



Oral Health Intervention

(An Initial Study)

By

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Introduction

This paper is primarily an enumeration of the common Oral diseases prevalent in the world today. The idea is simple, once we are aware of what our challenges truly are, we'll be in a better position to mount our defenses. In this case the aim is to provide basic Oral healthcare at the primary care level (RMHC). **Oral health problems** can be primarily be **classified into three categories**, namely: **Dental, Pre-cancerous (and Cancerous) and Oral cavity related diseases**. Apart from the dental problems, most of these issues can be tackled by a general physician. An important consideration may be the pre-cancerous (and Cancerous) conditions; India has the highest rate of Oral Cancer in the world (20 per 10,000)¹. We need to look into diagnostic, curative and preventive measures for Oral Cancer at the RMHC level (if nothing else, we need to setup a robust system of referrals to take adequate care of each patient that falls in our catchment area). In the next section, we outline the major Oral diseases with their respective causes, symptoms, treatment options and rates of prevalence. In the end, we sketch out a plan to tackle the situation at the RMHC level.

Disclaimer

At this point, before we jump into the content of the paper, we would like to point out a few problems we had during the course of gathering information. The data about the diseases, their cause, their symptoms was largely easily available, what proved to be a tough nut was collecting data about the prevalence of these conditions in the population. Ideally what we would have liked to do was to point out data which was collected in the rural Indian population. There's a large difference (in terms of the socio-economic conditions etc) between the rural Indian population and the developed world. Indian data was usually hard to come by, most of the very valuable data has not been digitized as yet and hence is unavailable online. Another hindrance was the very limited number of free publications with interesting/relevant and important data. When quoting prevalence figures from studies conducted in other countries, we have assumed the relevance of the data by assuming that (inspite of all the difference) the figures quoted would give a sense of the scale of the problem in terms of order of magnitude. We were forced on occasions to cite from the abstracts of unavailable publications, though this is bad practice, we thought in this situation it made sense to do this for an internal paper being prepared for our own understanding.

¹ http://www.nypcancerprevention.com/issue/14/cancer_prevention/feature/india.shtml

Reference Table

1. SOFT TISSUE:

S.No	CONDITION	PREVALENCE*	CAUSES	SIGNS & SYMPTOMS	DIAGNOSIS**	EQUIPMENT	TREATMENT	PREVENTION	TRAINING***
1.1	Glossitis	Low	Allergic reaction. Dry mouth. Infections. Injury. Low iron levels. Skin conditions. Tobacco, alcohol, hot foods, spices. Yeast infection.	Inflammation of tongue	CE	Gloves Mouth mirror	Antibiotics Anaesthetic gel	Good oral hygiene Diet	Grade I
1.2	Angular Chelitis	Low	Riboflavin (Vitamin B2). Iron deficiency. Mechanical tension in older patients.	Deep cracks or splits at the corner of the mouth	CE	Gloves Mouth mirror	Antibiotics Nutritional supplement	Dietary changes	Grade I

1.3	Canker sore (Aphthous ulcer) and other types of ulcers	Low	Immune system Mouth injury Dietary deficiency of Vitamins & Minerals Hormonal changes. Food allergies. Emotional stress.	Ulcers in the inner surface of cheeks	CE	Gloves Mouth mirror	Antibiotic Nutrition supplement Corticosteroids	Dietary changes Stress reduction Reduce the causative agent like sharp teeth, Tooth paste etc	Grade II
1.4	Herpetic (Stomatitis & Labialis)	Low	Viral infection.	Blisters & Ulcers on Tongue, Mouth	CE	Gloves Mouth mirror	Antiviral Anaesthetic gel	Children should avoid contact with person having cold sores	Grade II
1.5	Thrush (Oral Candidiasis)	Low	Having an HIV infection. Chemotherapy. High blood sugar level. Pregnancy.	Whitish lesions on Mouth & Tongue	CE Biopsy (late)	Gloves Mouth mirror	Anti fungal	Oral Hygiene	Grade III
1.6	Gingivitis	High	Plaque deposits	Bleeding gums	CE	Scaler Mouth mirror Probe Compressor	Scaling (Plaque removal)	Good oral hygiene Tobacco cessation	Grade IV

1.7	Leukoplakia	Low	Smoking Chewing tobacco Alcohol consumption	Painless white patches on the sides of the tongue	CE	Mouth mirror Probe Gloves	Nutrition supplement	Smoking, Tobacco, Alcohol Cessation Oral health hygiene	Grade III
1.8	Oral Lichen Planus	Low	Unknown	Tender or painful mouth lesions on tongue, sides of cheek,	Biopsy for confirmation	Gloves Mouth mirror	Antihistamines Cyclosporin Acitretin	Tobacco, Smoking cessation	Grade III
1.9	Oral Sub Mucous Fibrosis	Low	Tobacco chewing Smoking	Initially mucosa leathery with fibrous bands Later blanched and stiff Inability to open beyond mouth beyond a certain point	CE Biopsy	Gloves Mouth mirror	Hydrocortisone injection Placentrax injection initially.	Cessation of tobacco, smoking	Grade III

2. HARD TISSUE:

2.1	Dental caries	High	Frequent intake of food having free sugars Improper oral hygiene	Initially Sensitiveness	CE	Mouth mirror Probe Cement spatula Glass slab Plastic instruments Spoon shaped excavator Aerotor Cutting burs	Filling of tooth	Good oral hygiene Dietary habits	Grade IV
2.2	Fluorosis	Low	High Fluoride content in drinking water	Initially white streaks Later darkened streaks with severe staining	CE	Mouth mirror Probe	Bleaching, Crown Veneering	Low fluoride drinking water	Grade I
2.3	Late Periodontitis	High	Poor oral hygiene	Mobile teeth	CE	Mouth mirror	Tooth extraction (Late stages)	Good oral hygiene	Grade III

*According to National Oral Health Survey & Fluoride Mapping, 2002-2003, INDIA. Dental Council of India, New Delhi.

