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<https://doi.org/10.5281/zenodo.18470156>Available online at: <http://www.iajps.com>*Review Article***A REVIEW ON ORAL CARE**Ms. Arifa Banu<sup>1</sup>, Sania Naaz<sup>2</sup>, Saboor Arshi<sup>2</sup>, Aaine Ashfaq<sup>2</sup>, Noor Jaha Begum<sup>2</sup>

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**Abstract:**

*Oral health is essential for overall well-being, with dental caries, periodontal diseases, and oral lesions among the most common global health problems. This review covers the structure and function of teeth, the prevalence of oral diseases globally and in India, and the importance of oral hygiene practices like brushing, flossing, and rinsing. Preventive measures, including fluoride use, healthy diet, oral health education, and early interventions, help reduce disease burden. Management focuses on individualized treatment, mechanical and chemical therapies, and regular follow-up. Common oral care products, such as fluoride toothpaste, chlorhexidine rinses, antiseptic mouthwashes, interdental aids, saline rinses, and dry-mouth relief gels, support prevention and treatment. Recent innovations, including automated and smart toothbrushes, oral microbiome-based therapies, photodynamic systems, advanced water flossers, and bioactive toothpastes, are improving oral care outcomes and quality of life.*

**Keywords:** Oral health, dental caries, periodontal disease, oral hygiene, fluoride, oral care products, xerostomia, interdental cleaning, automated toothbrushes, oral microbiome, photodynamic therapy, preventive dentistry.

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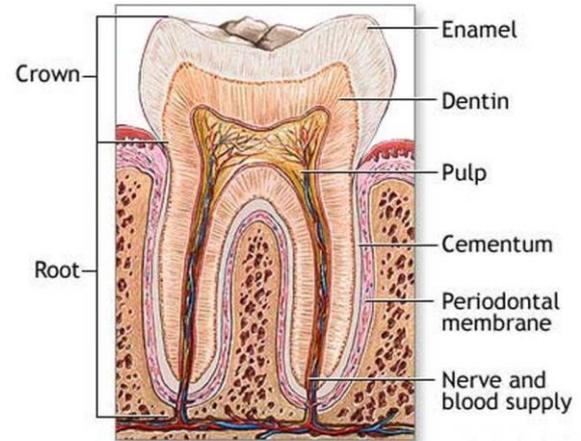
**INTRODUCTION:**

Oral health is an essential component of overall health and well-being and needs to be cared for throughout a person's lifetime. An individual's oral health status is largely determined by the presence or absence of dental caries and periodontal disease, along with the level of oral hygiene maintained. Dental caries and periodontal infections are among the most common and serious oral health problems affecting populations worldwide. Improving oral health mainly depends on reducing dental plaque, which plays a key role in the development of both caries and periodontal diseases. Effective prevention and control of dental caries, periodontal conditions, and various oral mucosal lesions can be achieved through simple daily practices such as brushing the teeth twice a day with fluoride-containing toothpaste and cleaning between the teeth using dental floss.

The aim of this review is to provide a comprehensive overview of oral health by explaining its meaning, scope, and importance in our life. This review also aims to examine the global burden of oral diseases, with particular attention to their social, economic, and quality-of-life impacts.

**STRUCTURE AND FUNCTIONS OF HUMAN TOOTH:****Structure:**

- A tooth consists of two main anatomical parts: the crown and the root. The crown is visible in the oral cavity, while the root is embedded in the alveolar bone of the maxilla and mandible and is attached by the periodontal ligament.
- The gingiva surrounds the cervical region of the tooth, and the cemento-enamel junction (CEJ) marks the transition between the enamel-covered crown and the cementum-covered root.
- Structurally, dentin forms the bulk of the tooth and surrounds the pulp, which contains nerves, blood vessels, and connective tissue.
- The crown presents five surfaces: facial (labial or buccal), lingual or palatal, mesial, distal, and occlusal. Teeth are composed of specialized tissues designed to withstand masticatory forces. Enamel, the hardest tissue in the body, covers the crown, while dentin provides structural support.
- The pulp maintains tooth vitality, and cementum covers the root, anchoring the tooth to the alveolar bone via the periodontal ligament.



