

# A Sweet Encounter of Periodontium & its Clinical Implication

**Dr. Minalli Vasandani**  
P.G. Student

**Dr. Neha Gupta**  
Lecturer

**Dr. Arvind Shetty**  
Professor &HOD

Dept. of Periodontics, Dr. D.Y. Patil Dental College, Nerul, Navi Mumbai

Offenbacher defined Perio Medicine as “A broad term that defines a rapidly emerging branch of periodontology focusing on the wealth of new data establishing a strong relationship between periodontal health and systemic health or disease.”

The various organ systems influenced by periodontal disease are -

- Cardiovascular/ Cerebrovascular System
- Respiratory system
- Reproductive system
- Endocrine system: Diabetes Mellitus

Where periodontitis and diabetes mellitus are concerned, well, the Relationship is Bidirectional. Thus suggesting that not only does Diabetes complicate periodontal conditions but a poor periodontal condition worsens the glycemic control too. Thus we are looking at Two Major Hypothesis here-

**Hypothesis I:** Diabetes Mellitus complicates Periodontal Conditions.

**Hypothesis II:** Periodontal Condition influences The Glycemic Control.

Thus lets now see how what conclusions can we draw of each of the hypothesis based on purely Evidence Based Dentistry.

**Hypothesis I: Diabetes Mellitus -> Periodontal Disease**

Diabetes mellitus comes from a Greek word where Diabetes means Siphon (symbolic for frequent urination) and Mellitus means Sweet like Honey. So Diabetes Mellitus means Sweet Urine.

“The term Diabetes Mellitus describes a metabolic disorder of multiple etiology characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both.” World Health Organization 1999.

Based on underlying pathophysiology American Diabetic Association in 1997 classified Diabetes Mellitus as follows:

(1) Type 1 Diabetes  $\beta$  cell destruction causing absolute insulin deficiency.

(2) Type 2 Diabetes insulin resistance/ insulin secretory defect.

(3) Other specific types

- Genetic defects of  $\beta$  cell function
- Genetic defects of insulin action
- Pancreatic diseases.
- Excess endogenous production of hormonal antagonists to insulin.
- Drug induced
- Viral infections
- Associated with genetic syndromes

**(4) Gestational Diabetes.**

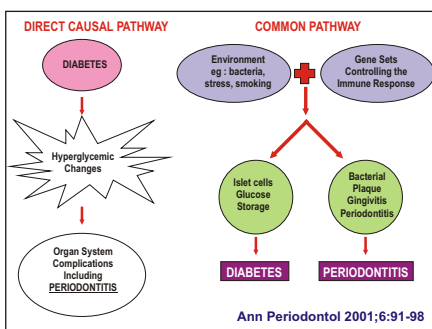
Diabetes mellitus is associated with various complications. The Classic 5 of Diabetes Mellitus are stated as:

- Retinopathy
- Nephropathy
- Neuropathy

- Macrovascular disease
- Altered wound healing

However, many evidences from the past, studies done by the likes of Williams 1928, Sheppard 1936, and Glickman 1946 suggested a possible link between diabetes and periodontitis. Following the landmark study of Loe in 1993, the Pima Indian Study, and Periodontal Disease was suggested as the Sixth Complication of Diabetes Mellitus.

In 2001 American Diabetic Association expert committee report mentioned Periodontitis as the Sixth Complication of Diabetes.



Hypotheses For association between Diabetes & Periodontitis as illustrated in Fig.1

## Direct causal Pathway Hypothesis

Hyperglycemia and hyperlipidemia of diabetes mellitus results in metabolic alterations which exacerbate the bacteria induced inflammatory periodontitis.

## Common causal Hypothesis

Variety of stressors affecting a host whose genetic composition consists of a gene set that could result in phenotype expression of diabetes, periodontitis or both.

Eg: Type I Diabetes Mellitus is Associated with HLA defects, Defects in MHC and altered hyperresponsive monocyte phenotypes which are commonly associated with aggressive periodontitis.

## How does Diabetes Modify Periodontal Disease Expression?

### 1. Effect on Periodontal Microflora:

Increased levels of Aggregatibacter Actinomycetanamcomitans, Prevotella Intermedia, Porphyromonas Gingivalis, Spirochetes and Motile Rods are detected in diabetic patients. (Mashimo et al 1983, Zamboni et al 1988 and Seppala Ainamo 1996.)

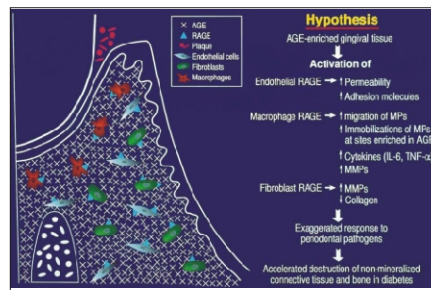
### 2. Effect on various aspects of Host responses:

Diabetes mellitus results in production of Advanced Glycation End Products (AGE). Interaction of AGE products with Receptors of Advanced Glycation End Products (RAGE) causes various alterations in host response which ultimately increase the host tissue susceptibility to infection.

