

Systematic Review: The Impact of Coeliac Disease On the Oral Cavity

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ABSTRACT : Since it is still under-diagnosed due to the large number of atypical cases with few or no gastrointestinal symptoms and a predominance of extra-intestinal manifestations, the diagnosis of celiac disease, called also Gluten-sensitive enteropathy ; which is fairly common digestive disease; often requires a multidisciplinary approach and a close collaboration especially with the dentist, who is able to recognize its manifestations in the oral cavity, but also to help in its management and prevention. The oral cavity with its complex histological tissues and microbial flora, can be a useful revealing organ of an atypical form of celiac disease when an accurate oral examination is performed, and that may lead to an early diagnosis of the disease. In coeliac disease patients, dental hard tissue manifestations are various, qualitative anomalies of the enamel (hypo-mineralization of the tissue) are the manifestations the most common (44%) , but also enamel hypoplasia (38%) , while for soft tissue manifestations , recurrent aphthous stomatitis (36%) and angular cheilitis (18%) are the most found. In children, in addition, we have found delayed eruption (33.8%) , malocclusion (40%) , and other various affections can be present as atrophic and geographic glossitis, glossodynia, lichen planus , periodontal diseases and xerostomia. In Algeria, predisposition to dental caries increases significantly with bad oral hygiene due to the scarcity of gluten-free toothpastes and difficult control of the disease due to nutritional and financial conditions, the good knowledge of these oral signs allows the dentist to perform an early detection of this disease manifested sometimes with discrete and atypical signs, but also to ensure its adequate management and care.

KEYWORDS: Coeliac disease , Delayed tooth eruption , Enamel defects , Gluten , Malocclusion , Recurrent aphthous stomatitis ,Toothpaste.

I. INTRODUCTION

Celiac disease (CD) is a permanent autoimmune disease characterized by severe cell-mediated immune of the intestinal mucosa in genetically determined patients intolerant to gluten, which is a protein contained in wheat, rye, barley and oat. This disease usually appears since the sixth month of life, coinciding with the introduction of cereals in the diet. Its prevalence varies greatly from one country to another and affects mainly white individuals. This disease is still largely under-diagnosed; indeed, classical CD is the most common pattern, it appears in the first years of life with chronic diarrhea, vomiting, irritability, anorexia, weight loss, growth deficiency, abdominal pain and iron deficiency anemia, in contrast to the neo-classical or atypical CD, which appears later and its manifestations are mainly extra-intestinal, among which oral signs, these oral manifestations are very important because they can help in the diagnosis of the disease when the dentist is attentive and thus allow an early and effective care ,and although anemia, osteoporosis, vitamin deficiency and sterility are signs sometimes found in atypical forms, the oral manifestations seem to be the best revealing signs for a diagnostic approach. In this research , we prove the correlation between the oral manifestations of hard and soft tissues and the atypical form of CD, we prove the very important and evocative role that the dentist can play in its detection, we also show the important increase of the carious lesions and periodontal diseases because of a bad hygiene essentially caused by the unavailability of gluten-free toothpastes and floss in Algeria.

II. METHODS

A Comprehensive literature search: For this systematic research, we first searched PubMed and Google Scholar library for published literature using keywords “Coeliac disease” or “Coeliac impact” and “Oral manifestations” or “dental decay” in the abstract or title since 2005 until April 2021.

Population study : 466 patients with celiac disease were consulted and interviewed carefully, to make it easy the obtain of this number of patients, announcements in groups on social media specially dedicated for patients with gluten hypersensitivity were made, these group, generally dedicated for gluten-free nutrition, have strongly helped

to collect a large number of patients themselves motivated to make oral consultations in hospitals (University Hospital of Beni Messous, University Hospital of Blida "Franz Fanon" service of stomatology), all included patients were examined attentively (soft and hard tissues ,and questionnaire) Some private dentists also helped by offering the results of 34 patients with celiac disease who consulted in the last 5 years.

Finally, 300 patients were interviewed through an online questionnaire, the questions included the patient's age and gender, the date of diagnosis of celiac disease, its type and severity, dental office visits, hygiene methods, normal or gluten-free diet , normal or gluten-free toothpaste and cosmetic products, enamel defects , oral ulcers and xerostomia. All information were very carefully collected and analyzed.

III. RESULTS

With the significant increase of atypical forms of CD, special attention is therefore needed to allow their early detection, and despite enamel defects and recurrent aphthous are generally caused by local conditions or trauma, hypo-mineralization of tooth enamel is the manifestation the most found in CD patients with (44%) and also enamel hypoplasia (38%) Oral lesions includes recurrent aphthous stomatitis (36%) , angular cheilitis (18%) , atrophic and geographic glossitis, glossodynia, lichen planus , periodontal diseases , xerostomia and squamous cell carcinoma of the oropharynx. We have found that in children , delayed eruption is a very common sign of CD disease with (33.8%) , malocclusion (40%) secondary due to eruption problems and a particular chewing position due to caries , enamel defects and oral lesions were more found in female (67%) than in male (33%). In comparison with healthy patients, carious diseases are much more frequent in CD patients (88%) due to mouth dryness and most probably related to the difficulty to ensure a good oral hygiene (lack of gluten-free toothpastes and floss) and gluten-free diet in Algeria, and their expensive prices if they are available , knowing that CD is not considered in Algeria as a chronic disease.