**FIGURE 1 : STRUCTURE OF HUMAN TOOTH [50]**

**Functions:**

- **Mastication and digestion:** Teeth mechanically break down food, aiding bolus formation, swallowing, digestion, and nutrient absorption.
- **Speech:** Teeth assist in sound articulation and proper airflow, contributing to clear phonation.
- **Facial support and aesthetics:** Teeth maintain facial height and support the lips and cheeks, influencing facial appearance.
- **Occlusal function:** A functional dentition (~20 occluding teeth) is essential for efficient chewing, occlusal stability, and patient satisfaction.
- **Additional roles:** Teeth also contribute to airway support, coordinated breathing, and overall oral physiology.

**ORAL DISEASES STATISTICS GLOBALLY:**

- Oral diseases affect nearly 3.7 billion people worldwide, making them among the most common global health problems.
- Untreated dental caries in permanent teeth is the most widespread oral condition, affecting over 2.3 billion people globally.
- Severe periodontal (gum) disease affects approximately 796 million individuals worldwide.
- Untreated dental caries in primary teeth affects about 532 million children globally.
- Complete tooth loss (edentulism) was reported in around 267 million people worldwide in 2017.

- Overall, oral diseases affect nearly 45% of the global population, with little reduction in their burden over recent decades.

#### ORAL DISEASES STATISTICS IN INDIA:

- Oral diseases continue to be a major public health concern in India, with a large proportion of the population affected by dental caries and periodontal diseases.
- Systematic reviews indicate that nearly 54% of the Indian population, ranging from 3 to 75 years of age, is affected by dental caries.
- The prevalence of dental caries shows marked regional differences, with higher rates reported in western India (approximately 72%) and lower rates in eastern regions (around 36%).
- Periodontal conditions are highly prevalent, with studies reporting rates ranging from moderate levels (about 15%) to very high levels (up to 90%) among adult and elderly populations.
- Community-based studies among older adults report periodontal disease prevalence of approximately 15–17%, with differences observed across demographic groups.
- National data indicate that periodontal disease affects a substantial proportion of adults (around 80–89% in certain age groups), and complete tooth loss is common among the elderly.

#### COMMON ORAL DISEASES:

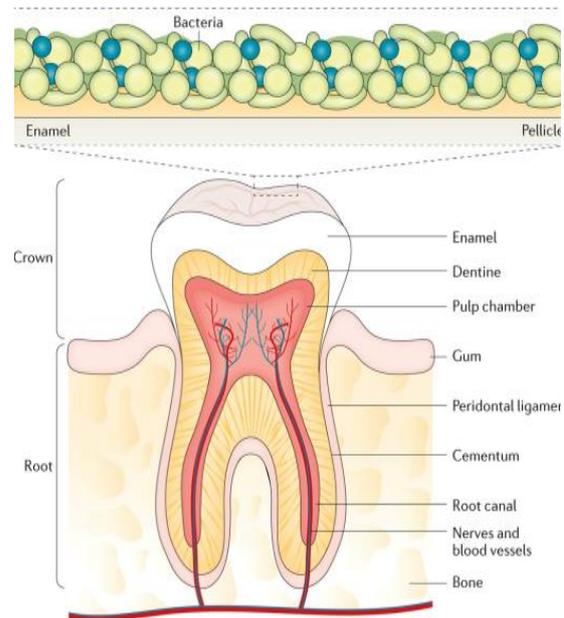
The most common Oral Diseases are

**Dental Caries:** Dental caries is defined as the localized breakdown of vulnerable dental hard tissues caused by acids produced during bacterial fermentation of dietary carbohydrates.

Clinical Features:

- Dental pain
- Observable cavities, pits, or perforations on the tooth surface.
- Discoloration of the tooth, appearing as white, brown, or black stains on any part of the tooth surface.
- Halitosis (bad breath)

- Systemic and local symptoms such as fever, chills, dental abscess formation, and restricted mouth opening (trismus).