In the periodontium these AGE RAGE interactions take place in various cells like Endothelial cells, Macrophages, Monocytes,

Neurons and Smooth Muscle Cells. These interactions increase permeability of blood vessels, increase release of pro inflammatory mediators thus an exaggerated response to periodontal pathogens as illustrated in Fig 2.

Periodontology 2000, Vol 23,2000,50-62



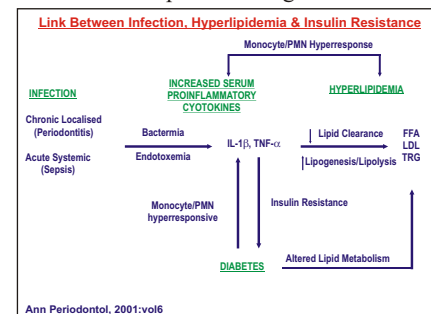
**3. Effect on Wound Healing:** AGE - RAGE interactions lead to increased collagenases secretion. This leads to increased collagen breakdown. Also the AGE RAGE interactions lead to increased formation of modified Collagen which have defective remodeling and are poorly crosslinked. Thus the end result being Impaired Wound Healing.

Thus to summarize a triad of increased periodontal microflora, altered host response and poor wound healing explain the effect of diabetes on periodontal diseases and also poor response to periodontal therapy in a diabetic patient with poor glycemic control.

## Hypothesis II: Periodontal Disease -> Diabetes Mellitus

Periodontal disease is an infection which is characterized by the release of various inflammatory mediators like Tumor Necrotizing Factor  $\alpha$ , IL-6, IL-1, Chemokines etc. These mediators increase the release of Acute Phase Proteins. These inflammatory mediators are also associated in the pathogenesis of Diabetes Mellitus. For Eg: TNF-  $\alpha$  IL-6, IL-1 act as antagonist to Insulin action. Chemokines on the other hand play a role in obesity related disorders one of which being diabetes mellitus.

Thus possibly suggesting a link between periodontal disease and insulin resistance. This has been explained in Fig 3.



Apart from this direct causative relation, there is another corollary. There is sufficient evidence showing that



treatment of periodontal infection, Scaling Root Planing coupled with systemic antibiotics has shown to definitely improve glycemic control in diabetic patients. Evidences for the same are stated in studies done by Miller ET all 1992, Taylor et al 1996 and Grossi et al 1997.

Also the Annal of Periodontology 2001 states that effective management of periodontitis using systemic antibodies decreases signs and symptoms of periodontal infection and also improves glycemic control.

### Conclusion

AAP 2006 Systematic Review-

Diabetes mellitus increases the risk of periodontal disease and there is enough evidence to prove the same.

The effect of periodontal disease on Diabetes Mellitus is less clear and Mechanisms are Unclear. Probably infection increases insulin resistance aggravating poor Glycemic Control.

Thus with more than one half of the population suffering from Diabetes Mellitus, their Periodontal Health Maintenance becomes an important concern.

### Clinical Implications

1. Routine dental and periodontal check up

can, with the help of various oral signs and symptoms, is indicative of diabetes mellitus. Thus can help detect Diabetes in a patient unaware of the same.

Various periodontal manifestations that could be suggestive of Underlying Diabetes Mellitus-

- Tendency towards gingival enlargement
- Sessile / pedunculated gingival polyps
- Multiple abscesses.
- Severe gingival inflammation
- Deep periodontal pockets
- Rapid bone loss

Various other oral manifestations that could be suggestive of Underlying Diabetes Mellitus:

- Cheilosis
- Mucosal drying & cracking
- Burning sensation of mouth and tongue
- Decreased salivary flow
- Taste impairment
- Lichen planus
- Increased C.albicans, Hemolytic Streptococci, Staphylococci.
- Dental caries

2. In a patient who is known to have diabetes mellitus, oral and especially periodontal health becomes of utmost importance. These patients should be kept on a high

maintenance protocol, especially if the patient has poor periodontal conditions.

3. Diabetic Patients should be constantly educated and motivated about maintaining good oral hygiene.
4. Periodontal Surgeries can be undertaken in a diabetic patient as long as the patient maintains a good glycemic control.
5. While treating a Diabetic Patient proper detailed history of his/her most recent diabetic record and drugs that patient is taking is mandatory.
6. One of the most important complications to be considered while testing a diabetic patient on medications is Hypoglycemia. It is advisable for every dentist to have a glycometer to keep a check on the glucose levels of a patient especially before and after a surgery. Also the emergency drugs to treat hypoglycemia should be within reach, while treating a diabetic patient who is on medication.
7. Special attention should be given to the oral health of pregnant women as it could increase the chances of gestational diabetes.

