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Angular cheilitis: A clinical and microbial study

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Abstract

Aims: The aim of the present study was to examine clinical types and microbiological flora isolated from angular cheilitis. **Materials and Methods:** An eroded and/or erythematous, with or without fissure formation, nonvesicular lesion radiating from the angle of the mouth was considered to be angular cheilitis. A sample of the present study comprised of 40 patients having unilateral or bilateral angular cheilitis and 20 healthy individuals without any lip lesions. Clinical examination was done. In both test and control groups, the sample for microbial analysis was obtained from angle of the mouth. **Results:** Clinically, four types of angular cheilitis lesions were found, Type I, II, III, and IV. The most common type of lesion found was Type I lesion. Microorganisms isolated from the lesion were *Staphylococcus aureus*, *Candida* or *Streptococci* in 33 (82.5%) cases either in pure culture or mixed culture. Among these 33 patients, *S. aureus* was found in 25 (75.5%) cases, *Candida* in 16 (48.4%) cases, and *Streptococci* in 5 (13.5%) cases, respectively. Out of 16 cases positive for *Candida*, in 13 cases further isolation of *Candida* was possible. *Candida albicans* was found in 6 cases and *Candida stellatodia* in 7 cases. In majority of the dentulous and edentulous patients, *S. aureus* showed profuse growth. **Conclusions:** There are microorganisms associated with angular cheilitis.

Keywords: *Angular cheilitis, Candida, Candida albicans, Candida stellatodia, Staphylococcus aureus*

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Introduction



Inflammation at the corner of the mouth is known by several names as angular cheilitis, angular cheilosis, angular stomatitis, commissural cheilitis, and perleche. "Cheil" is a Greek word for lip and suffix "itis" indicates inflammation. Angular cheilitis is a clinical diagnosis of the lesion affecting the angle of the mouth where both skin and mucosa may be affected and is characterized by maceration, erythema, and crust formation.^[1] Lemaistre^{[2],[3]} in 1886 gave name to this clinical picture as *perlèche*, (*pourlécher* in Limousin dialect means to lick), it having been observed that persons having this disorder frequently moistened the affected areas with the tongue.

Etiological factors reported in relation to angular cheilitis are infection, low vertical dimension and lack of lip support, old age, denture stomatitis, excessive carbohydrate consumption, deficiency of vitamins, iron deficiency, sensitivity to

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denture materials, prolonged use of antibiotics, etc.^{[4],[5]} Lemaistre^{[2],[3]} and Finnerud^{[2],[6]} considered infection as direct etiological factor. Lemaistre^{[2],[3]} demonstrated what he termed as streptococcus plicatilis. Finnerud^{[2],[6]} observed its appearance in several members of the same family in mild epidemic form and its apparent infectious nature and tendency to heal in one place and break down in another. He isolated monilia chiefly. Microorganisms isolated from the angular cheilitis are *Candida* particularly, *Candida albicans*,^{[7],[8],[9]} *Staphylococcus aureus* + *C. albicans*,^{[10],[11],[12]} and β -haemolytic streptococci along with these two organisms.^[13] In the present study, we tried to examine clinical types and microbiological flora isolated from angular cheilitis.

Materials and Methods



An eroded and/or erythematous, with or without fissure formation, nonvesicular lesion radiating from the angle of the mouth was considered as angular cheilitis. Patients were referred from the Department of Oral Diagnosis, of Government Dental College and Hospital, Ahmedabad, India. 40 patients having unilateral or bilateral angular cheilitis and 20 healthy individuals without lip lesions matching the test group with regard to age, gender, and dental conditions were studied microbiologically as control group.

A detailed clinical examination of the lesion at the angle of the mouth was done in artificial light. Lesions were categorized into four types as described by Ohman *et al.*^[12]

- Type I: Small rhagades limited to the corner of the mouth, adjacent skin slightly involved
- Type II: Lesion with ragged border more extensive in length and depth than Type I lesion
- Type III: Lesion consisting of several rhagades radiating from the corner of the mouth into the adjacent skin
- Type IV: Lesion presenting no rhagades, but erythema of skin contiguous to the vermilion border.

In both test and control groups, sample for microbial analysis was obtained from angle of the mouth. Sterile swabs were rubbed and rotated vigorously over these regions with as much pressure as possible to pick up deep-seated organisms. Bacteriological swabs were immediately inoculated in nutrient broth. After 30 min, material from nutrient broth was picked up through sterile swab. Saturated swab was streaked uniformly over the nutrient agar and Sabouraud media and incubated aerobically at 37°C. Within 1–3 days, easily identifiable colonies were observed.

Microbial examination

Colonies appeared on the simple and Sabouraud agars were examined with naked eye. Their characteristics, according to size, shape, color, border, elevation, outline, translucency, and edges were noted. Smears were stained with gram stain and were examined under oil immersion lens in the light microscope. In test group, Gram-positive cocci in cluster and chain as well as Gram-positive budding yeast cells with sometimes hyphae formation were found. Further isolation of these organisms was carried out. Criteria for isolation and identification of Gram-positive cocci according to their morphology, staining characteristics and culture characteristics on nutrient agar and Gram-positive yeast on Sabouraud agar were followed as described by Cruickson.^[14] According to these criteria, the organisms were found *S. aureus*, Streptococci and *Candida*. The test for coagulase production was carried out for *Staphylococcus*.^[14] Hemolysis pattern of streptococci could not be carried out because of heavy contamination of *S. plicatilis*.