**FIGURE 2: DENTAL CARIES [51]**

**Periodontal Diseases:** Periodontal diseases are among the most prevalent chronic inflammatory conditions affecting the oral cavity and represent a significant global public health challenge. These diseases, encompassing gingivitis and periodontitis, are primarily initiated by dental plaque biofilm and mediated by the host inflammatory and immune responses.

Clinical Features:

- In the early stage (gingivitis), the disease is characterized by gingival erythema, edema, and bleeding on probing or during routine oral hygiene procedures, usually without pain or loss of attachment.
- Gingival tissues may appear shiny and swollen, reflecting inflammatory changes confined to the soft tissues.
- Patients may report persistent halitosis, unpleasant taste, and increased tooth sensitivity due to root exposure.
- Advanced stages are characterized by progressive alveolar bone loss, leading to increased tooth mobility and pathological tooth migration.

## Stages Of Gum Disease

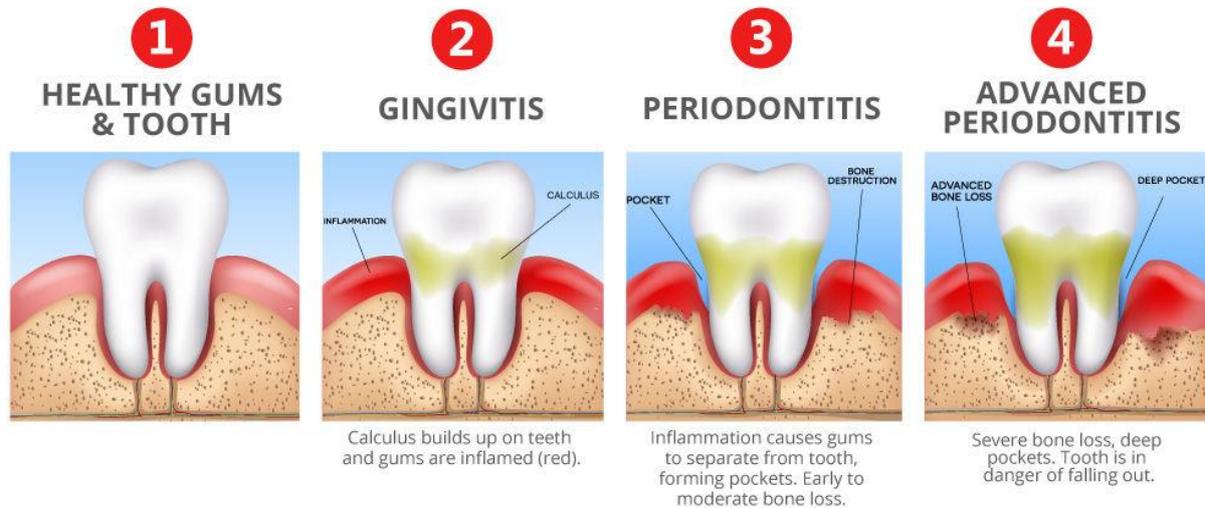


FIGURE 3: PERIODONTAL DISEASE [52]

**Dental Abscess:** A dental, or dentoalveolar, abscess is defined as a localized accumulation of pus within the alveolar bone at the root apex of a tooth. These abscesses typically arise secondary to dental caries, trauma, extensive restorations, or unsuccessful root canal therapy.

Clinical Features:

- Pain, swelling, and erythema are usually confined to the affected tooth in the early stages.
- Common clinical signs include fever, intraoral and extraoral swelling, redness, and tenderness on palpation.
- In rare cases, dental abscesses may spread to deep neck spaces or descend into the mediastinum, resulting in necrotizing mediastinal abscesses.