Address for Correspondence : Dr. Minalli Vasandani, P.G. Student, Dept. of Periodontics, Dr. D.Y. Patil Dental College, Nerul, Navi Mumbai. [drminalli.dentist@gmail.com](mailto:drminalli.dentist@gmail.com)

Continue of Page No. 44

Chaudhary, et al. : Prevention and Management of Children with Special Health Care Needs During Dental Treatment

the patient to see the instruments and demonstrate how they work.

- Allow the patient to ask questions about the course of treatment and answer them, keeping in mind that the patient is highly individual, sensitive, and responsive.
- The use of facial expressions, gestures and praises are important. The dentist should speak directly to the patient in a normal tone of voice.
- Local anaesthesia and use of rubber dam are essential but are especially difficult concepts to explain to children with intellectual or communicative disabilities.
- Minimize the gag reflex by placing the patient's chin in a neutral position or downward position
- If the patient has a swallowing problem, tilt the head slightly to one side and place the body in a more upright position

### Radiographic Examination

Adequate radiographic records are often necessary in planning dental treatment for the child with disabilities. For patients with limited ability to control film position, intraoral films with bite-wing tabs are used for all bite-wing and periapical radiographs. An 18 inch (46-cm) length of floss is attached through a hole made in the tab, to facilitate retrieval of the film if it falls toward the pharynx. Film-holders are a valuable aid in accomplishing proper positioning of the film intraorally.<sup>4</sup> Assistance from the parent, caretaker, dental assistant. Wear lead apron and/or gloves.<sup>11</sup>

### Treatment Immobilization

Partial or complete immobilization of the patient is sometimes a necessary and effective way to diagnose and deliver dental care to patients who need help controlling their extremities, such as infants or patients with certain neuromuscular disorders. The parents or guardian or patient must be informed and give consent, and the consent must be documented, before immobilization is used.<sup>4</sup>

### Indications for Using Immobilization

1. Lack of maturity
2. Mental or physical disability
3. Other behavior management techniques have failed
4. Safety

### Contraindications

1. Cooperative patient
2. Underlying medical condition (e.g. Osteogenesis imperfecta)
3. Should not be used as a punishment

The following are commonly used for immobilization:

**Mouth opening:** Tongue blade, OPEN-WIDE®, Molt mouth prop, Rubber bite block.

**Body :** Papoose Board, Triangular sheet, pedi-wrap, Beanbag dental chair insert, Safety belt, Extra assistant.

**Extremities:** Posey straps, Velcro straps, Towel and tape, Extra assistant.

**Head :** Forearm-body support, Head positioned, Plastic bowl, Extra assistant.<sup>11</sup>

### Conclusion

In recent years, the dental professionals have showed increasing concern regarding

the delivery of oral health care to mentally or physically disabled children. This increasing concern is the realization that individuals with a disability, whether developmental or acquired, are entitled to the opportunity to achieve appropriate habilitation, that is, to enable them to realise their maximal level of functioning and to assist them in "normalizing" their lives.

### References

1. Guideline on Management of Dental Patients with Special Health Care Needs. REFERENCE MANUAL V 34/NO 6 12/13
2. Wessels.K, Dentistry for the handicapped p.1-20, 33-62, 63-76, 77-115. PSG Publishing Co., Littleton, Massachusetts, 1984
3. Giddon, E., Ruide, C., and Belton, D. Psychological problems of the physically handicapped patient. Int Dent J. 25: 199-205, 1976
4. McDonald RE, Avery DR. Dentistry for the child and adolescent. 8th Ed. Pg 524-556. 2004. Mosby.
5. Herdandez P, Ikkanda Z. Applied behavior analysis: Behavior management of children with autism spectrum disorder in dental environments. J Am Dent Assoc 2011; 142(3):281-7.
6. American Academy of Pediatric Dentistry. Guideline on record-keeping. Pediatr Dent 2012;34 : 287-94.
7. American Academy of Pediatric Dentistry. Guideline on caries-risk assessment and management for infants, children and adolescents. Pediatr Dent 2012;34(special issue):118-25.
8. Charles JM. Dental care in children with developmental disabilities: attention deficit disorder, intellectual disabilities, and autism. J Dent Child 2010;77(2):84-91.
9. American Academy of Pediatric Dentistry. Guideline on behavior guidance for the pediatric dental patient. Pediatr Dent 2012;34(special issue):170-82.
10. American Academy of Pediatric Dentistry. Guideline on pediatric restorative dentistry. Pediatr Dent 2012;34 :214-21.
11. Dental Problems of Children with Disabilities C. Chavarría DDS - October 18, 2006.

Address for Correspondence : Dr. Gaurav Chaudhary, P.G Student, Dept. of Orthodontics, I.T.S Dental College & Research Centre, Muradnagar [chaudharydrgaurav@gmail.com](mailto:chaudharydrgaurav@gmail.com)

