
Investigation of the periodontal health status of group Libyan children using a novel gingivitis extent and severity indices: with reference to microbial gingival pathogens

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Received: 20 August 2019 / Accepted 10 Oct. 2019 / Publication date: 20 Oct. 2019

ABSTRACT

Periodontal disease is extremely common oral disease among dentate population. The occurrence and degree of severity of periodontitis is closely related to the early control of gingivitis at early stages of life. This study was aimed to investigate the periodontal health status of Libyan children group who attending children department at the faculty of dentistry at University of Benghazi. Also to validate using gingivitis extent (GE) and gingivitis severity (GS).in evaluating periodontal status of various group children. to serve as a data base for future studies. **Subjects and Methods:** Two hundred and eight children (mean age of 8.0) were included in the study. The samples were subdivided into 3 age groups (42 children in <6yrs old, mixed dentition 6-12 yrs old n=139) and older group (>12 yrs old n=27). Non-invasive and simplified procedures to examine their periodontal health and caries experience were used. Both the extent and the degree of gingivitis severity were assessed in the incisor area of the maxilla and the incisor and canine area of the mandible in the anterior teeth by using gingivitis extent (GE) and gingivitis severity (GS) indices. The individual gingival units (papillae (P), Margins (M) and attached gingivae (A) were assessed for the presence of inflammation based on visual examinations. The extent of inflammation was measured by scoring the colour change of the most severe gingival unit in both index teeth and forming a mean for both jaws. The caries experience was assessed by using dmft for deciduous teeth and DMFT for permanent teeth. Gngivitis extent and gingivitis severity indices were assessed and majority 206 (99%) out of 208 of children suffered from different degrees of gingival inflammation. **Conclusion:** There has been more untreated caries and more pronounced gingival inflammations of various degrees in this sample due to the lack of proper dental care.

Keywords: periodontal disease in Libyan children, Gingivitis Extent and Gingivitis Severity Indices (GE&GS), Index Teeth to Evaluate Gingival Inflammation.

Introduction

The periodontal diseases are among the most common oral diseases and causing loss of teeth (PHSHP, 2000; Maguire *et al.*, 1996; Moynihan & Petersen, 2004 and Ettinger, 1999). Periodontal disease is extremely common oral disease among dentate population. The occurrence and degree of severity of periodontitis is closely related to the early control of gingivitis at early stages of life (Petersen, 2003). Microbial role in development of some form of periodontitis was evaluated and were isolated *P. gingivalis* (13.65%), *P. intermedia/nigrescens* (9.62%), *P. micros* (4.19%), *E. corrodens* (4.54%), and *A. actinomycetemcomitans* (1.63%) (Gajardo *et al.*, 2005) .Periodontal disease is infectious disease initiated by number of the normal microbial flora in the mouth when allowed to accumulate in the gingival sulcus plaque (van Palenstein, 1981). Periodontal disease may be classifies as either gingivitis without loss of gingival attachment, or as periodontitis accompanied by loss of gingival attachment and also categorised according to severity as mild, moderate or advanced (Greenstein 1984 and Bollmer *et al.*, 1986) .

This study was aimed to investigate the periodontal health status of Libyan children group who attending children department at the faculty of dentistry at University of Benghazi Also to validate using gingivitis extent (GE) and gingivitis severity (GS).in evaluating periodontal status of various group children to serve as a data base for future studies.

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Subjects and Methods

Two hundred and eight children who were free from any systemic disease and/or mental developmental disorder were examined in the children's department in the faculty of dentistry Benghazi, Libya during their routine dental visit in the period from March 2016 to August 2016. Parental permission for oral examination and participation in the study was obtained before the conducting the study. There were 112 girls and 96 boys included in the study. The sample was further subdivided into 3 age groups, younger age group (< 6 years old), mixed dentition (6-12 years old) and older age group (> 12 years old).

Periodontal health evaluation

The evaluation was based on visual detection of gingival inflammation using ten index teeth on anterior segment only in upper 4 incisors and 6 lower anterior comprised of (3 papillae (P), 4 marginal gingiva (M) and 4 attached (A) in the upper incisor index teeth and 5 P , 6 (M) and 6(A) in the lower index teeth as updated modifications from Table 1,(Massler, 1950 ; Massler *et al.*, 1952 and 1957).

Table 1: Distribution of gingivitis extent (GE) scores according to the gingival units of the indexed anterior teeth.

Gingivitis extent scores (GE)	Number of inflamed units
GE 1	No inflammation in units
GE 2	Scores from (1-6) inflamed units.
GE 3	Scores from (7-14) inflamed units.
GE 4	Scores from (15-18) inflamed units.

The gingival inflammation was evaluated according to the degree of severity using (Gingivitis severity GS) scores and related characteristic features shown in (Table 2).