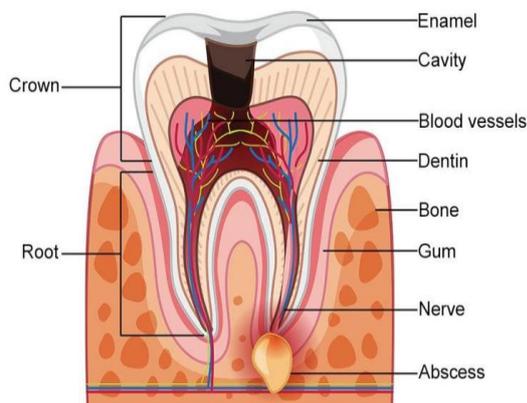


FIGURE 4: DENTAL ABSCESS [53]

**Bleeding Gums:** Bleeding gums are among the most frequently encountered conditions affecting the oral cavity.

Bleeding of the gums is usually a sign of a slowly progressing periodontal condition, which can extend to involve the alveolar bone supporting the teeth and may eventually lead to tooth loss if left untreated.

Clinical features:

- Gum disease may start silently, often without noticeable pain, making early detection difficult.
- Persistent bad breath (halitosis) that does not improve with regular oral hygiene .
- Gums that are red, swollen, or tender to touch .
- Bleeding gums during brushing or flossing, even when done gently .
- Receding gums, causing teeth to appear longer than normal .
- Loose or shifting teeth due to weakening of supporting structures .
- Pain or discomfort when chewing, indicating possible advanced gum disease .



FIGURE 5: BLEEDING GUMS [67]

**Edentulism:** Edentulism, the complete loss of natural teeth, is a significant adverse oral health outcome that affects millions worldwide (WHO, 2022). It is one of the most prevalent disabling oral health conditions globally, often causing substantial functional limitations and psychosocial impacts. The main causes of complete tooth loss include untreated dental caries, advanced periodontal disease, and, in some cases, dental trauma.

**Clinical Features:**

- A diet low in fruits, vegetables, fiber, and carotene, combined with high intake of cholesterol and saturated fats, along with a high prevalence of obesity, may increase the risk of cardiovascular diseases and gastrointestinal disorders.
- There is a higher incidence of chronic inflammatory changes in the gastric mucosa, upper gastrointestinal and pancreatic cancers, as well as an increased prevalence of peptic or duodenal ulcers ..
- Tooth loss is associated with reduced daily functioning, lower physical activity, and diminished physical aspects of health-related quality of life.



**FIGURE 6: EDENTULISM[68]**

**PREVENTION AND MANAGEMENT OF ORAL DISEASES:**

Oral health plays a crucial role in maintaining overall health, well-being, and quality of life. Implementing effective preventive strategies is essential to minimize oral health issues.

**Prevention:**

- ✓ **Personal Oral Hygiene:** Brushing twice daily with fluoridated toothpaste and using floss or interdental brushes effectively reduce dental plaque and the risk of caries.
- ✓ **Dietary Practices:** Limiting free sugars in processed foods and sweetened drinks reduces caries risk, while a balanced diet and water as the main beverage support overall oral health.
- ✓ **Fluoride Interventions:** Community water fluoridation and professional fluoride

applications are cost-effective strategies that significantly lower caries prevalence.

- ✓ **Oral Health Education:** Public awareness programs promote preventive practices across all age groups.
- ✓ **Shared Risk Factors:** Reducing tobacco use, excessive alcohol, and high sugar intake benefits both oral and general health.
- ✓ **Primary Care Training:** Educating healthcare providers on early detection, prevention, and referral improves access to oral care.
- ✓ **Life-Course Interventions:** Early childhood fluoride varnishes, dietary counseling, and adult preventive programs effectively reduce the cumulative burden of oral diseases.

**Management:**

- ✓ **Dental Caries Management:** Effective caries management requires a combination of strategies, including risk assessment, lesion control, and restoration of damaged teeth. Modern approaches focus on individualized treatment plans based on each patient's risk factors and severity of decay.
- ✓ **Periodontal Disease Treatment:** Gum disease is managed using both non-surgical and surgical methods to remove harmful bacteria and preserve gum health. Initial treatment usually involves mechanical cleaning, such as scaling and root planing, to remove plaque and tartar.
- ✓ **Maintenance and Follow-Up:** Long-term success relies on regular follow-up care. Post-treatment monitoring, professional cleanings, and reinforcement of oral hygiene habits help prevent disease recurrence.
- ✓ **Holistic Oral Health Care:** Managing oral diseases also supports overall health. For example, treating gum disease can improve blood sugar control in diabetic patients, highlighting the connection between oral care and general health.

