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# ORAL MANIFESTATIONS OF CELIAC DISEASE IN NORTH WESTERN PART OF INDIA: A CASE- CONTROL STUDY

Gastroenterology

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## ABSTRACT

**Background:** Celiac disease is a condition characterized by a wide spectrum of clinical manifestations. Any organ can be affected and, oral manifestations of celiac disease have been described. A close correlation between celiac disease (CD) and oral lesions has been reported. The aim of this study was to assess prevalence of dental enamel defects, recurrent aphthous stomatitis (RAS) in a well defined cohort of patients with CD in north western part of India.

**Method:** A case control study involving 40 cases of celiac disease (age ranged 12-30 years) and 40 healthy individuals of same age group. A detailed history including oral and systemic examination was done. Celiac disease was confirmed by both serologically and histopathologically.

**Results:** Dental enamel defects had higher prevalence (42.5% cases) compared to controls (5%). Frequency of RAS in the CD group was also significantly higher than that in controls (40% vs. 10%)

**Conclusion:** This study confirms that oral manifestations are common in celiac disease. There is increased risk of dental enamel defects and RAS in CD in comparison to control group.

## KEYWORDS

Celiac disease, dental enamel defects, RAS

## INTRODUCTION

Celiac disease (CD) is defined as immunological responsiveness to ingested gluten in genetically susceptible individuals. It is characterized by a lifelong intolerance to the gluten contained in wheat, rye and barley. Chronic diarrhoea, tiredness, abdominal distension and bloating, vomiting, weight loss, muscle weakness and loose stools are the characteristic clinical features [1]. The worldwide mean prevalence of CD is 1%, and it is one of the most frequent types of food intolerance.[2-4] In India prevalence of CD is 0.3 % to 1 % in the general population [5,6].

In addition to the classical gastrointestinal presentation (diarrhoea, abdominal distension, vomiting, weight loss and pallor) CD can cause minimal intestinal damage and weak or absent systemic symptomatology (also known as "silent form"). In these patients the lack of symptoms can persist for a long time, while the biopsy of the bowel shows the typical atrophy of intestinal mucosa [7]. It is also well recognized the association of CD with several complications, as lymphomas, autoimmune and degenerative nervous system diseases [8-10].

The oral cavity, a part of gastrointestinal system [11], can also be affected by several abnormalities in patients with CD. As the mouth is very easy to examine, oral lesions can provide a valuable clinical clue for early diagnosis of CD [12]. International literature has reported some interesting affections in the oral cavity, the most common are recurrent aphthous stomatitis (RAS) [13-15] and dental enamel defects [8, 13, 16-21]. In addition have been described the association between CD and unspecific forms of atrophic glossitis [22], oral manifestations of dermatitis herpetiformis [23], Sjögren's syndrome [24,25] and oral lichen planus [26,27]. These disorders, in absence of a typical intestinal symptomatology, can represent useful clues for a timely diagnosis [7,22].

The aim of our study was to evaluate the prevalence of the different oral manifestations, related to soft and hard oral tissues, in CD patients, in comparison with a control group of healthy subjects in north western part of India.

## MATERIAL AND METHODS

A total of 40 patients, 25 females and 15 males aged 12–30 years with a diagnosis of CD were enrolled in this study. The diagnosis of CD was based on serological tests (Ab-htTG IgA, Ab-htTG IgG, AGA IgA, AGA IgG, EMA IgA, EMAIgG), small-bowel biopsy during esophago-gastro-duodenoscopy (EGDS) and histological evidence of villous atrophy with crypt hyperplasia and increase in intraepithelial lymphocytes. The study included the selection of a control group of 40 healthy subjects of same age and socioeconomic group enrolled from a dental clinic of same region. Exclusion criteria for control group enrolment were malnutrition status, body growth delay, gastrointestinal diseases and/or familiar celiac diseases.

The oral examination was carried out with a mouth mirror and probe under artificial light in the clinic using World Health Organization criteria (dfs and DMFS indices) [28]. A questionnaire exploring additional systemic disease, medication, use of fluoride, oral hygiene habits, diet and the frequency of dental appointments was completed by all participants or their parents. The status of hard tissues (Enamel hypoplasia, dental caries) and soft tissues (RAS, atrophic glossitis, geographic tongue) was evaluated. Enamel defects were classified from I to IV degrees, according to Aine's classification [16]. Before the examination of enamel defects and caries, the teeth were brushed with a prophylaxis paste, then washed, dried and the affected permanent teeth were observed.

Soft tissues examination was carried out with conventional dental chairs, artificial light, flat mirrors, probe and sterile gauzes. With regard RAS, each lesion observed was registered. Aphthous stomatitis was classified into minor, major and herpetic aphthous ulcers (29), according to dimension, form, localization and evolutionary tendency, and also rate of occurrence was registered.

### Data analysis:

Data thus collected were entered into excel and were then analyzed with help of SPSS software through tables, diagrams and appropriate statistical test wherever required.

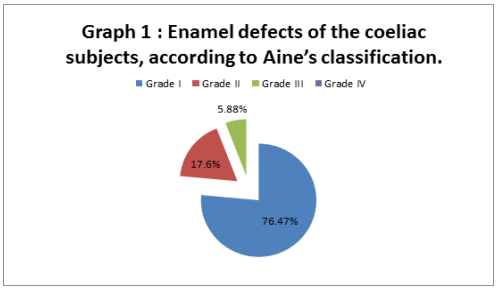
## RESULTS

Dental Enamel Defects

Enamel defects were observed in 17(42.5%) patients with CD. Of these 17, 13 (76.47%) had defects of grade 1, and 3 (17.64%) patients of grade 2 and 1 (5.88%) had grade 3 defects, while 23 of the CD patients did not have any defect. Only 2 (5%) subjects in the healthy group had grade 1 enamel defects. This finding showed that the dental enamel defects occurred significantly ($p<0.05$) more often in CD patients.