**CE – Clinical Examination

***Grade I – For all the conditions mentioned here, Physicians **can be trained in two days** in a clinical setup (with patient inflow).

***Grade II – Physicians can be trained to diagnose and treat the condition **in four days** in a clinical setup (with patient inflow).

***Grade III – **One week of intensive training** required for accurate diagnosis of the condition in a clinical setup (with patient inflow).

***Grade IV – **Two weeks of training** required to diagnose and treat (acceptably) in a full fledged dental setup.

Major Oral Health Problems

SOFT TISSUE CONDITIONS:

1.1 GLOSSITIS

Glossitis is an inflammation of the tongue. Under the influence of this disease, the tongue usually swells up or loses colour. Often the finger like projections (papillae) on the tongue, are lost and the tongue becomes smooth.

Types

- Median rhomboid Glossitis
- Geographical tongue (benign migratory Glossitis)

Prevalence

Very little research has been carried out on the prevalence of these diseases in the general population, instead what we have are isolated studies on a few thousand adults/children, often in places with wide geographical, ethnic and socio-economic differences. The occurrence of **Geographical tongue was found to be 4.3% in Iraqi school children** (sample size: 6090, year: 2004)². An Indian study in Karnataka found **MRG to be prevalent in 1.5% patients and Geographical tongue to be present in 0.84% of our population**³.

Causes⁴

Glossitis is often a symptom of other conditions or problems, including:

- Allergic reaction to toothpaste, mouthwash, breath fresheners, dyes in candy, plastic in dentures or retainers, or certain blood pressure medications (ACE inhibitors).
- Dry mouth, when the glands that produce saliva are destroyed.
- Infections with bacteria or viruses (including oral herpes simplex).
- Injury from burns, rough edges of teeth or dental appliances, or other trauma.
- Low iron levels (called iron deficiency) or certain B vitamins, such as vitamin B12.
- Skin conditions such as oral lichen planus, erythema multiform, aphthous ulcers, pemphigus vulgaris, syphilis, and others.

² Ghose, L. J. and Baghdady, V. S. (1982), Prevalence of geographic and plicated tongue in 6090 Iraqi schoolchildren. *Community Dentistry and Oral Epidemiology*, 10: 214–216. doi: 10.1111/j.1600-0528.1982.tb00381.x

³ Mathew AL, Pai KM, Sholapurkar AA, Vengal M. The prevalence of oral mucosal lesions in patients visiting a dental school in Southern India. *Indian J Dent Res [serial online]* 2008 [cited 2011 Jul 11];19:99-103. Available from: <http://www.ijdr.in/text.asp?2008/19/2/99/40461>

⁴ PubMed Health: Glossitis <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0002048/>



- Tobacco, alcohol, hot foods, spices, or other irritants. (Tongue piercing also represent a certain amount of danger).
- Yeast infection in the mouth.

Symptoms

Symptoms of glossitis may appear quickly or slowly over time. They include:

- Difficulty with chewing, swallowing, or speaking
- Smooth surface of the tongue
- Sore and tender tongue
- Tongue color changes
 - Pale, if caused by pernicious anemia
 - Fiery red, if caused by a lack of other B vitamins
- Tongue swelling

Signs and tests

Visual examination

- Finger-like bumps on the surface of the tongue (called papillae) may be missing
- Swollen tongue (or patches of swelling)

Blood tests may be done to rule out other medical conditions

Treatment

The goal of treatment is to reduce inflammation.

- Good oral hygiene is important. Brush your teeth thoroughly at least twice a day and floss at least once a day.
- Antibiotics, anti-fungal medications, or other antimicrobials may be prescribed if the Glossitis is due to an infection.
- Dietary changes and supplements are used to treat anemia and nutritional deficiencies.
- Avoid irritants (such as hot or spicy foods, alcohol, and tobacco) to reduce any tongue discomfort.

Expectations (prognosis)

Glossitis usually responds well to treatment if the cause of inflammation is removed or treated. This disorder may be painless, or it may cause tongue and mouth discomfort. In some cases, Glossitis may result in severe tongue swelling that blocks the airway.

Complications

- Airway blockage
- Difficulties with speaking, chewing, or swallowing
- Discomfort

1.2 ANGULAR CHELITIS:

Angular Chelitis is an inflammatory lesion at the labial commissure, or corner of the mouth, and often occurs bilaterally (on both sides of the mouth).

Prevalence

According to a national survey conducted in the U.S.A the **incidences of Angular Chelitis** amongst its population distributed according to education (less than 12th grade, 12th grade, more than 12th grade) **ranged from 1.5% to 3.4%**⁵. In a study conducted in Manipal, Karnataka on a much smaller sample size of about 1100 people, the **prevalence rate of Angular Chelitis was observed to be 0.58%**⁶.

Causes

Although Angular Chelitis may be linked to Candida (fungus) infections, the primary cause appears to be nutritional deficiency. Riboflavin (Vitamin B2) and Iron deficiency seem to be the main culprits. In older patients, due to the lack of teeth, mechanical tension could be the cause of Angular Chelitis.

