



Interrelationship between Diabetes, Thyroid Dysfunction and Periodontitis

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DESCRIPTION

Diabetes is a highly prevalent non-communicable disease seen across the world, showing a wide range of oral and periodontal effects. Similarly, thyroid dysfunction, (hypothyroidism, hyperthyroidism and Hashimoto thyroiditis), is another common group of disorders which may impact oral and periodontal health negatively.

Periodontitis is an inflammatory disease affecting the supporting tissues of teeth caused by microorganisms leading to damage of alveolar bone and periodontal ligament with clinical presentation as pocket formation, recession or both. Strong evidence exists, as seen in many observational studies, for interrelationship between periodontal disease and different systemic diseases influencing each other in a bidirectional manner. Inflammation, as expressed by elevated levels of inflammatory cytokines like TNF α , IL-1 and IL-6 as well as serum

C-reactive protein, oxidative stress and endothelial dysfunction are believed to be the underlying mechanism behind interrelationship between periodontitis and systemic diseases like Diabetes Mellitus (DM), Cardiovascular Disease (CVD), metabolic syndrome, obesity, Non-Alcoholic Fatty Liver Disease (NAFLD), Chronic Kidney Disease (CKD), osteoporosis, Rheumatoid Arthritis (RA), Alzheimer's disease and Parkinson's disease [1,2].

Pre-existing diabetes increases the risk of developing periodontitis by 34% and prevalence of type 2 diabetes is higher in periodontitis patients. Periodontal inflammation negatively affects the glycemic control in diabetics. Also, severe periodontitis in diabetic individuals may lead to a two times increased incidence of macro-albuminuria, a three times increased incidence of end stage renal disease and a three times higher risk of cardiorenal mortality, as compared to diabetic patients without severe periodontitis. Hb A(1c) reduction by almost 0.4% is associated with treatment of periodontitis and glycemic control further influences the periodontitis outcomes [3,4].

Similarly, a positive relationship was established between hypothyroidism and periodontitis with minimal confounding factors, in a scoping review [5]. An animal study demonstrated that reduced serum levels of thyroid hormones enhances periodontitis induced bone loss due to elevated numbers of osteoclasts [6]. Cross-sectional population based epidemiological studies have previously shown that low (Thyroid Stimulating Hormone) TSH levels were associated with significantly higher odds for periodontitis but well controlled prospective clinical and immunological studies are required to confirm the causal relationship. A genetic cross talk was detected between hypothyroidism and periodontitis where Late Cornified Envelope (LCE) family genes played an important role in a transcriptomic analysis [7]. Another case report showed clinical improvement with reduction in pocket depth, mobility and bleeding after intra-ligament injection of vitamin D and calcium in a patient of chronic periodontitis associated with hypothyroidism [8]. One study showed higher periodontal destruction in hyperthyroidism than hypothyroidism and authors concluded that serum and salivary levels of TNF α and IL-6 can be used as biological markers in predicting development of periodontitis in individuals with thyroid dysfunction [9]. A narrative review found biological possibility of supporting an association between Hashimoto thyroiditis, but due to insufficient studies a causal relation cannot be established [10].

Furthermore, we have recently reported of a case depicting an unusual simultaneous occurrence of diabetes and hypothyroidism in a 38 years old female periodontitis patient [11]. This may not be an isolated incident of these three pathological conditions occurring simultaneously in an adult patient, but may be a beginning of an era of multiple diseases concurrently being diagnosed perplexing the treating dentists and physicians. In general, it calls for an alert approach by the general dentist/periodontist and physician/endocrinologists to thoroughly investigate the patient's oral and systemic health. As these conditions adversely influence prognosis and response to

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treatment, early diagnosis and appropriate interventions may improve patient's health.

CONCLUSION

Diabetes and Hypothyroidism are two very commonly seen endocrinal disorders. Similarly, periodontitis is also a highly prevalent oral disease. Based on the above-mentioned findings from various evidences, dentists/periodontists should always suspect and investigate for simultaneous presence of diabetes and/ or hypothyroidism in periodontitis patients and vice-versa.

A thorough knowledge about interrelationship between periodontal and systemic diseases/ conditions like diabetes and hypothyroidism, is needed amongst both the dentists and the physicians, with regular update about treatment strategies. This will help in holistic management of patients and further lead to an improved overall health care system.

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