacteria?**

- Help degrade food
  - Help make nutrients available
  - Neutralize toxins
  - They play an essential role in the defense against infections by protecting colonized surfaces from invading pathogens
- extensive research focused on interventions to restore microbial health and balance in the oral microbiome, including prebiotics, probiotics, and antimicrobial agents, as potential therapeutic approaches for treating and preventing oral dysbiosis and its associated diseases.

### **Bacteria and their Implications to Oral and Systemic Health:**

Mohanty, Rinkee; Asopa, Swati Joshi; Joseph, M. Derick; Singh, et al. Red complex: Polymicrobial conglomerate in oral flora: A review Journal of Family Medicine and Primary Care8(11):3480-3486, November 2019. doi: 10.4103/jfmipc.jfmipc\_759\_19z

**Question to consider:** Is complete eradication the answer?

### **Risk Assessment: How are you currently assessing the level of risk?**

#### **Initial assessment:**

#### **Anatomical Considerations:**

- Calculus
- Pocket depth
- CAL
- BOP
- Root morphology
- Tissue Integrity
- Access

#### **Genetics:**

- Tooth Shape
- Enamel
- Salivary Factors
- Immune response
- Taste
- Crown to root ratio
- Genetic predisposition to other systemic diseases

#### **Genetic Testing:**

- Brand new technology that tests a patient's genetic susceptibility to caries and or periodontal disease
- Genetic markers are ranked and weighted to ensure the identification of markers with the greatest impact on these conditions or diseases using the power of AI to analyze massive quantities of genetic material and extract only the most significant. This has not been done before in dentistry!
- The patient and dental professionals are notified when the results are ready and can be accessed in the portal for review
- Understanding our patient's Genetics can help identify interventions, and treatment options to reduce the patient's risk.
- Provides objective data to help identify risk before any clinical signs have manifested
- Only needed once in a lifetime as genetic risk is inherent and unchanging.

How could this change your treatment approach? How would this change the patient's attitude or priorities?



**Genetic**

- ✓ Determines if a patient is predisposed to dental caries or periodontal disease based on their genetic DNA.
- ✓ Only needed once in a lifetime as genetic predisposition does not change.
- ✓ Action is taken to prevent and change the potential outcome.



**Bacterial**

- ✓ Identifies the types of bacteria present in the mouth
- ✓ Helps understand the bacterial composition that could contribute to dental issues but does not identify genetic risk.
- ✓ Changes constantly and can be taken as needed.
- ✓ Action taken to change bacterial profile

What do we have available to us to help manage pathogenic bacteria?  
Does it consider the ecosystem of the oral microflora?

**What's in our tool kit? (Chairside & Home Care Options)**

**1. Chairside:**  
**Antibiotics:**

Pro	Cons
Treatment of Bacterial Infections	Decreased Bacterial Diversity
Saves Lives and Prevents complications	Selection of Resistant Bacteria
Management of Chronic Conditions	People do not take them correctly
Control of Infectious Diseases	Cannot be prescribed by an RDH
Improving Quality of Life	

**Laser Bacterial reduction**

- Delays re-colonization period
- Biostimulation promotes healing and improves post-operative comfort
- Targets biofilm and accretions that have migrated into the sulcular epithelium.
- Stimulation of ATP production
- Charges and excites the mitochondria of anaerobic bacterial cells which in turn take in more oxygen

**Hydrogen Peroxide and Diode laser:** Reference: *Disinfection Potential of 980 nm Diode Laser and Hydrogen Peroxide (3%) in "Critical Probing Depths" Periodontal Pockets: Retrospective Study, El Mobadder et al, 2022*

**Diode Laser and SRP:** Reference: *Jiang Y, Feng J, Du J, Fu J, Liu Y, Guo L, Liu Y. Clinical and biochemical effect of laser as an adjunct to non-surgical treatment of chronic periodontitis. Oral Dis. 2022 May;28(4):1042-1057. doi: 10.1111/odi.13847. Epub 2021 May 3. PMID: 33715262; PMCID: PMC9292540.*

**Utilizing a diode laser in dental hygiene practice – By Joy Raskie RDH Mag Jan 2023**

### **Patient Selection:**

- Patients with inflammation
- Patients with gingivitis
- Patients with periodontal disease
- Immunocompromised patients
- Periodontal maintenance appointments (3, 4 or 6 Month)
- Patients with risk factors
- To reduce the risk of bacteremia and aerosol risk
- Improved healing

