

Gastroesophageal Reflux Disease (GERD) – Role of Dentist

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ABSTRACT

BACKGROUND

Gastroesophageal reflux disease (GERD) is highly prevalent across populations with varied manifestations and substantial morbidity. Our review focuses mainly on the role of dental practitioner in GERD, its oral manifestations and management. GERD shows oesophageal and extra oesophageal syndromes. Oesophageal syndromes are reflux chest pain syndrome, typical reflux syndrome, reflux stricture, reflux esophagitis, oesophageal adenocarcinoma and Barrett's oesophagus. Extra oesophageal syndromes are reflux cough syndrome, reflux asthma syndrome, reflux dental erosion syndrome, reflux laryngitis syndrome, pharyngitis, and sinusitis. Classic reflux symptoms may be absent in more than half the patients presenting with extra oesophageal symptoms. For this reason, the first provisional diagnosis of GERD may be made by a dental practitioner as a result of clinical observation of enamel erosion. A direct association exists between gastroesophageal reflux disease and oral cavity diseases. Dental practitioner can recognise the secondary manifestations of GERD for early diagnosis and can assist in management of these patients. Traditional management of GERD includes medical therapy, non-medical therapy and surgical therapy, in future dental examination and dental treatment can also be included. There is a lack of awareness among the general physicians regarding the association between GERD and dental erosions. According to the study, 40 % of them are aware of dental erosions in GERD, indicating that there is a need to circulate this information through medical education.

There should be an interdisciplinary coordination between family physician, dentist, orthodontist, prosthodontist, and gastroenterologist for treatment of oral manifestations resulting from GERD. This review highlights the role of dental practitioner in management of GERD.

KEY WORDS

Gastro Oesophageal Reflux Disease (GERD), Dental Erosion, Oesophagus, Gastric acid, Saliva

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BACKGROUND

Gastro oesophageal reflux is a normal physiological process that is present in healthy infants, children and adults.¹ Gastroesophageal reflux disease has been seen historically as a disease of western countries and was thought to be distinctly uncommon among Asians.² However endoscopic studies and more recently symptom based surveys have shown that reflux disease is more common in Asia than previously recognised.³ Classical symptoms of GERD are regurgitation, heartburn, nausea, or respiratory problems like asthma, wheezing, coughing and its oesophageal complications. Dental erosion, as an extra oesophageal manifestations of GERD has been reported with varying prevalence in the population and may be as high as 42 %.⁴ This article provides an overview of aspects of GERD, its oral manifestations and management.

GASTROESOPHAGEAL REFLUX DISEASE (GERD)

Definition

Gastro oesophageal reflux (GER) is defined as the passage of gastric contents into the oesophagus. GERD is a consequence of failure of the normal anti reflux barrier to protect against frequent and abnormal amounts of refluxed material. GER itself is not a disease and occurs multiple times each day without producing symptoms or mucosal damage, where as GERD is characterized by signs or complications of GER.⁵ The most widely accepted criterion for diagnosis of GERD is the happening of heartburn two or more times each week.

Pathogenesis

The pathogenesis of GERD is complex, resulting from an imbalance between defensive factors protecting the oesophagus (oesophageal acid clearance, tissue resistance) and aggressive factors refluxing from the stomach (gastric acidity, volume, and duodenal contents).

PATHOPHYSIOLOGICAL CONCEPTS

Gastro-oesophageal reflux may trigger extra-oesophageal manifestations in the upper and lower respiratory tract via two basic pathways⁶

1. Reflux of gastric contents into the pharynx with or without aspiration into the deeper airways. In addition, the aspirate can increase the sensitivity of the airway mucosa to other triggers.
2. Reflux of acid gastric content into the lower oesophagus triggers airway symptoms, such as cough and bronchospasm, via vagal reflex arcs.

The drugs frequently used to treat obstructive airway diseases, such as theophylline and beta agonist, may affect the pressure gradient across the anti-reflux barrier and the pressure of the lower oesophageal sphincter. This in turn may lead to increased gastro-oesophageal reflux.⁷

AETIOLOGY

Gastric Factors

Patients with GERD have delayed acid clearance. Gastroparesis, increased abdominal distension and myopathy affecting gastro intestinal motility are all aetiologic agents in GERD.⁸ The other causative factors are some drugs like calcium - channel blockers, nitrates and cigarette smoking.

