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PERIODONTAL PATHOGENS AMONG PRE PUBERTAL, PUBERTAL AND POST PUBERTAL GIRLS, IN CHENNAI, INDIA.

KANAKAM ELIZABETH THOMAS*, DR. BALAKRISHNAN D[1] AND DR.MANGAYARKARASI V[2]

Lecturer, SRM Dental College,Ramapuram, Dean Med Research,[1] Prof. Dept. of Microbiology[2] SRM Medical College,Kattankulathur, Chennai.*

ABSTRACT

The female sex hormones progesterone and oestrogen are seen in increased level during puberty. Some bacteria are able to colonize well at high concentrations of these hormones.In another study microbial change is attributed to a high blood circulation to the gums during Puberty, which leads to gums sensitivity. As a result the gums become tender and show greater irritation to food debris and plaque, leading to gingivitis. Samples were collected from SRM Dental College and SRM Speciality Hospital, Ramapuram Chennai. 30 prepubertal,55 pubertal and 55 post pubertal girls was included for this study. An increase in the percentage of periodontitis was seen from prepubertal to post pubertal stage. Among pre pubertal girls the percentage of periodontitis was 13% where as among pubertal girls it was 52.7%. There was a further increase in post pubertal girls from 52.7% to 61.8%. A comparison of various aerobic and anaerobic bacteria was done among pre pubertal pubertal and post pubertal girls.There is an increase in the percentage of anaerobic bacteria from pre-pubertal stage to the pubertal stage. The highest percentage of anaerobic bacteria that were isolated was *Fusobacterium sp., Prevotella sp*. and *Tannerella forsythia* when compared with other anaerobic bacteria. *Prevotella sp. Aggregatibacter, Fusobacterium and Tannerella forsythia* showed greater prevalence among post pubertal girls. These bacteria are considered as the main pathogens for periodontitis. It can be concluded that there is a notable shift in the oral microflora from pre pubertal to post pubertal stage. Importance of oral hygiene from prepubertal stage will help in maintaining the normal commensal of the mouth. Simultaneously educating parents of girl children can also help in giving their wards a better oral health.

KEYWORDS: **periodontal pathogens in puberty, puberty. anaerobic bacteria, oral microflora,**

KANAKAM ELIZABETH THOMAS
Lecture, Dept. of Microbiology, SRM Dental College.

INTRODUCTION

The term 'Periodontitis' is defined as "anapical extension of gingival inflammation to involve the tissues supporting the tooth, including periodontal ligament and bone". A periodontal pocket is being formed when there is a destruction of the fiber attachment. Studies show that during puberty there is a change in the oral microbial environment. The female sex hormones progesterone and oestrogen are seen in increased levels during puberty. Some bacteria are able to colonize well at high concentrations of these hormones.In another study microbial change is attributed to a high blood circulation to the gums during Puberty, which leads to gums sensitivity. As a result the gums become tender and show greater irritation to food debris and plaque, leading to gingivitis. [1]

Clinical Material.

Sample collection: Samples were collected from SRM Dental College and SRM Speciality Hospital, Ramapuram Chennai. Supra gingival plaque was removed with sterile cotton pellets. Samples were collected by inserting 2 paper points into the periodontal pockets and were removed after 30 seconds. 30 prepubertal,55 pubertal and 55 post pubertal girls were included for this study. Ethical clearance for the study was obtained from SRM University Ethical Committee.

Procedure for aerobic bacteria

The paper point was transferred into Brain Heart Infusion broth. The BHI broth was incubated at 37^{o}C for 24 hours. The sub culture was made into Mac.Conkey agar and Blood agar plates and incubated at 37^{o}C for 24 hours.

Procedure for anaerobic bacteria.

The second paper point was transferred into Thioglycollate broth, dispersed by vortex mixer for 30 seconds. Dilution was made 10 fold. 0.1 ml was plated onto Blood agar plates that were supplemented with Hemin and Vitamin K. The inoculated plates were incubated in an anaerobic jar using anaerobic Gaspak® (procured from Hi-media laboratory, Mumbai). [1]

Identification of periodontal bacteria.