IV. DISCUSSION

Enamel defects : Celiac disease affects (1%) of the world population and between 1% and 3% of the Algerian population, a prevalence that is not too precise since this disease seems to be still under-diagnosed, and also difficult to control due to difficulty in obtaining gluten-free food, this research carried out on CD confirmed patients and showed an increase in enamel defects like discolorations (yellow- grey - bluish grey) or structural defects , hypo-mineralization of enamel (44%) and hypoplasia (38%) are the most common signs found in CD patient's teeth (fig A). Teeth enamel defects that appear in CD , and the number of teeth affected, are strongly associated with the time of onset of symptoms and the age at which a gluten-free diet is initiated, the more intense the symptoms, the more severe the enamel defects. Enamel anomalies in deciduous teeth occurred most often in canines and second molars , whereas in permanent dentition, central and lateral incisors and first molars were the most involved, then come canines, premolars , and finally second premolars and molars, It should be noted that in (96%) of cases, enamel defects (discolorations, hypoplasia or opacities) were symmetrical and chronological, observed cases with no symmetrical enamel defects in same teeth of both hemi arches are non specific of CD, these defects may have other etiologies such as trauma or infection .



Figure A: Enamel defects in a 10 years old CD patient recently diagnosed.

Reduced salivary flow is also a sign well proven by the literature and confirmed by CD patients testimonies, no statistics have been realized because of the inappropriate fasting period of Ramadan which can make the results false, but none of these patients reported the necessity of a treatment for xerostomia, however, mouth dryness, bad oral hygiene and enamel defects are factors that strongly promote dental caries, which explains the big increase of caries in CD patients (88%), the bad hygiene is related to the lack of gluten-free toothpaste and floss, which is limited to non-productive third world countries (statistics are realized in Algeria). Several implications may be at the origin of enamel defects, for example immunological implication, as even the oral mucosa of patients on a gluten-free diet showed a significantly increased number of inflammatory cells (T cells), which has been interpreted as an immune response to minimal amounts of gluten due to an immunological memory of hypersensitivity to this substance, also genetic predisposition but especially malabsorption problems since disturbances in enamel mineralization due to celiac disease do not occur until a period of gluten consumption that coincides with the enamel mineralization phase; a possible explanation for the enamel defects could be malnutrition due to malabsorption and vitamin D deficiency which leads to hypocalcemia.

Delayed tooth eruption: Prolonged malnutrition can have irreversible effects on tooth eruption. Since children with CD are often subject to weight loss and have less somatic growth than healthy children, it is assumed that tooth development may be delayed, with a high percentage (33.8%), and even if it is a nonspecific sign, it should be evaluated in conjunction with the rest of the oral examination, and the dentist must be aware and suspicious of the possibility of CD.

Malocclusion: Malocclusion is common in patients with celiac disease (40%), it could be a result of impaired maxillary and mandibular growth and delayed tooth eruption, but also a result of a convenient mandibular position because of painful tooth decay.