Symptoms

The condition manifests as deep cracks or splits at the corner of the mouth. In severe cases, the splits can bleed when the mouth is opened and shallow ulcers or a crust may form.

Treatment

For minor cases caused by bacterial infection, applying a topical antibiotic to the area for several days is sufficient to treat the infection and heal the lesions. Minor cases caused by a fungal infection can be treated by over-the-counter antifungal creams. Investigations of an underlying

⁵ Data source: The Third National Health and Nutrition Examination Survey (NHANES III) 1988–1994, National Center for Health Statistics, Centers for Disease Control and Prevention. It can be seen at http://drc.hhs.gov/report/6_1.htm

⁶ Mathew AL, Pai KM, Sholapurkar AA, Vengal M. The prevalence of oral mucosal lesions in patients visiting a dental school in Southern India. Indian J Dent Res 2008;19:99-103.

disease such as diabetes or anemia must be conducted if the antifungal/antibiotic treatment doesn't work.

1.3 CANKER SORE (Aphthous ulcer)

A canker sore is a painful, open sore in the mouth. Canker sores are white or yellow and surrounded by a bright red area. They are a common form of mouth ulcer.

Prevalence

In a study of about 10,000 people from 21 countries, the **lifetime occurrence of Aphthous ulcer** (afflicted by it twice in their lifetime) was found to be **38.7% in men and 49.7 % in women**⁷. In a separate study on about 20,000 people the prevalence was found to be 17.7% (referring to cases within the last two years)⁸.

Causes

The exact cause of many Aphthous ulcers is unknown, but Aphthous ulcers maybe related to problems with the body's immune (defense) system. The sores may occur after a mouth injury due to dental work, aggressive tooth cleaning, or biting the tongue or cheek. Other causes could be:

- Lack of certain vitamins and minerals in the diet (Iron, folic acid, vitamin B-12).
- Hormonal changes.
- Food allergies.
- Emotional stress.
- Often some types of Chemotherapy might also lead to Aphthous ulcers.

Symptoms

Canker sores usually appear on the inner surface of the cheeks and lips, tongue, soft palate, and the base of the gums.

Symptoms include:

- One or more painful, red spots or bump that develops into an open ulcer.
- Middle of the sore is white or yellow
- Usually small (under 1 cm) but occasionally larger (Aphthous ulcer is often classified according to its diameter).
- Sore may turn gray just before starting to heal

⁷ J. A. Embil, R. G. Stephens, and F. R. Manuel, Prevalence of recurrent herpes labialis and aphthous ulcers among young adults on six continents. *Can Med Assoc J.* 1975 October 4; 113(7): 627–630. PMID: PMC1956715

⁸ AXÉLL, T. and HENRICSSON, V. (1985), Association between recurrent aphthous ulcers and tobacco habits. *European Journal of Oral Sciences*, 93: 239–242. doi: 10.1111/j.1600-0722.1985.tb01951.x

Less common symptoms include:

- Fever
- General discomfort or uneasiness (malaise)
- Swollen lymph nodes

Pain usually goes away in 7 to 10 days. It can take 1 to 3 weeks for a canker sore to completely heal. Large ulcers can take longer to heal and may necessarily need medical assistance.

Signs and tests

Clinical diagnosis is made by visual examination. If canker sores persist or continue to return, tests should be done to look for other causes, such as erythema multiforme, drug allergies, herpes infection, and bullous lichen planus.

Treatment

Canker sores usually heal by themselves. Additional care should be taken:

- Hot or spicy foods should be avoided.
- Mild, over-the-counter mouth washes or salt water may help. There are over-the-counter medicines that soothe the painful area. These medicines are applied directly to the sore area of the mouth. This may be fluocinonide gel (Lidex) or chlorhexidine gluconate mouthwash.
- Powerful anti-inflammatory medicines called corticosteroids are sometimes used.

Expectations (prognosis)

Canker sores usually heal on their own. The pain usually decreases in a few days. Other symptoms disappear in 10 to 14 days.

Complications

Antibiotic treatment for canker sores may lead to oral thrush (a type of mouth infection) or other Candida infections. Rarely, bacterial infections such as cellulitis and Ludwig's angina may occur. Canker sores are not cancer and don't lead to cancer. But if a mouth ulcer lasts for more than 2 weeks, a doctor should be consulted to rule out possible cancer.

1.4 HERPETIC (STOMATITIS & LABIALIS)

Herpetic Stomatitis is a herpes simplex viral infection of the mouth that causes ulcers and inflammation. These mouth ulcers are not the same as canker sores, which are caused by a different virus. **Herpetic Labialis** is the infection of the lips, mouth, or gums with the same virus. It leads to the development of small, painful blisters commonly called cold sores or fever blisters.

Prevalence

The Herpes simplex virus (HSV) is a common virus affecting a large part of the population (there are two types of HSV, type 1 and type 2. Type 1 is usually the cause of oral infections, and Type 2 usually causes genital Herpes). A study of about 10,000 people across six continents (referenced earlier for Aphthous ulcers) **found Herpes Labialis to have affected about 33.2% of men and 28% of women** (Lifetime occurrence, at least two instances of infection)⁹.

Causes

Herpetic stomatitis is a contagious viral illness caused by *Herpes virus hominis* (also called HSV). It is seen mainly in young children. This condition is probably a child's first exposure to the herpes virus. An adult member of the family may have a cold sore at the time the child develops Herpetic stomatitis. Once an individual is infected by the HSV, the virus spreads to regional mass of nerve tissue, ganglia (e.g., the trigeminal ganglion), where it remains latent but can be reactivated whenever conditions are appropriate.