The aerobic bacterial colonies that were obtained on blood agar plates and Mac.Conkey agar plates were identified based on Colony morphology, gram staining and biochemical tests, enzymatic tests and Real Time PCR was employed for seven obligate anaerobes.

RESULTS

An increase in the percentage of periodontitis was seen from prepubertal to post pubertal stage. In Table 1 it can be noted among prepubertal girls the percentage of periodontitis was 13% where as among pubertal girls it was 52.7%. There was a further increase in post pubertal girls from 52.7% to 61.8%.

Table 1
Percentage of periodontitis among Pubertal girls.

Stage	n	Periodontitis present n	Percentage within the stage	Test of significance
Prepubertal	30	4	13	λ^2 19.477
Pubertal	55	29	52.7	p= 0.005
Post pubertal	55	34	61.8	

The result obtained was found to be statistically significant.

A comparison of various aerobic and anaerobic bacteria was done among pre pubertal pubertal and post pubertal girls. *Streptococcus mutans* showed a decrease from 80% to 69% from pre pubertal to post pubertal stage. A similar pattern was seen in *Lactobacillus* sp. a decrease from 73.3% to 65.4 % was noted. A decrease in percentage was also noted in

Neisseria catrhallis. *Staphylococcus sp.,Staphylococcus aureus , Corynebacterium sp.* and *E.coli* in contrast to Streptococcus and Lactobacillus showed an increase in the percentage from pre pubertal to pubertal girls. (Table 2)

Table 2
Aerobic bacteria in Pre-pubertal, pubertal and post pubertal stages.

	Pre-pubertal. n=30 Frequency (%)	Pubertal.n=55 Frequency (%)	Postpubertal. n=55 Frequency (%)
Gram Positive Cocci			
Staphylococcus sp.	11 (36.6)	23 (41.8)	22 (40)
Staphylococcus aureus	05 (16)	20 (36.3)	18 (32.7)
Streptococcus mutans	24 (80)	43 (78.1)	38 (69)
Streptococcus sp.	23 (76.6)	49 (89)	43 (78.1)
Enterococcus sp.	10 (33.3)	17 (30.9)	16 (29)
Gram Positive Bacilli			
Lactobacilli sp.	22 (73.3)	40 (72.7)	36 (65.4)
Corynebacterium sp.	13 (43.3)	26 (47.2)	34 (61.8)
Gram Negative Cocci			
Neisseria catarhallis	21 (70)	41 (74.5)	48 (87.2)
Gram Negative Bacilli			
Escherichia coli	08 (26.6)	25 (45.4)	32 (58.1)
Haemophillus sp.	01 (3)	09 (16.3)	05 (9)

It can be noted that there is an increase in the percentage of anaerobic bacteria from pre-pubertal stage to the pubertal stage. The highest percentage of anaerobic bacteria that were isolated was Fusobacterium sp., Prevotella sp. and Tannerella forsythia when compared with other anaerobic bacteria.

Table 3
Anaerobic bacteria in Pre-pubertal, pubertal and post pubertal stages

	Pre-pubertal.n=30 Frequency (%)	**Pubertal. n=55. Frequency (%)**	**Postpubertal n=55. Frequency (%)**
Gram Positive Cocci			
Peptostreptococcus sp.	13 (43.3)	32 (58.1)	35 (63.6)
Peptococcus sp.	12 (40)	31 (56.3)	36 (65.4)
Gram Positive Bacilli			
Eubacterium	09 (30)	18 (32.7)	25 (45.4)
Aggregatibacter sp.	11 (36.6)	36 (65.4)	41 (74.5)
Actinomycetes	18 (60)	27 (49.0)	29 (52.7)
Gram Negative Cocci			
Vellionella sp.	20 (66)	34 (61.8)	43 (78.1)
Gram Negative Bacilli			
Bacteroides	05 (16.6)	29 (52.7)	37 (67.2)
Prevotella sp.	10 (33.3)	42 (76.3)	48 (87.2)
Porphyromonas sp.	11 (36.6)	32 (58.1)	38 (69)
Fusobacterium sp.	23 (76.6)	49 (89)	47 (85.4)
Treponema denticola	05 (16.6)	15 (27.2)	34 (61.8)
Tannerella forsythia	14 (46.6)	38 (69)	46 (83.6)
Capnocytophagea sp.	03 (10)	28 (50.9)	32 (58.1)