In addition dysfunction of the upper oesophageal sphincter (UES), which normally increases its pressure when minute amounts of gastric fluid are in contact with the pharynx to protect upper airway from further exposure, may have an important role in the aetiology of extra-oesophageal manifestations.⁹

Clinical Features

GERD shows oesophageal and extra oesophageal syndromes. Oesophageal syndromes are reflux chest pain syndrome, typical reflux syndrome, reflux stricture, reflux esophagitis, oesophageal adenocarcinoma and Barrett's oesophagus. Extra oesophageal syndromes are reflux cough syndrome, reflux asthma syndrome, reflux dental erosion syndrome, reflux laryngitis syndrome, pharyngitis, sinusitis, idiopathic pulmonary fibrosis and recurrent otitis media.¹⁰ Additional signs of GERD include chronic laryngitis, gastric fluid in the oral cavity, laryngeal granuloma, laryngeal carcinoma, chronic pharyngitis, subglottic stricture, vocal cord polyps. Classic reflux symptoms may be absent in more than half the patients presenting with extra oesophageal symptoms. For this reason, the first provisional diagnosis of GERD may be made by a dental practitioner as a result of clinical observation of enamel erosion.¹¹

Complications

The complications include Barrett's oesophagus, oesophageal stenosis, ulcer in the oesophagus, increased risk of transformation to oesophageal adenocarcinoma, pulmonary aspiration and upper gastrointestinal haemorrhage.¹²

Diagnosis

The diagnosis is typically made by a combination of clinical signs and symptoms, response to acid suppression, as well as objective testing with upper endoscopy and monitoring of oesophageal pH.¹³ (Table 1)

Diagnostic Test	Indication
PPT trial	For definitive GERD symptoms
Oesophageal ph. monitoring	GERD diagnosis is in question with refractory symptoms
Upper endoscopy	Alarm symptoms (like dysphagia), PPI insensitive patients, most at risk for Barret's oesophagus
Barium esophagram	Evaluation of dysphagia, otherwise not recommended for GERD evaluation
High resolution manometry	Prior to anti - reflux surgery to rule out esophageal dysmotility (eg., achalasia, scleroderma) or else not recommended for GERD evaluation

Table 1. Diagnostic Testing for Gastro Oesophageal Reflux Disease

Treatment

GERD requires long- term management in the form of non medical therapy, medical therapy and surgical therapy. Non medical therapy includes lifestyle and diet modification, head of bed elevation, avoiding night time meals, and elimination of trigger foods like caffeine, chocolate and alcohol.¹⁴ Medical therapy includes acid neutralizing agents, Histamine -2 blockers, enteric emptying pro kinetic agents, proton pump inhibitors.¹⁵ (Table 2)

Therapy	Agent	Dosage
Acid - neutralizing agents for GERD	Sodium bicarbonate (NaHCO ₃)	1 suppository PR 325 – 650 mg PO
	Magnesium hydroxide (milk of magnesia)	1.8 – 14.4 g qd
	Aluminates	15 – 45 mL q3 – 6h
Histamine - 2 blockers	Cimetidine	800 mg PO hs 400 mg bid
	Ranitidine	300 mg PO hs 150 mg bid
	Famotidine	20 mg PO bid
	Famotidine	150 mg PO bid
Gastric emptying	Metoclopramide	10 – 20 mg PO, IM or IV (IV given over 1 – 2 min)
Prokinetic agents	Cisapride	10 – 20 mg PO qid
Proton pump inhibitors	Omeprazole	20 – 40 mg qd every morning
	Lansoprazole	
Surgery	Nissen fundoplication	

Table 2. Medical Therapy for Gastroesophageal Reflux Disease

PR = per rectum, PO = per os, qd = every day, q3 – 6h = every 3 – 6 hours, hs = at bedtime, bid = 2 times daily, IM = intramuscular, IV = intravenous, qid = 4 times daily

Surgical Therapy

Surgical therapy is another treatment option for long term therapy in patients with GERD. Surgery indications include unwillingness to remain on lifelong medical therapy, intolerance of medical therapy, evidence of GERD endoscopy or pH monitoring.¹⁴ The fundamental requirement for a successful treatment of GERD is a multidisciplinary approach involving general practitioners, gastroenterologists, otorhinolaryngologists. Dentists can support the medical management of GERD patients by recognising the secondary manifestations of GERD and directing the patient towards further management.¹⁶

ROLE OF DENTIST IN GERD

Dental Erosion

Oral manifestations can be an indicator for GERD.¹⁷ Dental erosion is characterised as irreversible loss of dental hard tissue by a combination procedure that doesn't include microscopic organisms. Dissolution of mineralized tooth structure occurs upon contact with acids that are introduced into the oral cavity from intrinsic or extrinsic sources.¹⁸

Prevalence

The prevalence of dental erosion varies widely and depends upon age - 6 - 50 % in pre-school children, 11 - 100 % in adolescents, 4 - 82 % in Adults.¹⁹

