

# Investigation Into The Mycology of Supra Gingival Calculus

Dr. K.D. Prasad  
Professor  
H.O.D, Dept. of Oral & Maxillofacial Pathology

Dr. Sharanamma B.  
Professor  
Dept. of Periodontics

Sri Bankey Bihari Dental College & Research Centre, Ghaziabad (U.P.)

## Introduction

Supra gingival calculus has been defined as a calcifying or calcified mass of material that forms and is firmly adherent to the surface of the tooth, coronal to the free margin of the gingiva. Experimental work by Loe<sup>9</sup>, (1971) Loe et al.<sup>8</sup>(1965) and Theilde et al<sup>14</sup> (1966) point towards an association between oral cleanliness, microbial accumulation and gingival inflammation. The microbiology of Dental Calculus and its precursor the plaque is very well documented, Gibbons & Socranstey,<sup>6</sup> (1964), Silverman & Klienber<sup>12</sup>

While it is accepted that fungal diseases do not figure prominently amongst, various causes of death, it is well recognised that mycotic infections are widespread and affect millions of people in world. More over indiscriminate use of antibiotics and corticosteroids has also contributed towards increased incidence of mycotic infection Bartel,<sup>1</sup>1965, Bartel, et al<sup>2</sup> 1965, As early as in 1926 Neasland,<sup>10</sup> concluded that the principle micro-organisms which build up the stroma of calculus are "first actinomyces and leptothrix and second certain gram positive and gram negative cocci". Howell et al<sup>7</sup> (1965) observed that filamentous organisms were most numerous 90 days after scaling and streptococi were next in abundance. Actinomyces Isreali and Actinomyces Neaslundi constituted 36% of the cultivable organism in mature calculus. Ritzii (1967) observed the change in microbial flora in developing plaque and observed that while in the initial stages aerobic organisms like streptococi, Neisseria and nocardia were present in large numbers, on 9th day though streptococi

still predominate anaerobic organisms, Actinomyces, Veillonella, Corynebacterium and Fusobacteria made their appearance and there was a decline in Neisseria and Nocardia.

Snyder et al<sup>13</sup> (1967) used the fluorescent antibody technique to study the morphology of filamentous bacteria in plaque, and stated that though Actinomyces Isreali, A Neaslunde, A odontolyticus, Nocardia, Dentocarios and Odontomyces viscosus appear as coccobacillary forms, but in culture they appear as filamentous forms.

Yeasts have been frequently isolated from normal and healthy mouths and from diseased conditions hence it is controversial whether they should be included as a part of the normal microflora. Fox and Ainsworth<sup>5</sup> (1958) studied the mycology of the mouth and isolated filamentous and yeast forms both from normal as well as diseased mouths. Candida Albicans was isolated more commonly than any other. However in this study no attention was paid to the mycology of oral calculus.

Glayton and Fox<sup>4</sup> (1973) studied the mycology of oral calculus in human and animals, and were able to isolate a large number of yeasts and filamentous fungi. Yeasts were isolated in 17.3% and 6.9% while filamentous fungi were isolated in 11.5% and 43.1 % of the calculus samples obtained from Town dwellers and Agricultural workers respectively. The most striking difference between the results from human and animal specimens were the much greater incidence and wider variety of yeasts isolated from the latter.

The aim of this investigation was to study the mycology of supra gingival

calculus in detail.

## Methods & Materials

Supra gingival calculus was collected from 50 patients attending the periodontia Department of SBB Dental College & Research Centre. In all the samples selected the deposition of calculus was severe and records of Green's Calculus index were high (i.e. 3.0). The calculus was dislodged either from lingual surface of lower anterior teeth or from buccal surface of upper molar teeth. The calculus samples thus collected were immediately placed under sterile conditions on Sabouraud's agar plates to which 20 mg chloramphenicol per 100 cc. of medium were added, to prevent the growth of routine gram positive and gram negative oral flora. The plates were examined daily and incubated upto 7 days. The growth obtained at the end of this period was either in the form of creamy white moist colonies or greenish or blackish filaments.

If creamy white moist colonies were formed, the presence of yeasts and their subtypes was confirmed by smears, inoculation on cornmeal agar for chlamyospore formation and sugar fermentation. If the growth on the Sabouraud's agar was filamentous it was directly observed by removing it and spreading it out in lacto phenol solution and mounting under a cover glass to observe the arrangement of mycelia and spores for identification of the various types of filamentous fungi.

## Results

Out of 50 patients 36 were males and 14 were females. The age range was from 19 to 60 years, with mean age of 32.4 years. Most of the Patients were between the age of 30-45 years.

The advertisement is divided into three main sections. On the left, there is a logo for 'KENTAMED' in a yellow box with a red diagonal line. The middle section features a blue and white control panel for the 'KENTAMED-ESU-DENTO' unit, with a list of specifications: Power 0-60 watts, 2 Electrode adhesive type, Metal handle Electrode, Frequency 50/60Hz (Automatic), 100-240V (4-6kg), Control to 00 stops the metal implosion of the handle body, Control of heat on handle, Temperature can be regulated at 115°C, IN 1000h (1:1000h) LENS (0.1-2.2) REC 400-1-2, 240V/50Hz, 20-100W and 100-240V, Control by Hand & Dental Chair, and a note that 'KENTAMED-ESU-Dento is a trade mark, belonging to KENTAMED LTD, Belgium'. On the right, there is a white and blue 'MD 666 Bleaching Unit (Motion, Taiwan)' with a list of features: Ultrasonic cavitation Bleaching Unit, Service completed, Digital display for timer 0-100 TC 30 Min, 1 Stop every 10min, 1 Stop on completion, Auto power indicator P.O.D, Light intensity 1000-1500mW, and Working time 02-05min. At the bottom right, there is a pink and white logo for 'dentomed healthcare' with the website 'www.dentomedhc.com' and phone number '+91-9654350641, 9560223355'.