Prevotella sp. Aggregatibacter, Fusobacterium and Tannerella forsythia showed greater prevalence among post pubertal girls. These bacteria are considered as the main pathogens for periodontitis. From the above results it can be noted that there is an increase in percentage of potential periodontal pathogens from pre pubertal to post pubertal stage. American Academy of Periodontology consensus report 1996 has pointed out three species as the etiological agents for periodontitis. They are *Aggregatibacter actinomycetomcomitans, Porphyromonas gingivalis,* and *Tannerella forsythia.* These organisms appear to be

responsible for bleeding on probing and in increasing the periodontal pocket depth.[2]

DISCUSSION AND CONCLUSION

Gingivitis and periodontitis are caused by the accumulation of dental plaque. This biofilm initially forms in the gingival crevices and later extends into the periodontal pocket [3]. From a single periodontal pocket approximately 100 cultivable species can be isolated. Hence the identification of a particular species which is responsible for the initiation of periodontitis is very tedious and highly complex. In two separate studies, Meurman [4] and Piovano [5] states that, the diverse environmental factors and host factors which are involved in the accumulation of bacteria and the diverse microbial flora present in the oral cavity, make the identification of particular species which are responsible for initiating periodontitis, very tedious and highly complex. According to Leonhardt the putative pathogens such as *Porphyromonas gingivalis* and *Prevotella intermedia* were seen in 60% of the subgingival samples.[6] Kamma et al studied moderate and minimal lesions seen in young adults with progressive periodontitis. They observed microbial complexes associated even with severe periodontitis. He was able to identify *Actinomyces* and *Streptococcus, Hemophillus, Capnocytophagea* and *Veillonella* from minor periodontitis condition [7] A study done by Sizonenko shows that there is a fluctuation in estradiol, progesterone and testosterone during puberty.[8] In another study conducted by Nakagwa et al showed an increase in the microbial flora from pre puberty to puberty. Our study also shows a similar trend. According Nakagwa et al during puberty there was an increase in the Gingival Index score when compared to pre puberty and Puberty stage. Till now there was no study on the comparison between Puberty and Post Puberty stage.[9] Rao SP noted that there is a difference in the prevalence of periodontitis in a rural area when compared to the urban area. According to him the prevalence rate is less in urban area. This may be due to the fact that there is a better health care system in the urban area.[10] At present the oral health services are present only in around 20% of the community health centers. This is seen till the tehsil level hospitals.[11] According to Chauhan et al, among 12 year old children in Himachal Pradesh 60% female were affected by an oral health problem. He also noted that girl children showed a higher percentage of health problems when compared to boys. Gingival bleeding was seen among 12.9% and calculus deposit was seen in 21.8% children. From his study he noted that children from rural area had unhealthy gingiva 23.9% when compared to those of urban area 17.1%.[12]This was in contrast to a study conducted by Mahesh Kumar which showed girls had lesser oral problems when compared to boys with a statistical significance of p=0.008.[13] In another study conducted by Dhar V. et al in Udaipur Rajasthan, on pubertal children of 14 years age. It was noted that female children were more affected when compared to boys of the same age. [14] In Kerala an epidemiological study was conducted by Jose among children of rural area reported a lesser prevalence rate of 15%, which is lesser compared to other reports from India.[15] Awareness on dental hygiene, regular dental check ups should be done from school. It can be concluded that there is a notable shift in the oral microflora from pre pubertal to post pubertal stage. Importance of oral hygiene from prepubertal stage will help in maintaining the normal commensal of the mouth. Simultaneously educating parents of girl children can also help in giving their wards a better oral health.

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