**ORAL CARE PRODUCTS:** Oral care products are used in the treatment of various oral diseases

**TOOTHPASTES:**

- ✓ Toothpaste is used to clean teeth and keep them healthy. It is available in both paste and gel forms. Although different toothpastes are made for different purposes, most of them contain some common ingredients. These usually include abrasives to remove plaque

and stains, fluoride to strengthen teeth and prevent cavities, and detergents to help spread the paste and produce foam during brushing.

- ✓ It usually contains fluoride compounds, such as sodium fluoride or sodium monofluorophosphate, which help strengthen tooth enamel and protect against cavities. Some toothpastes also include active ingredients that are slowly released to support better oral health.

#### **MOUTH WASHES:**

- ✓ Antimicrobial mouthwashes help reduce dental plaque by controlling the biofilm on teeth, which can lower the risk of oral diseases caused by plaque, especially gum (periodontal) diseases.
- ✓ Chemicals used in commercial mouthwashes, such as fluoride, chlorhexidine, essential oils, and cetylpyridinium chloride, are effective in reducing bacterial plaque on teeth and decreasing gum inflammation.
- ✓ Chlorhexidine on its own is not very effective in treating advanced periodontal disease. This suggests that mouthwashes should mainly be used to prevent early gum disease, such as gingivitis, and that at all stages they should be used together with toothbrushing and interdental cleaning, not as a replacement.
- ✓ Several herbal extracts, including clove oil, green tea, Aloe vera, *Punica granatum*, and white oak bark, have been shown to provide therapeutic benefits in the mouth when used as mouthwashes.

#### **MOUTH SPRAYS:**

- ✓ Mouth spray, also called a mouth freshener spray, is used to reduce dryness in the mouth and improve breath freshness. Like mouth rinses, mints, and breath-freshening candies,
- ✓ It helps moisten the mouth and cover bad breath, but the effect lasts only for a short time, usually about 4 to 6 hours.
- ✓ Mouth spray helps prevent and relieve dry mouth by stimulating saliva production.

#### **TOOTH POWDERS:**

- ✓ Dentifrices are products used to maintain oral hygiene, keep the mouth fresh, and help prevent tooth decay.
- ✓ Toothpowder is commonly used for oral care because it is affordable and there is a common belief that locally made herbal products are beneficial for teeth and gums.
- ✓ They are prepared tooth powder using various materials, including bones, hooves, and horns of certain animals, as well as crab, oyster, and murex shells, and eggshells.
- ✓ Natural tooth powders often contain ingredients such as sea salt, which acts as an

abrasive, natural chalk, and essential oils like peppermint, eucalyptus, and wintergreen.

#### **FLUORIDE GELS:**

- ✓ Fluoride gels are topical dental products containing a high amount of fluoride that are used to help prevent tooth decay. They usually contain 1.23 % acidulated phosphate fluoride (APF) or sodium fluoride. These gels are most often applied by dental professionals using trays, but some types can also be used at home under a dentist's guidance.
- ✓ A meta-analysis found that children and adolescents treated with professionally applied fluoride gels developed fewer cavities than those who did not receive the treatment.

#### **CHEWING GUMS:**

- ✓ Sugar-free chewing gums increase saliva production, which helps balance acids in the mouth, remove food particles, and protect the tooth surface.
- ✓ Chewing gums that contain xylitol limit the growth of harmful bacteria such as *Streptococcus mutans*, thereby reducing the risk of dental caries.
- ✓ When used regularly after meals, chewing gum can contribute to plaque control and support enamel remineralization.
- ✓ However, chewing gum serves only as a supportive measure and cannot replace proper oral hygiene practices like brushing and flossing, as recommended by the American Dental Association.

