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DEPARTMENT OF THERAPEUTIC DENTISTRY*



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**"THERAPEUTIC DENTISTRY"**

**Part 2**

**Educational and methodical textbook  
for practical classes in therapeutic dentistry  
for fourth-year students of the dental faculty**

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The study guide is designed for studying the program in the discipline "Therapeutic Dentistry" by 4th year students of the dental faculty. This manual is designed to deepen students' knowledge of the classifications, etiology and pathogenesis of inflammatory and dystrophic periodontal diseases, features of clinical and additional methods of examination of periodontal patients; clinic, treatment and prevention of periodontal diseases.

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**LIST OF ABBREVIATIONS AND TERMS**

<b>CPC</b>	<b>Cetylpyridinium chloride and</b>
<b>CHX</b>	<b>Chlorhexidine</b>
<b>GV</b>	<b>Gingivectomy</b>
<b>GP</b>	<b>Gingivoplasty</b>
<b>MWF</b>	<b>Modified widman flaps</b>
<b>SPT</b>	<b>Supportive periodontal treatment</b>

## INTRODUCTION

Despite the progressive development of modern dentistry, periodontal tissue diseases remain quite relevant.

The role of periodontal diseases as a general medical problem is explained by the following factors: firstly, the widespread prevalence of this pathology in the world; secondly, the loss of a large number of teeth in these diseases; thirdly, the appearance of foci of chronic infection due to the occurrence of a pathological formation - a gingival pocket and a decrease in the body's reactivity. According to the WHO, the main problem in periodontics is inflammatory periodontal disease.

Understanding the mechanisms of periodontal disorders at the molecular level makes it possible to develop optimal measures for their diagnosis, prevention and treatment.

Morphofunctional changes in the periodontium are the main factors of bone resorption and, as a result, pathological overload of the teeth, which eventually leads to their complete elimination. This causes tooth loss with age and a large percentage of tooth loss in young people.

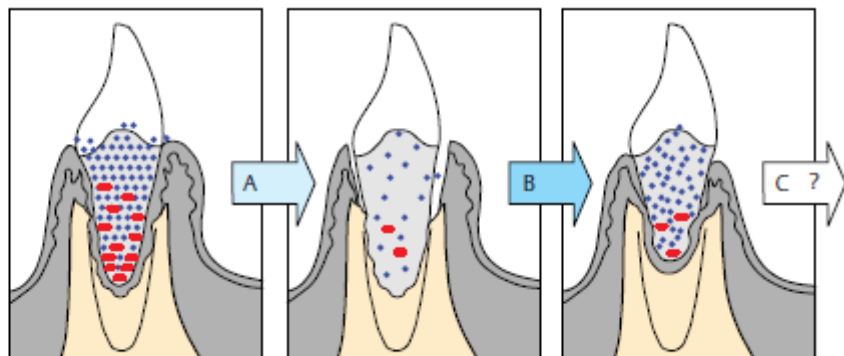
## Topic 1. Surgical methods of treatment of periodontal diseases

**Periodontal surgery** is primarily performed to alter or eliminate the microbial factors that create periodontitis, and thereby stop the progression of the disease. Periodontal diseases comprise a number of conditions that affect the health of periodontium. The factors include a variety of microorganisms and host conditions, such as the immune system, that combine to affect the gums and, ultimately, the support of the teeth. The primary invasive factor creating disease is plaque-producing bacteria. Once the gingiva are infected by plaque-making bacteria unabated due to immuno-suppression or by oral hygiene, the bacterial conditions for periodontitis or gum infections are present. Unless the microorganisms and the pathological changes they produce on the gum are removed, the disease progresses. In the most severe cases, graft surgery may be necessary to restore tissue ligament and bone tissue destroyed by pathogens.