#### **Gingivitis Diagnosis**

LBR + Prophylaxis + Irrigation & LBR

- LBR pre-treatment
- Prophylaxis
- H2O2 irrigation + LBR post treatment as required

#### **Periodontitis Diagnosis**

LBR + NSPT + Irrigation & LBR

- LBR full mouth
- Anesthesia as required
- Quad NSPT/SRP
- H2O2 irrigation
- LBR
- Re-eval in 6 weeks

#### **Periodontal Stability or Remission**

LBR + Periodontal Maintenance +  
Spot irrigation & LBR

- LBR
- Perio Maintenance
- Spot treat with H2O2 irrigation and LBR

### **Instrumentation Options;**

When selecting instruments, we should consider:

- Deposit size
- Deposit location
- Pocket shape
- Pocket depth
- Root anatomy
- Burnished calculus
- Functional safety of the instrument

## **2. At Home:**

**Power brushing:** Powered versus manual toothbrushing for oral health, Cochrane Study, Munirah Yaacon, June 17m 2014

- Objective:
  - To compare manual and powered toothbrushes in everyday use, by people of any age, in relation to the removal of plaque, the health of the gingivae, staining and calculus, dependability, adverse effects and cost.
- Results:
  - 51 trials involving 4624 participants provided data for meta-analysis
  - There was an 11% reduction in plaque at one to three months of use, and a 21% reduction in plaque when assessed after three months of use. For gingivitis, there was a 6% reduction at one to three months of use and an 11% reduction when assessed after three months of use

### **Dentifrices:**

**Stannous Fluoride:** Ramji et al. J Dent Res (Spec Iss A) 2024; 103: Abstract 2509.

- SnF2 treatment shifted oral microbiomes in peri-implant mucositis subjects toward healthy
- A 4-week SnF2 toothpaste treatment reduced the relative abundance of: Fusobacterium, Porphyromonas, Treponema, Prevotella, etc
- This change to the dental plaque microbiome composition is consistent with improved clinical signs and symptoms

### **1.1% Sodium Fluoride:**

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Urquhart O, Tampi MP, Pilcher L, et al. Nonrestorative Treatments for Caries: Systematic Review and Network Meta-analysis. J Dent Res 2018;22034518800014

- 5,000-ppm F (1.1% NaF) toothpaste or gel was effective for arresting or reversing noncavitated occlusal, approximal, and noncavitated and cavitated root carious lesions on primary and/or permanent teeth

Evidence-based clinical practice guideline on nonrestorative treatments for carious lesions Slayton, Rebecca L. et al. The Journal of the American Dental Association, Volume 149, Issue 10, 837 - 849.e19

- To arrest or reverse noncavitated and cavitated carious lesions on root surfaces of permanent teeth, the expert panel suggests clinicians prioritize the use of 5,000 parts per million fluoride (1.1% NaF) toothpaste or gel

### **Improving Homecare tools and options:**

#### ***Disclosing***

- Disclosing agents are excellent tools for educating patients about biofilm
- Disclosing solution with two colours such as BioClear Dual Color demonstrates:
  - Plaque 24 hours or less is stained pink
  - Plaque 24 and older is stained blue
- Ideally added for all patients with periodontal and caries risk

#### ***Interdental Brushes***

- To effectively remove plaque and prevent gum inflammation, cavities and bad breath, interdental cleaning is recommended daily. There are many available tools such as: floss, picks and interdental brushes.

J Clin Periodontol 2015; 42 (Suppl. 16): S71–S76 doi: 10.1111/jcpe.12366

- Flossing vs. Interdental Brushes Results: Flossing cannot be recommended other than for sites of gingival and periodontal health, where inter-dental brushes (IDBs) will not pass through the interproximal area without trauma. Otherwise, IDBs are the device of choice for interproximal plaque removal.
- It is crucial to ensure you select the correct size and tool to improve oral health outcomes

### **TePe IDB are available in a variety of sizes:**

- The range offers an option for everybody in multiple sizes, two bristle textures, and two handle lengths with a straight or angled brush head.
  1. Original:
    - Ideal for patients with healthy gums, gingivitis, and periodontal disease
    - Available in 9 ISO sizes.
    - Smaller brushes have bendable heads and larger have bendable wires.
  2. Extra Soft:
    - ideal for patients with severely inflamed gingiva, post-surgery, lichen planus, implants, etc.
    - Available in 6 ISO sizes
  3. Angle:
    - Angle head is ideal for molars and bicuspid
    - Longer handle
    - Ideal for patients with healthy gums, gingivitis, and periodontal disease
    - Available in 6 ISO sizes