Symptoms¹⁰

- Blisters in the mouth, often on the tongue, cheeks, palate, gums, and a border between the lip (red colored) and the normal skin next to it
- Decrease in food intake, even if the patient is hungry.
- Difficulty swallowing (dysphagia).
- Drooling.
- Fever (often as high as 104 °Fahrenheit) may occur 1 - 2 days before blisters and ulcers appear.
- Irritability.
- Pain in mouth.
- Swollen gums.
- Ulcers in the mouth, often on the tongue or cheeks, these form, after the blisters pop.

⁹ J. A. Embil, R. G. Stephens, and F. R. Manuel, Prevalence of recurrent herpes labialis and aphthous ulcers among young adults on six continents. *Can Med Assoc J.* 1975 October 4; 113(7): 627–630. PMID: PMC1956715

¹⁰ Medline : Herpetic stomatitis <http://www.nlm.nih.gov/medlineplus/ency/article/001383.htm>

Signs and tests

Herpetic stomatitis is normally diagnosed based on its very typical appearance. Laboratory studies are seldom done. Sometimes viral culture and special stains can help with the diagnosis.

Treatment

Herpetic stomatitis can be treated with the acyclovir family of antiviral medications. While the mouth is very sore, the child should be put on a mostly liquid diet of cool-to-cold, non acidic drinks. An oral topical anesthetic (viscous lidocaine) is available for severe pain, but it must be used with care because the anesthetic deadens all feeling. It may interfere with swallowing, and can possibly cause the child to burn the mouth or throat on hot liquids, or choke. In addition, there are rare reports of death from overdose or misuse of lidocaine.

Expectations (prognosis)

The child should recover completely within 10 days without medical treatment. Oral acyclovir may speed up recovery.

Complications

Herpetic kerato conjunctivitis, a secondary herpes infection in the eye, may develop. This is an emergency and can lead to blindness. Dehydration may develop if the child refuses to eat and drink enough because of a sore mouth.

Prevention

Approximately 90% of the population carries herpes simplex virus. It is difficult to prevent children from picking up the virus at some time during their childhood.

Children should strictly avoid close contact with people who have cold sores (for example, no kissing parents who have active cold sores). Children should also avoid other children with the HSV infection. They should not share utensils, glasses, or food with actively infected people.

1.5 THRUSH (Oral Candidiasis)

Oral Candidiasis is caused by a fungus group called *Candida*. A small amount of this fungus lives in mouth most of the time. When immune system is weaker, the fungus can grow, leading to sores (lesions) in mouth and on tongue.

Prevalence

Oral Candidiasis is more prevalent in very young and very old people. It is fairly common for people with HIV infections to develop Thrush, due to the breakdown of their immune systems. In an earlier quoted **study in Karnataka** (with sample size 1100) the **incidence rate of Oral Candidiasis was found to be 3.07%**¹¹.

Causes¹²

The fungus *Candida* is present in around 80% of humans and any decrease in the strength of the immune system may contribute to the over growth of *Candida* which causes Oral Candidiasis (Thrush). Usually causes then are:

- Having an HIV infection or AIDS.
- Receiving chemotherapy for cancer or drugs to suppress immune system following an organ transplant.
- High blood sugar level.
- Pregnancy.

It is commonly seen in infants and not considered abnormal unless it lasts longer than a couple of weeks.

Symptoms

Thrush appears as whitish, velvety lesions in the mouth and on the tongue. Underneath the whitish material, there is red tissue that may bleed easily. The lesions can slowly increase in number and size.

¹¹ Mathew AL, Pai KM, Sholapurkar AA, Vengal M. The prevalence of oral mucosal lesions in patients visiting a dental school in Southern India. Indian J Dent Res [serial online] 2008 [cited 2011 Jul 11];19:99-103. Available from: <http://www.ijdr.in/text.asp?2008/19/2/99/40461>

¹² Medline plus : Oral Candidiasis <http://www.nlm.nih.gov/medlineplus/ency/article/000626.htm>

Signs and tests

Visual examination can help in diagnosis since these fungal lesions have a distinct appearance. If not entirely clear, one of the following tests may be performed to look for the *Candida* organisms:

- Microscopic examination of mouth scrapings
- Culture of mouth lesions

Treatment

For thrush in infants, treatment is often not necessary. It generally gets better on its own within 2 weeks. For adults using a soft toothbrush and rinsing the mouth with a diluted 3% hydrogen peroxide solution several times a day is helpful.

- In of thrush developing after taking antibiotics, eating yogurt or taking over-the-counter acidophilus capsules can help.
- Good control of blood sugar levels in persons with diabetes may be all that is needed to clear a thrush infection.
- An antifungal mouthwash (nystatin) or lozenges (clotrimazole) may be prescribed in case of severe thrush (prescription duration is usually 5-10 days).
- If the infection has spread throughout body or person has HIV/AIDS, stronger medications may be used, such as fluconazole (Diflucan) or ketoconazole (Nizoral).

Expectations (prognosis)

Thrush in infants may be painful, but is rarely serious. Because of discomfort, it can interfere with eating.

In adults, thrush that occurs in the mouth can be cured. However, the long-term outlook is dependent on your immune status and the cause of the immune deficit.

Complications

If immune system is weak (for example, if you are HIV-positive or receiving chemotherapy), *Candida* can spread throughout your body, causing infection in your esophagus (esophagitis), brain (meningitis), heart (endocarditis), joints (arthritis, or eyes (endophthalmitis).