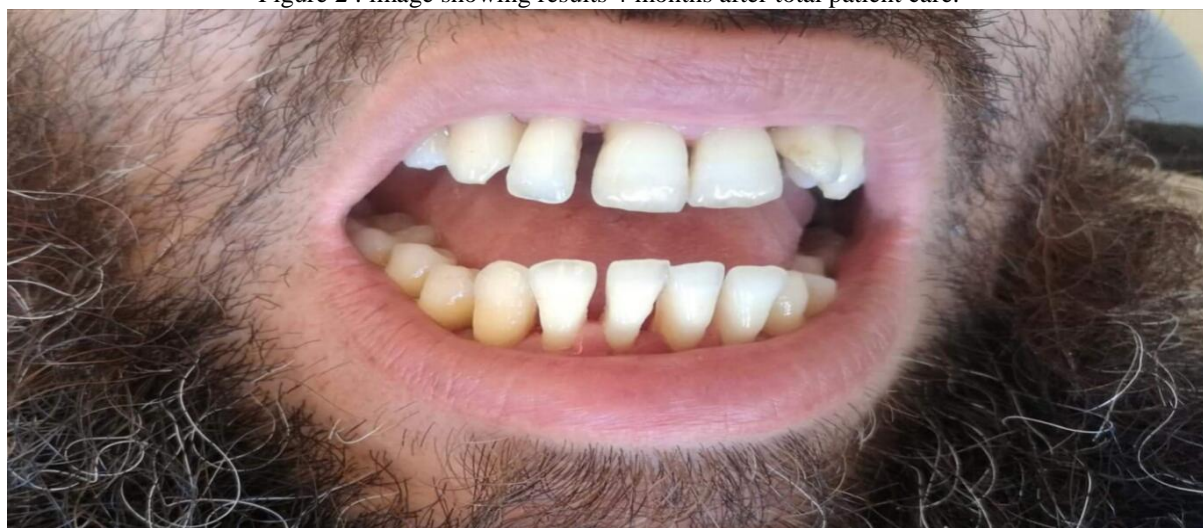
Oral Soft Tissue Manifestations : Aphthous ulcers, are the most common soft tissue lesion (36%), aphthous presents as an ulceration with a yellowish or grayish background, with an infiltrated base, sharp edges surrounded by an erythematous halo, painful in (91%) of CD patients, because of the close relationship between the functioning of the intestinal mucosa and the functioning of the oral mucosa which share the same embryological origin, the correlation between intestinal inflammation and recurrent mouth aphthous has been approved, nutrient deficiency is the most likely cause of recurrent canker sores. There were a report of a 42 years old CD female patient who presents painful aphthous ulcers too often, the patient declares that she is on a strict gluten-free diet, but after careful clinical examination, it appears that she still uses cosmetic products with gluten such as lipstick and usual toothpaste with gluten, an education on the need to use gluten-free cosmetic products is performed, after 5 months the patient confirms a very significant reduction in mouth ulcers and burning sensations. Other oral manifestations were also reported such as angular cheilitis with a prevalence of (18%), lichen planus, atrophic and geographic glossitis, glossodynia, tongue burns and periodontal diseases, literatures show an improvement of these manifestations after a strict gluten-free diet. Dermatitis herpetiformis (Duhring-Brocq disease) is a chronic disease consisting of skin involvement, it could combine erythema of the oral mucosa with vesiculobullous lesions that become painful superficial ulcers after its rupture, gingival erythema may manifest itself as diffuse or erosive erythematous gingivitis. Its association with CD was well evoked, oral lesions were reported six months before the appearance of skin lesions in dermatitis herpetiformis.

Case report : Case of a 39 years old male patient who has severe CD (fig 1) diagnosed since 7 years, the patient has no other general pathology, he finds difficulties in his gluten inclusive diet because of the lack of gluten-free foods and his limited financial conditions, the patient at the consultation presents a defective oral hygiene, the reason according to him is the lack and especially the high price of gluten-free toothpastes and floss, 4 months after scaling, the providing of gluten-free necessary hygiene material and the referral of the patient to a CD aid society, obtained results were impressive (fig 2), his control of CD improved the condition of the oral cavity.

Figure 1 : image that shows the state of the patient's oral cavity before scaling , gluten-free diet and proper hygiene products(without gluten)



Figure 2 : image showing results 4 months after total patient care.



Management of CD patient in dental office: The main goal of this research -as a good oral health is a reflection of a good global health- is to motivate all dentists to be very attentive during the clinical examination which makes possible the early diagnosis of any atypical form of the CD all in collaborating with the pediatrician and the gastroenterologist. The dentist, before performing a complete clinical examination followed by radiological or other complementary examinations, must first know the patient's family and medical history, his age since the age of the patient is important here, as the typical forms of CD are observed in very young children from 6 to 24 months of age, while the atypical forms, which do not correspond to the classical manifestation of gluten intolerance, are usually present in older children or adults. Concerning the management of MC patients, these patients should be followed frequently to assess the dental and periodontal status, in collaboration with the pediatrician and the gastroenterologist, the treatment for mouth ulcers depends on its severity, it will be prescribing gluten- free antimicrobial mouth rinse, antibiotics, gluten-free antiseptic gel, nonsteroidal anti-inflammatory drugs, corticosteroids, home remedies like applying ice and keeping a good oral hygiene. For enamel defects, the dentist will consider conservative and aesthetic treatments (composite restorations, root canal treatment, prosthetic restorations.) depending on the case and its severity, strategies to prevent dental caries should be rigorously considered. Finally, a particular attention by the dentist towards the commonly used products during the dental practice which contain gluten such as contact anesthesia, toothpaste , polishing paste and topical fluoride, recently, the manufacturers of dental products have increased the production of gluten-free products, several brands are available, we will not name them to avoid any kind of advertising.

V. CONCLUSION

The oral cavity was always a main good health indicator because of the extremely numerous manifestations with systemic origin, and given that the prevalence of celiac disease continues to increase, the dentist must be aware that sometimes the presence of dental enamel defects in correlation with mucosal lesions may be a symptom or a sign revealing a more profound and undetermined disease. The role of the dentist in the diagnosis, management, prevention of celiac disease is now known and approved. The dentist must collaborate with the physician in the event of a possible suspicion of celiac disease in order to have an early diagnosis, must ensure proper care for CD patients especially children, and must educate them on the necessary hygienic measures with the appropriate hygienic material, and on their nutrition and daily life, especially in third world countries where toothpaste, cosmetics and gluten-free foods are hard to find.

CONFLICT OF INTEREST: none to declare.

Abbreviations: CD = Coeliac disease

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