### **Why TePe Brushes:**

- Eco-friendly (80% less CO<sub>2</sub>)
- 98% filament coverage of the coated, round wire
- Ergonomic and flexible handle
- Variety of sizes and handle options
- Improved oral health outcomes and improved patient satisfaction

### **When to recommend IDB or Easy-Picks to patients with:**

- Gingivitis, Periodontal disease
- Implants, crowns and bridges
- Unable to floss
- Open contacts
- High caries risk
- Moderate to heavy biofilm
- Dry mouth
- Embrasure spaces
- Orthodontic

#### **Easy-Picks**

- Alternative to IDB
- Easy pick for an easy and efficient way to clean between teeth.
- It is flexible, has an easy non-slip grip, long working length to easily clean the lingual surface
- The silicone coating cleans efficiently between the teeth while touching 360 degree of the surface area.
- Comfortable feeling on the gums.
- Available in three sizes and two package configurations
- Patient selection: healthy, gingivitis, periodontal patients

Kotsakis GA, Lian Q, Ioannou AL, Michalowicz BS, John MT, Chu H. A network meta-analysis of interproximal oral hygiene methods in the reduction of clinical indices of inflammation. *J Periodontol.* 2018 May;89(5):558-570. doi: 10.1002/JPER.17-0368. PMID: 29520910; PMCID: PMC5984142.

- “BNMA enabled us to quantitatively evaluate IOH aids and provide a global ranking of their efficacy. Interdental brushes and water-jets ranked high for reducing gingival bleeding, whereas toothpicks and floss ranked last.”

#### **Stimmie:**

- Effectively dislodges food particles from tight interdental spaces
- Precisely removes subgingival plaque and biofilm around teeth and restorations
- Stimulates gingival papillae to enhance microcirculation and promote tissue health

#### **When to recommend Stimmie:**

- When patients are non-compliant with other oral care aids
- When interdental aids are not enough
- When patients can use it as a post-operative solution to surgical procedures
- Patients with poor dexterity and difficulty flossing
- Kids and adults with orthodontic appliances

#### **Who benefits from gum stimulation?**

Patients with a clinical presence of:

- Copious biofilm around the gingival margins
- Periodontal pockets on the buccal, lingual and palatal aspects
- Gingival hyperplasia and hypertrophy
- Furcations
- Pericoronitis
- Severe crowding
- Open contacts
- Gingival Recession

#### **Perio Protect:**

Benefits of 1.7% Hydrogen Peroxide Perio Gel

- 1) Debrides Matrix: Removes dead tissue and debris from the periodontal pockets

- 2) Debrides Bacterial Cell Walls: Disrupts the outer layers of bacteria, reducing their viability.
- 3) Oxygenates the Pockets: Creates an oxygen-rich environment, inhibiting anaerobic bacteria growth
- 4) Safe for Pregnancy and Nursing: Hydrogen Peroxide is naturally occurring in breast milk.
- 5) No Allergic Reactions: Naturally produced in the body.

#### **Perio Tray Therapy Benefits**

- Decreases bleeding, inflammation, pocket depths
- Uses a 1.7 % Hydrogen Peroxide gel in custom trays that create a vacuum seal
- Easy to use @10-15 min/day
- Customized and comfortable
- Leads to optimal restorative results (Implants too!)
- Whitens teeth
- Freshens breath
- Prevents (re)infection

#### **Patient Selection:**

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Gingivitis patients with 10+ BOP</li> <li>• Patients with a Periodontitis diagnosis</li> <li>• Perio maintenance patients</li> <li>• Patients with implants, crowns and/or veneers</li> <li>• Prevention</li> <li>• Medically compromised patients</li> </ul> | <ul style="list-style-type: none"> <li>• Halitosis patients</li> <li>• Cosmetic/whitening patients</li> <li>• Patients identified as high-risk for caries or periodontal disease</li> <li>• Geriatric patients</li> <li>• Patients who smoke</li> </ul> |
|--|---|

Marshall MV, Cancro LP, Fischman SL. Hydrogen peroxide: a review of its use in dentistry. *J Periodontol.* 1995 Sep;66(9):786-96.