Table 2: Gingivitis severity (GS) scores and the characteristic periodontium features

Gingivitis severity (GS) scores	Characteristic features of degree of gingivitis severity
GS 0	No gingivitis characterised by colour-pale pink: texture-firm, no bleeding on firm digital pressure.
GS1	Mild inflammation with slight change in colour and little loss of contour
GS2	Moderate inflammation with swelling, glazing and redness. Papillae or margins appear rounded.
GS3	Severe inflammation with more swelling, redness and spontaneous bleeding. Slight ulceration.
GS4	Very severe more than above including sloughing and ulceration

Results

Periodontal health results

Table 3 shows the majority of children have gingivitis extent (GE) score from (7-14) inflamed gingival units. Gingivitis was present in 98% of < 6 years had gingival inflammation (GE), 99 % of 6-12 years old had GE, and 100% of > 12 had GE.

Table 3: Distribution of gingivitis extent scores in (GE scores) in the different age groups

Gingivitis extent scores (GE) of the inflamed gingival units of the indexed teeth	Age Groups			Total
	<6 years	6-12 years	>12 years	
GE 1= (no inflammation)	1	1	0	2
GE 2 =(1-6) inflamed units	9	31	3	43
GE 3 = (7-14) inflamed units	30	82	11	123
GE 4= (15-18) inflamed units	2	25	13	40
Total	42	139	27	208

Table (4) Displays the degree of gingivitis severity (GS), moderate gingivitis (GS2) was seen in the majority of children (78%), mild gingivitis (GS1 was 6%), and severe gingivitis was in 15% of the total examined children.

Table 4: Gingivitis severity inflammation degrees scores (GS scores)

Gingivitis Severity (GS) Scores	Characteristic Features of Degree of Gingivitis Severity among Examined Subjects	%
GS 0		1%
GS1		6%
GS2		78%
GS3		15%
GS4		0%

Discussion

This is the first study to highlight the periodontal problems in a group of Libyan children post conflict status. However, the oral health status of Libyan population showed insufficient information and there were very limited studies regarding the oral health status of Libyan children in literature reviews several years ago (Peeran *et al.*, 2014; Omar *et al.*, 1989 and Ingafou *et al.*, 2003)

The present study conducted at university hospital during providing dental care service and recorded in special charting form using simplified indices adapted by the the principal investigator and was published elsewhere (Fowziya *et al.*, 2017 and Fowziya, 1996). There was an increase in the presence of gingival inflammation about (98%) and the majority had moderate gingivitis among the examined children as estimated by gingivitis extent (GE) scores and gingivitis severity (GS) scores. The majority belonged to GE3 scores (7-14) and GE4 scores (8-15) inflamed units. More children suffered moderate gingivitis (GS2) with an estimation of 78%. Severe gingivitis was seen in the older age groups The present study showed highly increase in gingival inflammations comparing to previous (Peeran *et al.*, 2014; Omar *et al.*, 1989 and Ingafou *et al.*, 2003) A practice-based survey was carried out on 280 Libyan children aged 6-12 years who attended as dental patients in the children's department of Benghazi at faculty clinic . Ali, (2004) found that a high number of children (59%) reported undertaking no tooth brushing at all, 19% brushed once per day, 16% brushed twice per day while only 7% brushed three times per day (Omar *et al.*, 1989) . In 2017, the same investigator found Lack of toothbrushing practice at home was seen in 82 % of the total sample of the Libyan children, 11% who brushed twice, while 5% brushed once per day, 2% brushed 3 times per day (Fowziya *et al.*, 2017). Plaque induced gingivitis initiated after accumulation of bacterial plaque biofilm over days or weeks without removal from the teeth surfaces and release of bacterial contaminants and end products and modified by systemic and oral factors (Ximenez-Fyvie *et al.*, 2000 and Murakami *et al.*, 2018). The classification of gingivitis by introducing the term ('incipient gingivitis) with description of extent and severity of gingivitis were stated (Massler *et al.*, 1952 and 1957). In a study by Ximenez-Fyvie (2007) found that predominant presence of the Actinomyces species in both supra and subgingival plaque samples and suggest a good reason for controlling supragingival plaque in which may be a major reservoir for species that eventually initiate periodontitis (Ximenez-Fyvie, 2000) . Thus, oral care measures and motivation have been shown that with professional support to patients and parents in the form of preventive and various educational programmes improve patient motivation, leading to improved levels of oral health (Hochstetter *et al.*, 2007)

Conclusion

The study showed originality in the methodological procedures. There was moderate to severe gingivitis were predominant in all age groups. All examined children showed gingival inflammations with different various score of gingivitis extent (GE). The study group reflect the extensive and complex, costly, time consuming and busy work during dental management and treatment in the children's department. The GE & GS indices proved validation in using clinically. It is safe, simple, fast, and quantitative, ease recording and can be used for cooperative and uncooperative patients. The study helped in initiation of motivation and education regarding oral health attitude. The study helped in early detection of periodontal diseases among the younger population.

Recommendations

Early detection of periodontal disease in children should form the basis of a suitable periodontal screening examination for use in the primary dental care visit when attending for the first time, at recall or prior to orthodontic therapy.

Acknowledgment

We gratefully acknowledge all the children who participated in this clinical study and their parents for their permission and cooperation. Many thanks attributed to Paediatric Dentistry at faculty of dentistry, University of Benghazi, Benghazi/Libya.

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