Dental Problems

1.6 GINGIVITIS

Gingivitis is inflammation of the gums (Gingiva). It is a form of periodontal disease involving inflammation and infection that destroys the tissues that support the teeth, including the gums, the periodontal ligaments, and the tooth sockets (alveolar bone). It usually develops during puberty or early adulthood due to hormonal changes and may persist or recur frequently, depending on the health of your teeth and gums..

Prevalence

In a national Indian survey, the prevalence of periodontal disease increased as 12 year or higher age groups were surveyed. In children aged 12 years, **the prevalence was 55.4 per cent** and it peaked **at 89.2 per cent** in the 35-44 year age group. The prevalence was lower in 65-74 year age-group (79.4 per cent), possibly due to the presence of a high number of fully and partially edentulous subjects in that age group. Calculus was more prevalent than bleeding across age groups. Periodontal pockets, both shallow (4-5 mm) and deep (6 mm) were markedly more prevalent in older adults (65-74 years)¹³.

Causes¹⁴

Gingivitis occurs due to the long-term effects of plaque deposits. Plaque is a sticky material made of bacteria, mucus, and food debris that develops on the exposed parts of the teeth. It is a major cause of tooth decay. If not removed it turns into a hard deposit called tartar that becomes trapped at the base of the tooth. Plaque and tartar irritate and inflame the gums. Bacteria and the toxins they produce cause the gums to become infected, swollen, and tender. Injury to the gums from any cause, including overly vigorous brushing or flossing of the teeth, can cause gingivitis. Some aspects which may aggravate Gingivitis are:

- General illness.
- Poor dental hygiene.
- Pregnancy (hormonal changes increase the sensitivity of the gums).
- Uncontrolled diabetes.
- Misaligned teeth, rough edges of fillings, and ill-fitting or unclean mouth appliances (such as braces, dentures, bridges, and crowns) can irritate the gums and increase the risk of gingivitis.
- Medications such as phenytoin and birth control pills, and heavy metals such as lead and bismuth are also associated with Gingivitis.

¹³ National Oral Health Survey & Fluoride Mapping, 2002-2003, INDIA.

¹⁴ PubMed Health, Gingivitis, <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0002051/>

Symptoms

- Bleeding gums (blood on toothbrush even with gentle brushing of the teeth)
- Bright red or red-purple appearance to gums
- Gums that are tender when touched, but otherwise painless
- Mouth sores
- Swollen gums
- Shiny appearance to gums

Gingivitis at later stage results in Periodontitis which leads to pocket formation, loss of periodontal fibres and this results in teeth becoming mobile.

Signs and tests

- Soft, swollen, red-purple gums.
- Deposits of plaque and tartar may be seen at the base of the teeth.
- The gums are usually painless or mildly tender.
- Dental x-rays and dental bone measurements may be done to determine whether the inflammation has spread to the supporting structures of the teeth.

Treatment

The goal is to reduce inflammation. The teeth are cleaned thoroughly. Careful oral hygiene is necessary after professional tooth cleaning. Proper brushing techniques must be taught. Professional tooth cleaning in addition to brushing may be recommended twice per year or more frequently for severe cases. Antibacterial mouth rinses or other aids may be recommended. Repair of misaligned teeth or replacement of dental and orthodontic appliances may be recommended.

Expectations (prognosis)

The removal of plaque from inflamed gums may be uncomfortable. Bleeding and tenderness of the gums should lessen within 1 or 2 weeks after professional cleaning and careful oral hygiene. Warm salt water or antibacterial rinses can reduce the puffiness. Over-the-counter anti-inflammatory medications will ease any discomfort from a rigorous cleaning. Strict oral hygiene must be maintained for whole life or gingivitis will recur.

Complications

- Recurrence of gingivitis
- Periodontitis
- Infection or abscess of the gingiva or the jaw bones
- Trench mouth (Also called Acute Necrotizing Ulcerative Gingivitis (ANUG) is an endogenous infection characterized by necrosis of gingiva)

Prevention

Good oral hygiene is the best prevention against gingivitis because it removes the plaque that causes the disorder. The teeth should be brushed at least twice daily. For people who are prone to gingivitis, brushing may be recommended after every meal and at bedtime. Antiplaque or anti-tartar toothpastes or mouth rinses may be recommended. Regular professional tooth cleaning at least once in every 6 months is important to remove plaque that may develop even with careful brushing.

Pre – cancerous (and cancerous) diseases

1.7 LEUKOPLAKIA

Oral white lesions that cannot be clinically or pathologically characterized by any specific disease are referred to as Leukoplakia¹⁵. It is a precancerous sore (lesion) that develops on the tongue or the inside of the cheek affecting the mucous membranes.

Prevalence

According to well-documented epidemiologic data from different countries over the last thirty years, the prevalence of oral Leukoplakia varies between 1.1 and 11.7 percent, with a mean value of 2.9 percent¹⁶. This range reflects assessments made on the basis of different definitions of oral Leukoplakia. An Indian study on around 50,000 villagers puts this figure at **around 2%** (this figure is an average of the values found by the survey on five different districts. The actual values ranged from 0.2% to 5.1%)¹⁷.

Types

There's another form of Leukoplakia called '**Hairy**' Leukoplakia. This is caused by the Epstein-Barr virus and is usually seen in people with very weak immune system. It is usually seen in people with HIV infection.

Bright red lesions can be classified as Erythroplakia.