Pathogenesis

The mechanism producing dental erosion starts at the surface of the dental tissue, where the chelating agents or decalcifying acid destroy the pellicle, followed by the dissolution of the tooth's organic substrate and the demineralization of the surface. The damaged dental surface is exposed to mechanical

friction in connection with chewing, swallowing, mobilizing the soft tissues or brushing. These losses may affect hard tissues, the enamel and the dentin. The erosion areas have a smooth, concave and lacunary appearance.²⁰

Aetiology

Extrinsic Erosion

Teeth are regularly exposed to exogenous acids, such as fruit drink, soft drinks, pickles, fresh fruits, and yogurt; most of these foods present an acidic environment causing enamel demineralization.²¹

Intrinsic Erosion

The major cause is Gastroesophageal reflux.²² Teeth are affected by endogenous acids during recurrent vomiting, regurgitation, or reflux. To decide the aetiological variables of dental erosion, the dental specialist should acquire details from the patient regarding his / her recreations and work.²³

Biological Modifying Factors

The factors affecting erosion process are saliva, tooth composition, tooth structure, dental anatomy, soft tissue anatomy and occlusion. The buffering capacity of saliva and unstimulated salivary flow rate have been directly linked with dental erosion. The pellicle function is to protect against acid demineralization.²⁴ Any procedure which eliminates the pellicle thickness may lead to loss of protective properties and accelerate erosion process. The content of saliva like Matrix metallo proteinases (MMPs) have been recently involved in the progression of erosion.

Grade	Description
Zero	Tooth erosion is not visible
One	Preservation of occlusal surface structure, lightly rounded and flattened cusps with moderate cupping, small occlusal pits and fissures.
Two	Restoration margins are seen above the level of surrounding tooth. Flattening of cusps with severe cupping and occlusal surface structure, grooving and flattening

Table 3. Dental Erosion Evaluation Scale of Ganss

Grade	Description
Zero	No tooth disintegration
One	Loss of tooth enamel surface detail
Two	Less than one third of the crown is affected; disintegration is confined to the dentin.
Three	More than one third of the crown is affected; disintegration is confined to the dentin.

Table 4. Dental Erosion Grading Scale of Eccles and Jenkins

Clinical Features

The primary signs of dental erosion are: absence of macroscopic plaque; diminishing enamel luster; Due to loss of microanatomy, the dental surfaces becomes rounded and polished, smoothening out of developmental pits and grooves, dentin exposure, prominent restorations that are elevated above the surrounding tooth structure are seen. Proximal ridges gradually become flat and even concave.²⁵ The most common site of dental erosion is on the palatal surface. (Table 3 and Table 4).

Diagnosis Protocol

A thorough dental evaluation including individual's clinical history, type of diet intake and oral hygiene techniques, additionally an intraoral assessment, salivary capacity, head and neck examination are to be done.²⁶

Medical History

Clinical assessment starts with a complete medical history, including history of vomiting, gastric reflux signs, examination of gastro-intestinal structures, and a listing of all non-prescription medications. Use of β_2 - agonists, for example, salbutamol, salmeterol, or terbutaline, prompts diminished salivary stream, resulting in lessening of defensive impacts of saliva.²⁷ Broncho dilators act to loosen up the smooth muscle and they may influence the oesophageal sphincter and thereby increase the gastro oesophageal reflux. Vitamin C tablets chewing shall cause a pH under 2.0 in the mouth, leading to drop in saliva ph. The assessment should include enquiries regarding the acidic taste for the mouth, burping, indigestion, coughing, unconstrained spewing, halitosis, and excessive salivation. On the off chance that a dental specialist is dubious about a patient may have gastric reflux, he should refer patient for additional clinical assessment.

Dietary History

The dental specialist should get the definite information about diet history to decide the aetiological components of dental erosion and to apply sufficient preventive measures. The recurrence of utilization of acidic beverages (sodas, natural product juices, sport beverages) and specific nourishments (citrus organic products) are significant factors in tooth erosion,²⁸ since they contain acids.

Occupational History

Regular contact with acids in the work spot can rise the severity of dental erosion. In a study by Geurtsen,²⁹ rigorous swimmers show increased incidence of dental erosion because of low pH gas - chlorinated pool water.

Intraoral Examination

Changes in teeth shading and sensitivity may give several details about lesions.³⁰ Classic indications of enamel erosion are the presence of a smooth, plush coated, sometimes dull enamel surface with the perikymata nonappearance.³⁰ In further developed phases of dental erosion, the morphology changes and brings about a concavity in the enamel, the width of which obviously surpasses its depth.¹⁶ Extrinsic erosion happens fundamentally on the anterior teeth labial surfaces, posterior teeth buccal surfaces and molar teeth occlusal surfaces. Refluxed acid first attack upper incisor palatal surfaces; in the auxiliary stage, posterior teeth occlusal surfaces of both the arches are affected. The palatal surfaces of the maxillary teeth are first influenced because of the way that they are shielded from the major salivary organs, and the tongue keeps in touch with the gastric acid. Experts have inferred that the force of the regurgitation flowing from the pharynx into the mouth may impact the seriousness of dental erosion.