Dunlap T, Marshall M, Costerton J, Schaudinn C, Sindelar B, and Cotton J. Subgingival Delivery of Oral Debriding Agents. [The Journal of Clinical Dentistry 2011;22:149-158.](#)

Putt M and Proskin H. Custom Tray Application of Peroxide Gel as an Adjunct to Scaling and Root Planing in the Treatment of Periodontitis: Results of a Randomized, Controlled Trial after 6 Months. [The Journal of Clinical Dentistry. 2013;24:100-107.](#)

#### **Oral Probiotics**

- Can maintain a healthy balance in the mouth while also colonizing in the gut to get the systemic effect.
- *L. reuteri* DSM 17938 is one of the most studied probiotic strains in the world. It is a strong producer of the antimicrobial substance reuterin.
- BioGaia Prodentis® contains the probiotic strains *L. reuteri* ATCC PTA 5289 and *L. reuteri* DSM 17938.
  - *L. reuteri* DSM 17938 was isolated from human breast milk and has anti-microbial properties.
  - *L. reuteri* ATCC PTA 5289 was isolated from human saliva and is the anti-inflammatory strain; it inhibits inflammatory cytokines.
- Clinical studies have shown that:
  - *L. reuteri* is an adjunct to SRP, it reduces the number of oral bacteria and the number of obligate anaerobes
  - *L. reuteri* ATCC PTA 5289 has a strong inhibitory effect on periodontal pathogens, such as:
    - *Fusobacterium nucleatum*,
    - *Porphyromonas gingivalis*,
    - *Prevotella intermedia*,
    - *Actinobacillus actinomycetemcomitans*, in vitro.

Indications	<i>L. reuteri</i> ATCC PTA 5289	<i>S. Salivarius</i> K12	<i>S. Salivarius</i> M18	<i>S. uberis</i> KJ2
	<i>L. reuteri</i> DSM 17938			<i>S. oralis</i> KJ3 <i>S. rattus</i> JH145
Gingivitis	HIGH	-	LOW	-
Periodontitis	HIGH	-	LOW	-
Implantitis	HIGH	-	-	-
Caries	MODERATE	-	MODERATE	LOW
Halitosis	LOW	LOW	LOW	-
Candida	MODERATE	LOW	-	-
ENT	LOW	MODERATE	-	-

	Probiotic Bacteria	Pet
Group	Lactic acid bacteria	Animal
Genus	<i>Limosilactobacillus</i>	Mammal
Species	<i>Limosilactobacillus reuteri</i>	Dog
Strain	<i>L. reuteri</i> ATCC PTA 5289	Great Dane

### Patient Selection

- Healthy
- Gingivitis
- Periodontitis
- Implant
- Halitosis
- Caries
- Orthodontic
- Safe for Diabetics, pregnancy and many more patients

- Burton JP, Chilcott C, Moore CJ et al. J Appl Microbiol. 100: 754-64 (2006); Burton JP, Chilcott C, Tagg J. Oral Dis 11(S1): 29-31 (2005); Burton JP, Wescombe PA, Moore CJ et al. Appl Environ Microbiol 72: 3050-53 (2006)
- Stensson M, Koch G, Coric S, Abrahamsson TR, Jenmalm MC, Birkhed D, Wendt LK. Oral administration of Lactobacillus reuteri during the first year of life reduces caries prevalence in the primary dentition at 9 years of age. Caries Res. 2014;48(2):111-7. doi: 10.1159/000354412. Epub 2013 Nov 29. PMID: 24296746.
- Martin-Cabezas R, Davideau JL, Tenenbaum H, Huck O. Clinical efficacy of probiotics as an adjunctive therapy to non-surgical periodontal treatment of chronic periodontitis: a systematic review and meta-analysis. J Clin Periodontol. 2016 Jun;43(6):520-30. doi: 10.1111/jcpe.12545. Epub 2016 May 7. PMID: 26970230.
- Garban F, Guyard A, Labussière H, Bulabois CE, Marchand T, Mounier C, Caillot D, Bay JO, Coiteux V, Schmidt-Tanguy A, Le Niger C, Robin C, Ladaïque P, Lapusan S, Deconinck E, Rolland C, Foote AM, François A, Jacquot C, Tardivel R, Tiberghien P, Bosson JL; Evaluation of the Efficacy of Platelets Treated With Pathogen Reduction Process (EFFIPAP) Study Group. Comparison of the Hemostatic Efficacy of Pathogen-Reduced Platelets vs Untreated Platelets in Patients With Thrombocytopenia and Malignant Hematologic Diseases: A Randomized Clinical Trial. JAMA Oncol. 2018 Apr 1;4(4):468-475. doi: 10.1001/jamaoncol.2017.5123. PMID: 29392283; PMCID: PMC5885167.

### What is your Protocol?

Current Options in my office	Protocol of my dreams...

Thank you:

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