**Table 1: Prevalence of the dental enamel defects in CD patients**

| Authors | Prevalence |
|---|---|
| Aine 1996. (30) | 96 |
| Aine et al, 1990. (17) | 83 |
| Petrecca et al, 1994. (18) | 76 |
| Aguirre et al, 1997. (31) | 52.5 |
| Rasmusson et al, 2001. (8) | 50 |
| Present study, 2019 | 42.5 |
| Prati et al, 1987 (32) | 33.3 |
| Martelossi et al., 1996 (33) | 32.4 |
| Mariani et al, 1994 (34) | 28 |
| Procaccini et al;, 2007 (35) | 26 |
| Bucci et al, 2006.(19) | 20 |
| Andersson-Wenckert et al, 1984. (13) | 21 |
| Lahteenoja et al, 1998. (22) | 10.1 |

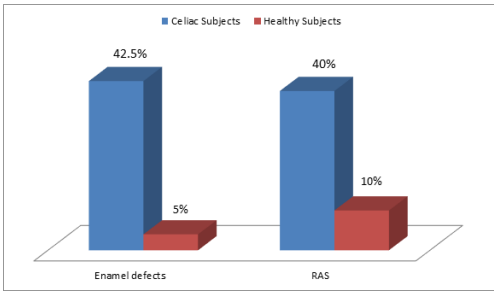



Recurrent Aphthous Stomatitis

Sixteen (40%) of the CD patients had aphthous ulcers compared to 4 (10%) in the control group. RAS was observed to be statistically ($p<0.05$)) higher in patients with CD (Table 2).

**Table 2 : Prevalence of the RAS in CD patients**

| Authors | Prevalence |
|---|---|
| Sedghizadeh et al, 2002 (15) | 41.0 |
| Present study, 2019 | 40.0 |
| Procaccini et al;, 2007 (35) | 36.0 |
| Bucci et al., 2006 (19) | 33.3 |
| Andersson-Wenckert 1984 (13) | 26.3 |
| Sood et al, 2003 (21) | 19.8 |
| Petrecca et al, 1994 (18) | 17.0 |
| Majorana et al, 1992 (20) | 16.8 |
| Lähteenoja et al, 1998 (22) | 3.7 |




**Graph 2: shows percentage of enamel defect and RAS in Celiac subject and Healthy subject.**

## DISCUSSION AND CONCLUSION

In this study we found the higher prevalence of enamel defects in CD patients than in controls which is similar to the findings of other studies done worldwide [8, 17, 18, 19, 30, 3]. The etiology of dental enamel defects associated with CD is still uncertain. However enamel defects, associated with the CD, have been explained by malabsorption-hypocalcaemia theory. The malabsorption due to the enteropathy determines an alteration of phospho-calcium metabolism and a consequent hypocalcaemia [8, 36]. The latter, therefore, could be a cause of enamel defects in celiac patients, through an influence on dental mineralization during ontogenesis, both in deciduous and permanent teeth [37]. However, some investigators [38-40] did not find any statistically significant difference in the mean serum calcium concentration between children with CD with and without enamel defects, they suggested that malabsorption could not be the cause of dental enamel defects [38-40]. In addition, Rasmusson and Eriksson [8] reported that CD did not have any significant influence on the mineralization of permanent teeth because the crowns of the deciduous and permanent teeth develop from 6 months to 7 years of life (except third molars), nutritional, immunological and genetic factors could be the possible cause of developmental defects in the enamel [41] According to one more theory, the antigen, i.e. the gluten, binding to class II molecules of the major histocompatibility complex, produces an autoimmune response, mediated by lymphocytes, against the enamel organ through the release of antimatrix antibodies [17,36,41]. Additionally, a genetic hypothesis was proposed which was confirmed by the association between dental defects and the allele HLA-DR3[(34], related to the locus DQ, specifically the DQW2, i.e. the principal antigenic locus of CD. Mariani et al. [34] demonstrated that the presence of this specific antigen increases the risk for enamel defects. Current evidence suggests that an autoimmune pathogenesis is more likely, as enamel defects are also present in autoimmune diseases, such as some polyendocrine syndromes [42].

With respect to oral soft lesions, we confirmed that CD patients are likely to suffer from RAS compared with healthy controls. In our study RAS had high prevalence (40 %) of CD patients with comparison to other studies done previously (Table 2). Our data shows the higher prevalence which is similar to study done by Sedghizadeh et al. [15]. Etiology of RAS is not known exactly. Genetic, immunological and microbial factors may play a role in the occurrence of RAS. Also local trauma, stress, food intake, some drugs, hormonal changes or vitamin and trace element deficiencies could play a role [43]. The effect of GFD on the remission of RAS is still uncertain, but dietary withdrawal of gluten occasionally results in significant benefit. It was reported that CD patients with RAS showed a significant improvement in their aphthous lesions after GFD [19, 43, 44]. On the other hand, Hunter et al. [45] examined the effects of GFD in patients with RAS and without CD and found no statistical significance between the study group with GFD and the control groups. Our findings are in agreement with most studies. RAS was seen mostly in CD patients; it can be a risk indicator and an oral manifestation of CD, but in our study we did not examine the effect of GFD on the remission of RAS.

So this study confirms that oral manifestations are common in celiac disease. There is increased risk of dental enamel defects and RAS in CD in comparison to control group.

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