Dental History

The tooth structure area surrounding the restorations dissolve appreciably more quickly than the restorative material.

Salivary Function

The salivary Ph and the buffering limit can be determined with an indicator system in recently collected saliva. Chewing will rise the flow rate and the buffering limit of saliva.³¹

Management of Erosion in GERD

Preventive Treatment

There is a lack of awareness among the general physicians regarding the association between GERD and dental erosions. According to the study, 40 % of them are aware of dental erosions in GERD, indicating that there is a need to circulate this information through medical education.

Dental specialists and patients should know about acidic attack that may irreversibly harm the dental hard tissue. First and foremost is to reduce the extent of oral acidity to anticipate erosive attacks. For people at higher danger of dental erosion, it is wise to decrease the frequency of intake of possible harmful beverages and food and limiting their contact time with teeth.³² Sugar free antacid medications chewing will help to enhance salivary flow rates and lessen the acidity too. Immediately after sensation of acid reflux into the mouth patients can take antacids. Patients with erosion should be taught to rinse the mouth with sodium carbonate, a fluoride mouthwash and water, following a noteworthy acid test. Fluoride mouthwash will help to remineralize the abraded tooth structure surface. Individuals must be taught not to use more abrasive toothpastes. Fluoride varnish ought to be applied at regular intervals

Recent Advances

As of late, the laser application has defensive influence on enamel and dentin demineralization. Laser application dissolves and solidifies the dental surface, making another, smoother surface.³³ Casein phosphopeptide / amorphous calcium phosphate (CPP - ACP) are used to decrease dental erosion. Amorphous calcium phosphate ought to be applied daily by rubbing it on the teeth with a finger or utilizing a bleaching tray. Nd : YAG laser and its relationship with fluoride have been proposed as a possibility for the treatment of dental erosion. Additionally, resin based dentine bonding agents has been accounted for the protection of dentin. During high danger of erosive challenge, such as during rest (for patients with reflux) a close fitting occlusal guard can be utilized.

To enhance the rates of salivary flow in patients with erosion, use of sugar - free antacids and xylitol chewing gum should be encouraged. Xylitol promotes mineralization by increasing the salivary flow and by defeating the growth, metabolism, and polysaccharide production of streptococci mutans.³⁴

Restorative Treatment

Patients with chronic regurgitation and acid reflux symptoms present for at least two days should be suggested to visit a doctor for additional examination, as the untreated condition can prompt complexities, like erosive esophagitis and Barrett's oesophagus which enhances the danger of oesophageal adenocarcinoma.³⁵ Some of the patients may not know about their condition as disease till it begins influencing their teeth. These patients should consult an appropriate expert or a multidisciplinary group.

The dental specialist should consider remedial treatment when -

1. Structural integrity of affected teeth are impeded;
2. The hypersensitive teeth;

3. Loss of vertical dimension, function as well as its structure;
4. Unacceptable aesthetics and
5. Exposure of pulp.

Initially, erosion is constrained to the enamel during which phase the teeth are not hypersensitive. Restorations of teeth are required for aesthetic needs as well as to prevent further progression. In advanced cases, restoration of tooth form with direct composite coatings or porcelain veneers should be considered as treatment of choice.

Indirect restorations (ceramic crown bridges) are indicated for patients with loss of vertical dimension and severely destructed teeth.

Recommendations for Patients with GERD

1. For a definitive diagnosis and treatment, patients should be examined by a physician.
2. Instantly after heartburn or sensation of acid reflux into the mouth, take antacids.
3. Rinse the mouth with water, sodium bicarbonate, and a fluoride mouthwash immediately after a noteworthy acid challenge.
4. Abstain from brushing teeth following an acid challenge and use of abrasive toothpastes.
5. Decrease the utilization of acidic and carbonated drinks.
6. To stimulate salivary flow use xylitol chewing gum.
7. During high risk erosive challenge viz during sleep use a close fitting occlusal guard.
8. Use desensitizing and fluoride toothpaste.³⁶

CONCLUSIONS

There is a close relationship between GERD and oral cavity diseases. The secondary manifestations of GERD can be recognised early by otorhinolaryngologists, gastroenterologists and dentists. Management of GERD should also include a dental examination with acceptable dental remedy. Multidisciplinary approach involving family physician, dentist, orthodontist, prosthodontist, and gastroenterologist is required for the treatment of dental erosion resulting from GERD. Most of the dental erosion patients who take treatment have been referred, by both physicians and the family dentists. This template reflects that both dentists and gastroenterologists are mainly the first health care providers to diagnose GERD based on its oral manifestations.

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