Candida species were determined according to methods advocated by Cruickshank^[14] and Russell and Melville.^[15] Biochemical tests were carried out using agar media containing glucose, maltose, sucrose, and lactose. A germ tube formation test was carried out by method described by MacKenzie.^[16] They used serum for the test. Instead of serum, we used plasma separated from the discarded blood in the blood bank. Chlamydospore production was observed by inoculating isolated *Candida* on Cornmeal agar.

Semiquantitation of microorganisms

Semiquantitation of microorganisms was carried out according to criteria described by Turrell,^[17] i.e., <5 number of colonies—sparse growth, between 5 and 20 colonies—moderate growth and >20 colonies—profuse growth.

Results



Out of 40 patients, 24 (60%) were female and 16 (40%) were male. The youngest patient in the test group was of 5 years and the eldest 70 years [Table 1]. All patients having angular cheilitis complained of pain or discomfort during opening of the mouth. Bilateral lesions were more frequently found, 31 (77.5%). Essentially four types of lesions were identified among 40 patients examined. Lesions of Type I were most frequent, 34 (85%). Among edentulous patients, no one was wearing complete denture; hence, no denture stomatitis was found. Leukoplakia at the commissure was observed in 4 cases. They all were heavy smokers. Drooling of the saliva was observed in seven patients [Table 1]. Six of them were children and one was mentally retarded. Majority of Type I and Type II lesions were of short duration.

Table 1: Clinical findings related to different types and duration of angular cheilitis

Character type of the lesion	Type I (%)	Type II (%)	Type III (%)	Type IV (%)	Total (%)
General description	4 (20)	4 (20)	4 (20)	4 (20)	16 (80)
Retention features	3 (15)	2 (10)	1 (5)	1 (5)	7 (35)
Endothelial features	8 (40)	7 (35)	1 (5)	1 (5)	17 (85)
Internal features					9 (45)
Ducts	10 (50)	4 (20)	1 (5)	-	15 (75)
Elastic fibers	1 (5)	2	-	1 (5)	4 (20)
PF connective	-	2	-	-	2 (10)
Developing of radicle	5	3	3	-	11 (55)
Calcification	6	-	-	-	6 (30)
Duration of the lesion					10 (50)
3-6 months	14	2	3	-	19
6-12 months	1	3	-	-	4
Not specified	2	-	-	-	2
12-18 months	-	-	-	-	0
1-2 years	-	-	-	3	3
>2 years	1	-	-	-	1
Not specified	1	3	-	-	4

Table 2: Microbial results in patients with angular cheilitis

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Table 3: Type and semiquantitation of micro-organisms in relation with number of cases, relationship between clinical types of angular cheilitis and their dentate status

	Isolated subgroups (n)	Number of patient	R score (%)	C statistic (%)	Sensitivity (%)
First address (21)	1. none	11	10 (26.4)	8 (24.2)	-
	2. Confide	0			
	3. Suppression	0			
Mixed address (11)	1. none + Confide + suppression	2	11 (10.1)	8 (24.2)	7 (23.7)
	2. none + Confide	0			
	3. none + suppression	1			
Other responses (7)	1. none	3			
	2. other	1			
	3. preposition	1			
No response		2			
Total number		29 (75.7)	10 (86.6)	7 (23.7)	

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Microorganisms	Serial quantification of growth in the sample	Type of negative children				Isolated strains		Enter
		I	II	III	IV	Staphylococci	Enterobacteriaceae	
3 strains of <i>St. aureus</i>	Sputa	+	-	-	-	-	-	-
	Mucosae	+	-	-	-	3	-	1
	Periton.	10	4	1	2	2	2	24
Candidates of 38 strains	Sputa	3	1	-	1	3	2	8
	Mucosae	5	-	-	-	4	1	5
	Periton.	5	2	-	-	3	1	6
Impregnated of 8 strains	Sputa	2	1	-	-	1	-	2
	Mucosae	2	-	-	-	1	-	2
	Periton.	1	-	-	-	1	-	1

Table 4: Properties of candida species

Total	Species	Genus/tele pathogens	Clinical diagnosis pathogens	Sugar fermentation			
				Glucose (G)	Maltose (M)	Sucrose S	Lactose L
12	<i>C. albicans</i>	8	0	0	0	0	100
	<i>C. glabrata</i>	4	0	+	+	+	100

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Angular cheilitis occurs in both young and adults.^[20] Patients studied by Fox and Ainsworth,^[21] Macfarlane and Helnarska^[13] and Ohman *et al.*^[12] were from the second to eighth decade, whereas Lemaistre^[3] and Finneurd^[6] studied perleche in children. In our study, the age distribution of the patients reveals that lesions were seen from the first to seventh decade.