In healthy gums, there is very little space between the gum and tooth, usually less than 0.15 in (4 mm). With regular brushing and flossing, most gums stay healthy and firm unless there are underlying hereditary or immunosuppressive conditions that affect the gums. The continuum of progressive bacterial infection of the gums leads to two main conditions in the periodontium: gingivitis and periodontitis. Such external factors as smoking, and certain illnesses such as diabetes are associated with periodontal disease and increase the severity of disease in the gum tissue, support, and bone structures. Two types of procedures are necessitated by the severity of gum retreat from the teeth, represented by periodontal pockets. Both nonsurgical and surgical procedures are designed to eliminate these pockets and restore gum to the teeth, thereby ensuring the retention of teeth.

567 Pocket Instrumentation—Schematic of Residual Pockets

- A Untreated Pocket**  
Non-pathogenic (blue) and pathogenic (red) pocket flora.
- B Following Instrumentation**  
The pocket flora is dramatically reduced.
- C Recolonization + Shift**  
The percentage composition of the "blue" (non-pathogenic) has increased; in many cases, these and/or the host response will keep the "red" (pathogens) in check.



### Gingivitis

**Gingivitis** occurs when gum tissue is invaded by bacteria that change into plaque in the mouth due to diseasefighting secretions. This plaque resides on the gums and hardens, becoming tartar, or crystallized plaque, known also as calculus. Brushing and flossing cannot remove calculus. The gum harboring calculus becomes irritated, causing inflammation and a loss of a snug fit to the teeth. As the pockets between the gum and the teeth become more pronounced, more residue is developed and the calculus becomes resistant to the cleaning ability of brushing and flossing. Gums become swollen and begin to bleed. A dentist or periodontist can reverse this form of gum disease through the mechanical removal of calculus and plaque. This cleaning procedure is called curettage, which is a deep cleaning process that includes scraping

the tartar off the teeth above and below the gum line and planing or smoothing the tooth at the root. Also known as dental débridement, this procedure is often accompanied by antibiotic treatment to stave off further microbe proliferation.

### Periodontitis

Periodontitis is the generalized condition of the periodontium in which gums are so inflamed by bacteria-produced calculus that they separate from the teeth, creating large pockets (more than 0.23 in [6 mm] from the teeth), with increased destruction of periodontal structures and noticeable tooth mobility. Periodontitis is the stage of the disease that threatens significant ligament damage and tooth loss. If earlier procedures like scaling and root planing cannot restore the gum tissue to a healthy, firm state and pocket depth is still sufficient to warrant treatment, a gingivectomy is indicated. The comparative success of this surgery over such nonsurgical treatments as more débridement and more frequent use of antibiotics has not been demonstrated by research.

The delivery of oral surgery, or even dental care, to individuals in the United States is difficult to determine. Race, ethnicity, and poverty level stratified individuals making dental visits in a year. While 70% of white individuals made visits, only 56% of non-Hispanic black individuals and only 50% of Mexican-American individuals made visits. Seventy-two percent of individuals at or above the federal poverty level made visits, while only 50% of those below the poverty level made visits. Since it is also estimated that more than 100 million Americans lack dental insurance, it is likely that periodontal surgery among the people most likely to have periodontal disease (low-income individuals with nutritional issues, with little or no preventive dental care, and who smoke) are the least likely to have periodontal surgery.

#### 566 Root Planing and Curettage—Principles

##### A Cleaning the Root and the Pocket

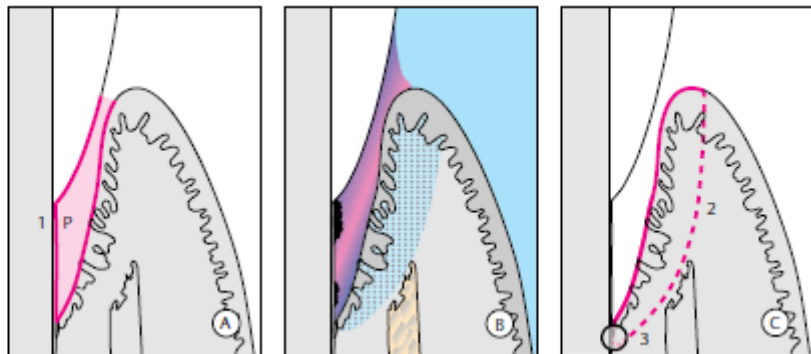
The root surface is treated (1), and the plaque (P) is removed from the pocket.