#### **TONGUE SCRAPERS:**

- ✓ Mechanical tongue cleaning is an important part of daily oral hygiene because most bad breath is caused by bacteria present on the tongue that produce volatile sulfur compounds (VSCs).
- ✓ It helps remove harmful bacteria from the tongue surface.
- ✓ Tongue cleaning also clears food particles and other debris that accumulate on the tongue.
- ✓ Regular tongue cleaning reduces bad breath and helps eliminate dead cells, improving overall oral cleanliness.

#### **RECENT INNOVATIONS IN ORAL CARE PRODUCTS:**

Recent technological advances in oral hygiene are as follows

- ❖ **Automated Toothbrushing Systems:**
- ✓ Modern automated brushing devices clean plaque evenly and effectively, without needing much user skill or effort.
- ✓ Like many manual tools, toothbrushes now have electric versions. These electric

toothbrushes are designed to remove plaque and food particles from teeth, helping to prevent dental problems.

- ✓ A powered toothbrush is a device that runs on electricity or batteries. It has a handle with a motor that moves the brush head and its bristles quickly to clean the teeth.
- ❖ **Smart and Connected Toothbrush Platforms:**
- ✓ Smart toothbrush technologies integrate embedded sensors, wireless connectivity, and companion software to capture brushing metrics and provide real-time feedback to users.
- ❖ **Oral microbiome-based therapies:**
- ✓ New research is focusing on improving oral health by balancing the oral microbiome. Precision bacteriophage therapy, such as the Microbe/phage Investigation for Generalized Health TherApy (MIGHTY) project, uses viruses that selectively destroy harmful bacteria while sparing beneficial ones. This targeted approach may reduce reliance on broad-spectrum antibiotics, help prevent microbial imbalance, .
- ❖ **Advanced water flossers:**
- ✓ Water flossers are becoming more affordable and widely used. This growing demand has led to rapid market expansion for manufacturers.
- ✓ Water flossers clean between teeth and along the gums using a stream of water, instead of regular floss.
- ✓ Water flossers are an advanced oral care tool that help remove plaque and improve gum health.
- ❖ **Serum-inspired toothpastes:**
- ✓ New toothpaste and oral gel formulations contain bioactive ingredients such as peptides and hyaluronic acid, similar to skincare serums. These products aim to strengthen enamel, moisturize gum tissues, and reduce oral inflammation.
- ❖ **Laser Dentistry:**
- ✓ This has become an important tool in modern oral care. It provides several pain-free and minimally invasive treatments.
- ✓ Lasers are used in dental procedures such as detecting cavities, reshaping gums, and removing soft tissue lesions, with very little pain or bleeding.
- ✓ Their high precision and faster healing time make dental treatments more comfortable and safer for patients, representing a major advancement in dental care.

### CONCLUSION:

Oral health is an important part of overall health and affects quality of life, as dental caries, gum diseases, and other oral problems impact millions of people worldwide. Maintaining good oral hygiene through regular brushing, flossing, and rinsing, along with preventive measures like fluoride use, healthy diet, and public awareness, helps reduce these problems. The increasing availability of oral care products, such as medicated toothpastes, antimicrobial mouthwashes, fluoride gels, mouth sprays, and interdental aids, helps in both preventing and managing oral diseases. New developments in oral care, including automated and smart toothbrushes, oral microbiome-based treatments, advanced water flossers, bioactive toothpastes, and laser dentistry, are improving traditional oral hygiene practices. These innovations make dental care more accurate, comfortable, and easier for patients, leading to better treatment results.

In conclusion, maintaining good oral health requires a combined approach that includes preventive care, proper use of oral care products, patient education, and modern technologies. Increasing public awareness and improving access to oral healthcare services are essential for promoting lifelong oral health and enhancing the overall quality of life for individuals and communities. Overall, combining good oral hygiene, modern treatments, and innovations can greatly improve oral and general health.

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