Causes

Idiopathic Leukoplakia are mostly benign lesions occurring in response to chronic irritation. Its usual causes are:

- Smoking or chewing tobacco (snuff) use.
- Rough teeth or rough places on dentures, fillings, and crowns.
- Excessive alcohol consumption.

Symptoms¹⁸

¹⁵ Mishra M, Mohanty J, Sengupta S, Tripathy S. Epidemiological and clinicopathological study of oral Leukoplakia. Indian J Dermatol Venereol Leprol 2005;71:161-5

¹⁶ Jolán Bánóczy, D.Sc.; Zeno Gintner, Ph.D.; Csaba Dombi, Ph. Tobacco Use and Oral Leukoplakia. American Dental Education Association, Journal of Dental Education, Vol 65, Issue 4, 322-327

¹⁷ J. PINDBORG*, F. S. MEHTA, P. C. GUPTA AND D. K. DAFTARY, Prevalence of Oral Sub mucous Fibrosis among 50,915 Indian villagers. The Basic Dental Research Unit, Tata Institute of Fundamental Research, 1968

¹⁸ Pub Med Health: Leukoplakia <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0002041/>

Hairy Leukoplakia:

Painless, fuzzy white patches on the side of the tongue.

Normal Leukoplakia (skin lesions):

- Location
 - Usually on the tongue
 - May be on the inside of the cheeks
- Color
 - Usually white or gray
 - May be red (called Erythroplakia, a condition that can lead to cancer)
- Texture
 - Thick
 - Slightly raised
 - Hardened surface

The typical white patch of Leukoplakia develops slowly, over weeks to months. The lesion may eventually become rough in texture, and may become sensitive to touch, heat, spicy foods, or other irritation.

Treatment

The goal of treatment is to get rid of the lesion. Removing the source of irritation is important and may cause the lesion to disappear.

- Treat dental causes such as rough teeth, irregular denture surface, or fillings as soon as possible.
- Stop smoking or using other tobacco products.
- Do not drink alcohol.

Surgery may be needed to remove the lesion.

Expectations (prognosis)

Leukoplakia is usually harmless. Lesions often clear up in a few weeks or months after the source of irritation is removed.

Oral hairy Leukoplakia is often a sign of HIV infection and an increased likelihood of developing AIDS but it is not harmful by itself.

Possible Complications

- Chronic discomfort
- Infection of the lesion
- Oral cancer

1.8 ORAL LICHEN PLANUS

Oral Lichenoid lesions (or Oral lichen Planus) are an autoimmune chronic inflammatory condition that affects the lining of mouth, most often on the inside of cheeks, and can also affect gums, tongue, or lips. In some cases, the throat or esophagus can also be affected. This condition can occur at any age but it usually begins during midlife.

Prevalence

According to some studies on a Swedish population with a sample size of about 20,000 people the occurrence of Oral Lichen Planus was about 1.9%, with about 1.6% of men having Oral Lichen Planus and about 2.1% women reporting its occurrence¹⁹. Another study in India, trying to find the malignant potential of Oral Lichen Planus found 722 patients having Oral Lichen Planus from amongst 27,599 patients involved in various epidemiological studies in Kerala (Ernakulum)²⁰. This gives us a slightly higher **prevalence rate of about 2.6%**.

Causes²¹

The exact cause of lichen planus is unknown. However, it is likely to be related to an allergic or immune reaction. Factors which can aggravate the situation are:

- Exposure to medications, dyes, and other chemical substances (including gold, antibiotics, arsenic, iodides, chloroquine, quinacrine, quinide, phenothiazines, and diuretics).
- Disorders such as Hepatitis C.

Lichen planus generally affects middle-aged adults. It is less common in children.

Symptoms

- Tender or painful (mild cases may have no discomfort) mouth lesions.
- Located on the sides of the tongue, the inside of the cheek or on the gums.
- Area of blue-white spots or "pimples".
- Lines of lesions that form a lacy-looking network.
- Gradual increase in size of the affected area.
- Lesions sometimes form painful ulcers.

¹⁹ Axéll, T. and Rundquist, L. (1987), Oral lichen planus – a demographic study. *Community Dentistry and Oral Epidemiology*, 15: 52–56. doi: 10.1111/j.1600-0528.1987.tb00480.x

²⁰ Murti, P. R., Daftary, D. K., Bhonsle, R. B., Gupta, P. C., Mehta, F. S. and Pindborg, J. J. (1986), Malignant potential of oral lichen planus: observations in 722 patients from India. *Journal of Oral Pathology & Medicine*, 15: 71–77. doi: 10.1111/j.1600-0714.1986.tb00580.x

²¹ PubMed Health <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0001870/>

Other symptoms include:

- Dry mouth
- Metallic taste in the mouth

Signs and tests

Clinical diagnosis:

A skin lesion biopsy or biopsy of a mouth lesion can confirm the diagnosis.

Blood tests may be done to rule out hepatitis.

Treatment

The goal of treatment is to reduce your symptoms and speed healing of the skin lesions. If symptoms are mild, you may not need treatment.

Treatments may include:

- Antihistamines
- Immune-suppressing medications, such as cyclosporine (in severe cases).
- Lidocaine mouthwashes may be used to numb the area and make eating more comfortable (for mouth lesions).
- Topical immune-suppressing medications, such as tacrolimus and pimecrolimus could be used but lesions must be watched carefully for signs of cancer
- Oral retinoids (acitretin)

Expectations (prognosis)

Lichen planus is usually not harmful and may get better with treatment. It usually clears up within 18 months. However it may last for varying periods of time from weeks to months, and may come and go for years. If lichen planus is caused by a medication, the rash should go away once the medicine is stopped.