Microorganisms are often considered to be associated with angular cheilitis. Macfarlane and Helnarsk [13] isolated *S. aureus*, *Candida* and/or β haemolytic streptococci from 68% of angular cheilitis. In our study, out of 40 patients with angular cheilitis, *S. aureus*, *Candida* and/or streptococci were isolated in 33 (82.5%) cases [Table 2].

Combining both pure and mixed form, total number of isolates of *S. aureus* were in 25 (75.7%), *Candida* in 16 (48.4%), and streptococci in 5 (13.5%) cases out of 33 cases [Table 2]. These findings agree with MacFarlane and Helnarska.^[13] They isolated *S. aureus* in 75%, *Candida* in 44%, and Streptococci in 15% of cases. In both these studies, the number of isolates of *S. aureus* are almost double than those of *Candida*. This finding does not support the

common belief that *Candida* and angular cheilitis are closely associated. MacFarlane *et al.*^[13] explained this on the basis that previous workers had used Sabouraud medium alone to culture organisms. This culture medium selectively encourages the growth of yeasts and farley supports the growth of *S. aureus* and β haemolytic Streptococci. Hence, it is not surprising that *Candida* species have become recognised as the common infective cause of angular cheilitis and that other potential pathogens have been missed. Dahlen's^[11] study observed the isolates of *S. aureus* more in dentate patients and of *Candida* in edentulous patients with denture stomatitis.

The aim for semiquantitation was to see the relative severity of the infection, to estimate the relationship between the various microorganisms in the sample and to determine whether or not the flora could be considered normal in the septic case and location. In our study, *S. aureus* showed profuse growth predominantly which agrees with the findings of Dahlen *et al.*^[11] and Ohman *et al.*^[12] *Candida* showed sparse, moderate and profuse growth in almost equal number of cases where in Ohman *et al.*'s^[12] study the occurrence of *C. albicans* was often sparse. They said that as usually heavy growth of *S. aureus* and a sparse growth of *C. albicans* was obtained in their study, it seems that yeasts would be less significant than *S. aureus*. On the other hand, when antifungal measures were taken against angular cheilitis, lesions healed rapidly as quoted by Cawson^[8] and Shuttleworth and Gibbs.^[2] This could imply that *Candida* species do not have to be present in large numbers to sustain a clinical lesion.

In correlating the type of angular cheilitis and isolated micro-organisms, in ours and Ohman *et al.*'s^[12] study, Type I, II, and III lesions showed sparse to profuse growth of *S. aureus*, *Candida* and streptococci. Type IV lesions showed growth of *Candida*.

Out of 16 cases positive for *Candida*, in 13 cases further isolation of *Candida* was possible. *C. albicans* was found in 6 cases and *Candida stellastodia* in 7 cases. Germ tube was positive in all *C. albicans* species and was negative only in one *C. stellastodia* case. *C. albicans* showed negative chlamydospores in 2 cases and *C. stellastodia* showed positive chlamydospore formation in 4 cases. Martin *et al.*^[22] said that there are strains of *C. albicans* that are poor chlamydospore producers and there are strains of *C. stellastodia* that form germ tubes as well as chlamydospores.

In our study and Ohman *et al.*'s^[12] study, none of the lip samples obtained in the control patients, *Candida*, *S. aureus* or streptococci were isolated. However, MacFarlane and Helnarska^{[8],[13]} out of 45 individuals in control group, observed *S. aureus* in 3 (7%) cases (all scanty growth), *Candida* in 10 (22%) (scanty to moderate growth) and Streptococci in none of the case. The fact that *S. aureus* and/or *C. albicans* were recovered in very few number of cases in MacFarlane and Helnarska's^[13] study and were not recovered in ours' and Ohman's^[12] study in the lip samples of healthy control patients further support the view that angular cheilitis is an infectious disorder.

Conclusions



Angular cheilitis may appear in various forms; small rhagades limited to the corner of the mouth to extensive rhagades radiating from the corner of the mouth into the adjacent skin. It can also appear as erythema of the skin contiguous with vermilion border. It can appear as unilateral or bilateral lesions.

The fact that micro-organisms, particularly *S. aureus*, *Candida* and Streptococci could be found from the lesions does not necessarily imply that these organisms initiated the lesion by invading the tissues at the corner of the mouth. It could be that they were there because of conditions that favoured their multiplication. These conditions are called predisposing factors. The predisposing factor may be hypovitaminosis, iron deficiency, age-related because of sagging of tissue of corner of the mouth, reduced vertical dimension of occlusion, denture related, etc., However, the very fact that these micro-organisms were isolated from the lesions showed profuse growth in the majority of cases and were not isolated from lip samples of healthy individual suggest that their presence cannot be denied. They may be secondary invaders, aggravating the process. Thus, topical chemotherapy may not produce a permanent cure if the predisposing conditions are not cured or removed,^{[1],[8],[12],[13],[23]} but the application of antibacterial preparation on lesions with rhagades formation and antifungal preparation on lesions with only erythema without rhagades may control the infection and help in the healing of lesions.

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Conflicts of interest

There are no conflicts of interest.

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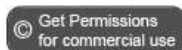
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