The colour of the supra gingival calculus in most of the sample was white or yellowish white. Yeasts were observed in 8 out of 50 specimens (16%) Filamentous fungi were observed in 38 out of 50 specimens (76%) while 4 (8%) specimen did not show any growth. (Table-I).

**Table 1**

Incidence of Yeasts and Filamentous organisms in Supra Gingival Calculus specimen

	No. of isolates	%age
Yeasts	8	16%
Filamentous organisms	38	76%
No growth	4	8%
Total	50	100%

Four out of the 8 yeasts (50%) growths were identified as Candida Krusai; while the other two were not typed.

Table-II shows the distribution of the filamentous fungi, Aspergillus and Mucor were more frequently isolated than the other types.

**Table 2**

Distribution of Filamentous organisms isolated from Supra gingival Calculus

Filamentous fungi	No.	%age
Aspergillus	14	37%
Mucor	10	27%
Actinomyces	6	16%
Penicillium	4	10%
Rhizopus	4	10%
Total	38	100%

**Discussion**

Clayton and Fox (1973) showed the presence of yeasts in 9 out of 52 specimens (17.3%) of calculus from town dwellers and 4 out of 58 specimens (6.9%) of agricultural workers. In present study also the incidence of yeasts was 16% which is similar to the above study.

From among the specimens by Clayton and Fox (1973) 2 of the yeast specimens were identified as Candida albicans while the remaining were various other forms of yeastlike organisms like Guillermondi, C. Para-psillosis, C. Zeylanoides,

Cryptococcus albidus, Rhodotorula, rurb. Torulopsis, Candida and Trichosporiumcutaneum. In the present study 4 of the 8 yeast like etc were identified as C. Krusai while the remaining two could not be sub-typed. This is probably because more sophisticated specialised media were not available for use for further isolation.

The contents of C. Albicans and other yeas in the mouth and on the skin of humans was found to be quite low by Clayton and Noble (! who observed that out of 514 children, C. Albicans was isolated in the mouth in 5.4% and other yeasts from 0.6% of mouth swabs.

Of the filamentous organisms isolated, the largest number 7 out of 19 were aspergillus, 5 were mucor, 3 were actinomyces and 2 each were penicillium & Rhizopus. In the study by Clayton and Fox (1973), out of 34 specimens from a cultural workers 6 were aspergillus, 10 were penicillium spp, and one was a mucor.

This study was thus able to establish the presence of yeasts and filamentous fungi in supra gingival dental calculus, further studies will help elucidate their role in the formation of calculus

**References**

1. Bartels, H. A., Cohen, G., Scoop, I. W, The Tongue, appearance and ecology systemetic disease and chemotherapy. Periodont. 38 : 449, 1967.
2. Bartels, H. A. : Alterations in the oral mkhial flora accompanying local and systv drug therapy, J. Periodont. 40:421, 79SS
3. Clayton, Y. M. & Noble, W. C. : Observatk on the Epidemiology of Candida albicn J. Clin. Pathol. 19 : 76, 1966.
4. Clayton, Y. M. & Fox, E. C. : Investigate into the mycology of Dental Calculus Town dwellers. Agricultural workers a Grazing Animals, J. Periodont. 44 :25 7573.
5. Fox, E. C. & Ainsworth, G. C. : A contiktion to the Mycology of the mouth, I Med J. 2 : 828, 1958.
6. Gibbons, R.j. and Socransky, S .S.: Studies Of Predominant cultivable microbiota of Dental Plaque. Arch. Oral Biol. 9:365, 1964.
7. Howell, A., Rizzo, A., Paul, F. : Cultivable Bacteria in developing & mature Human Dental Calculus. Arch. Oral Biol. 100 :307, 1965.
8. Loe, H., Theilade, E. & Jensen, S.B. : Experimental

- gingivitis in man. J. Periodont. 36 : 177, 1965.
9. Loe, H. , Human Research Model for the production and prevention of gingivitis. J. Dent. Res. :50 :256, 1971.
10. Nesslund (1962) : Cited by Howell, a. Rizzo, Paul, : Cultivable bacteria in the developing & mature Dental Calculus. Arch. Oral Dent Biol. 10 :307, 1965.
11. Ritz, H.L. : Microbial population shifts in developing human dental plaque. Arch. Oral Biol. 12 :1561, 1967.
12. Silverman, G., Kleinberg, I.: Studies of factors affecting the aggregation of microorganisms in human Dental Plaque. Arch. Oral Biol. 12 :1407, 1967.
13. Theilade, E., 13. Theilade, J. [1985] Formation and ecology of plaque at different locations in the mouth. Scandinavian Journal of Dental Research 93, 90-95.