Complications

Mouth ulcers that are there for a long time may develop into oral cancer.

1.9 ORAL SUBMUCOUS FIBROSIS

Oral sub mucous fibrosis (or OSF) is a chronic, complex, irreversible, highly potent **pre-cancerous** condition. As the disease progresses, the jaws become rigid to the point that the sufferer is unable to open his mouth.

Prevalence

A 1968 study on about 50,000 people in India (in rural areas) revealed that OSF was **prevalent in about 0.14 % of the population** (the number is an average of the percentage of the population affected in the five different districts where the study was conducted, the percentage ranged from 0%(Bihar) to 0.4%(Kerela))²² .

Causes

- Dried products such as paan masala and gutkha have higher concentrations of areca nut appear to cause the disease,
- Excessive consumption of red chilies.
- Immunological diseases.
- Extreme climatic conditions.
- Prolonged deficiency of iron and vitamins in the diet.

Symptoms

In the initial stages the mucosa becomes leathery with fibrous bands. In the later stages the mucosa becomes blanched and stiff. The disease is believed to begin in the posterior part of the oral cavity and gradually spread outward.

Other features of the disease include:

- Dry mouth.
- Recurrent ulceration.
- Pain in the ear or deafness.
- Nasal intonation of voice.
- Restriction of the movement of the soft palate.
- A budlike shrunken uvula.
- Thinning and stiffening of the lips
- Pigmentation of the oral mucosa
- Dryness of the mouth and burning sensation
- Decreased mouth opening and tongue protrusion

²² J. PINDBORG*, F. S. MEHTA, P. C. GUPTA AND D. K. DAFTARY, Prevalence of Oral Sub mucous Fibrosis among 50,915 Indian villagers. The Basic Dental Research Unit, Tata Institute of Fundamental Research, 1968

Treatment

- Sub mucosal injections of hydrocortisone 100 mg once or twice daily depending upon the severity of the disease for two to three weeks.
- Sub mucosal injections of human chorionic gonadotrophins (Placentrax) 2-3 ml per sitting twice or thrice in a week for three to four weeks.
- Surgical treatment is recommended in cases of progressive fibrosis when interincisor distance becomes less than 2 centimeters.

Treatment also includes:

- Abstention from chewing areca nut (also known as betel nut) and tobacco.
- Minimizing consumption of spicy foods, including chilies.
- Maintaining proper oral hygiene.
- Supplementing the diet with foods rich in vitamins A, B complex, and C and iron.
- Employing a dental surgeon to round off sharp teeth and extract third molars.

Expectations (Prognosis)

OSF once detected is practically incurable. As a pre-cancerous condition, what can be done is keep the patient under regular observation to ensure that the condition doesn't develop into Oral cancer. OSF usually reoccurs if surgically removed.

Prevention

Chronic irritation is one of the chief causes of OSF. Abstaining from consuming Tobacco, chewing betel nut, would go a long way in preventing OSF.

HARD TISSUE CONDITIONS:

2.1 DENTAL CARIES:

Dental caries, also known as tooth decay or a cavity, is a disease where bacterial processes change carbohydrate like sugar in food left on teeth to acid that demineralises hard tooth structure (enamel, dentin, and cementum). If demineralization exceeds saliva and other remineralisation like from calcium, these tissues progressively break down, producing dental caries (cavities, holes in the teeth)²³.

Prevalence

Dental Caries is one of the most common diseases in the world. In an Indian survey the **prevalence percentage of subjects** with caries experience was **52.5 %** for people in the age group of 12 years, **61.4 %** in subjects aged 15 years, **79.2%** in subjects in the age group 35-44 years and **84.7 %** for subjects with age 65-74 years. The prevalence clearly increased with age²⁴.

Causes

Tooth decay is caused by specific types of acid-producing bacteria that cause damage in the presence of fermentable carbohydrates such as sucrose, fructose, and glucose. The mineral content of teeth is also sensitive to increases in acidity from the production of lactic acid.

It usually occurs in children and young adults but can affect any person. The following are relevant risk factors:

- Carbohydrates (sugars and starches) increase the risk of tooth decay.
- Any kind of processed food.
- Poor Oral hygiene.

Symptoms

There may be no symptoms. If symptoms occur, they may include:

- Tooth pain or achy feeling, particularly after sweet, hot, or cold foods and drinks
- Visible pits or holes in the teeth

²³ Medline Plus, Dental Cavities, <http://www.nlm.nih.gov/medlineplus/ency/article/001055.htm>

²⁴ National Oral Health Survey & Fluoride Mapping, 2002-2003, INDIA.

Signs and tests

Most cavities are discovered in the early stages during routine checkups. The surface of the tooth may be soft when probed with a sharp instrument. Pain may not be present until the advanced stages of tooth decay. Dental x-rays may show some cavities before they are visible to the eye.

Treatment

Treatment can help prevent tooth damage from leading to cavities.

Treatment may involve:

- Fillings
- Crowns
- Root canals

Expectations (prognosis)

Treatment often saves the tooth. Early treatment is less painful and less expensive than treatment of extensive decay.

Complications

- Discomfort or pain
- Fractured tooth
- Inability to bite down on tooth
- Tooth abscess
- Tooth sensitivity

Prevention

Oral hygiene is necessary to prevent cavities (brushing at least twice a day). Chewy, sticky foods (such as dried fruit or candy) are best if eaten as part of a meal rather than as a snack. If possible, brush the teeth or rinse the mouth with water after eating these foods. Minimize snacking, which creates a constant supply of acid in the mouth. Avoid constant sipping of sugary drinks or frequent sucking on candy and mints.

2.2 FLUOROSIS

Dental Fluorosis results from drinking water drawn from ground water sources containing high fluoride content (usually more than 2.0 ppm) over the period when teeth are in the process of development or mineralization. It manifests with change in enamel translucency (occasional white flecks or spots, paper white areas to frank white opacity of enamel) or more severe forms (marked wear and brown stains to marked hypoplasia of enamel with disfiguring of tooth form). The criteria for recording severity are described in **Dean's Index** as 'questionable', 'very mild', 'mild', 'moderate' and 'severe'.

Prevalence

According to an Oral Health survey in India:

In children aged 12 and 15 years, if 'questionable' Fluorosis is excluded, the prevalence of Fluorosis was **7.2 per cent** in each age group. **'Moderate' and 'severe' form of Fluorosis together affected a negligible 1.2 and 1.3 per cent children respectively in 12 and 15 year age groups.** The prevalence of Fluorosis in adults (35-44 and 65-74 years) is very low (4.2 and 2.4 per cent respectively) with the exclusion of 'questionable' Fluorosis. The pattern of distribution of Fluorosis by level of severity remained similar to other age groups. There are no marked gender related differentials but Fluorosis was marginally more in rural areas than in urban areas²⁵.

Causes

Fluorosis is caused by high Fluoride content in drinking water.

Symptoms

In its mild form, which is the most common, Fluorosis appears as tiny white streaks or specks that are often unnoticeable. The spots and stains left by Fluorosis are permanent. They may darken over time. In its most severe form, which is also called mottling of dental enamel, it is characterized by black and brown stains, as well as cracking and pitting of the teeth.

Treatment

Tooth bleaching, micro abrasion, and conservative composite restorations or porcelain veneers are commonly used treatments. Bleaching and micro abrasion are used for superficial staining, whereas the conservative restorations are used for more unaesthetic situations.

²⁵ National Oral Health Survey & Fluoride Mapping, 2002-2003, INDIA.

Conclusion

Challenges

Now that we have before ourselves a list of the major Oral health issues, we are forced to look at the challenges facing us in our endeavor to tackle Oral health at the primary care level. Our challenges in each of the three classifications of Oral health problems are different though a common thread amongst all of these would be the identification of our limitations and the training requirements for our physician (who isn't an M.B.B.S. doctor). The challenges we face for dental diseases and for pre-cancerous (and Cancerous) conditions are quite different, and these we list down below.

For Dental diseases:

- Developing skill set required to treat these conditions by a general physician require considerable amount of time and effort.
- Infrastructure can be potentially capital intensive.

For pre – cancerous (and cancer) diseases:

- Training the physician to identify pre-cancerous lesions clinically.
- Confirmatory diagnosis for oral cancer (requires biopsy).
- Setting up of referral network.
- Follow up of patient identified oral cancer positive.

Immediate plan and conclusion

Our immediate plan is to isolate the conditions which can be brought to a satisfactory conclusion at the primary health care (RMHC) level. We need to prepare plans to tackle each of the three different types of Oral health problems (namely – Dental, pre-cancerous (and Cancerous) and Oral cavity related diseases). Now that we have familiarized ourselves with theoretical information about these conditions, what we need is clinical, practical advice. We plan to draw up our strategy for the Oral intervention and then talk to a critical mass of relevant people (General practitioners, Dentists, Research organizations dealing with Oral cancer or oral ailments, Tobacco cessation). This will allow us to gain an insight into the real world conditions which might affect us. Our strategy will in the end reflect all the collective wisdom we are exposed to. With the strategy in place, we'll figure out a plan for the logistics of the roll out. Training and instruments will be the key aspects in this process. The preventive aspect of Oral health will be most important in order to make a long term sustainable difference to our target population. This will have to be devised most carefully. Another important consideration could be research potential. We feel that our intervention can have immense medical research potential if we apply ourselves to scientifically collecting data and analyzing it once the roll out of the intervention has been done. This will need to be built into the intervention itself.

Annexure A

Outline of Basic training for Oral Health Intervention (common for all conditions).

Theoretical component	Practical Component
Oral Anatomy	Disease diagnosis
Oral Physiology	Treatment
Diagnosis and Medicine	Skill development (Instrument usage)
Dental Instrumentation	

Annexure B

TRAINING PHASE COMPONENTS:

PHASE I

S.No	GRADES	CONDITIONS COVERED
1	Grade I	Glossitis Angular Chelitis Fluorosis
2	Grade II	Canker sore (Apthous ulcers) Herpetic (stomatitis, labialis)
3	Grade IV	Gingivitis

PHASE II

S.No	GRADES	CONDITIONS COVERED
1	Grade III	Oral Candidiasis Leukoplakia Oral Lichen Planus Oral Sub Mucous Fibrosis
2	Grade IV	Dental Caries

***Grade I – For all the conditions mentioned here, Physicians **can be trained in two days** in a clinical setup (with patient inflow).

***Grade II – Physicians can be trained to diagnose and treat the condition **in four days** in a clinical setup (with patient inflow).

***Grade III – **One week of intensive training** required for accurate diagnosis of the condition in a clinical setup (with patient inflow).

***Grade IV – **Two weeks of training** required to diagnose and treat (acceptably) in a full fledged dental setup.



Thank you!