##### B Original Pocket

With calculus, adherent plaque and non-adherent microorganisms.

##### C Soft Tissue Curettage

In addition, but never as the sole therapy, pocket epithelium/infiltrate (2) and junctional epithelium (3) are removed.



### Description

Periodontal procedures for gingivitis involve gingival curettage, in which the surgeon cuts away some of the most hygienically unhealthy tissue, reducing the depth of the pocket. This surgery is usually done under a local anesthetic and is done on one quadrant of the mouth at a time.

#### *Periodontal Surgical Procedures:*

- “Access flap surgery,” open flap debridement (OFD), e. g., modified Widman flap (MWF)
- Wedge excisions on lone-standing or individual teeth

- Regenerative methods, pocket implantation with bone or bone replacement materials, “guided tissue regeneration” (GTR), use of matrix proteins or growth factors
- Resective procedures (osseous surgery, pocket elimination, crown lengthening;
- Gingivectomy (GV)/gingivoplasty (GP): These procedures are included in the resective or modeling methods
- Surgical furcation therapy
- Mucogingival plastic surgery

“**Access flap**” connotes the creation of visual access to periodontally involved root surfaces. The methods comprise for the most part the techniques formerly referred to as “modified Widman procedures.” In principle, even in the more complicated flap procedures the goal is to create access. The guiding principles of the modified Widman flap procedure—incisions, creation of the flap, tight adaptation during flap repositioning—must also be adhered to.

**Wedge excisions** may be indicated when, distally, an endstanding or a lone-standing tooth exhibits bony pockets.

**Regenerative methods** are becoming more and more popular in periodontitis therapy. In contrast to the more traditional resective methods, these attempt to rebuild lost tissues, and the regeneration of periodontal defects is surely a desirable goal. Unfortunately, today, the long-term results cannot yet be predicted with certainty. Regenerative treatment techniques are indicated primarily in cases of vertical osseous defects, in furcation involvement (F1 or F2;), and for covering areas of gingival recession (Class I and Class II).

**Resective procedures** retain, even today, their position as the most predictable of success, even long-term. Resective procedures are indicated with irregular alveolar bone loss, and when the osseous morphology requires osteoplasty or ostectomy. There are significant disadvantages to respective therapy, which temper their indication.

**Gingivectomy (GV) and gingivoplasty (GP)** represent surgical techniques within the rubric of resective soft tissue treatment methods. As a treatment modality for periodontitis, GV is only rarely employed today. On the other hand, GP remains the treatment of choice for contouring hyperplastic gingiva.

**Surgical furcation therapy** is indicated in Class F3 furcation involvement, and often also F2 involvement. Such treatment may be resective or maintenance. Amputation of individual tooth roots, hemi- and tri-section with maintenance of individual or all roots can be recommended for maintenance of the masticatory efficiency of a dental quadrant or if a tooth must be maintained as a component of a total arch reconstruction. The alternative may involve the use of osseointegrated, root-form dental implants.

#### **Mucoplastic Procedures**

Mucogingival surgery is not truly a method for the treatment of periodontitis. It is indicated primarily for the treatment of progressive gingival recession and its consequences, as well as in the treatment of alveolar ridge defects. It is truly a form of plastic surgery, which helps to eliminate esthetic problems.



**Gingival or periodontal flap surgery** (gingivectomy) is indicated in advanced periodontal disease, in which the stability of the teeth are compromised by infection, which displaces ligament and bone. In gingivectomy, the gingival flap is resected or separated from the bone, exposing the root. The calculus buildup on the tooth, down to the root, is removed. The surgery is performed under local anesthetic.

Small incisions are made in the gum to allow the dentist to see both tooth and bone. The surrounding alveolar, or exposed bone, may require reforming to ensure proper healing. Gum tissue is returned to the tooth and sutured. A putty-like coating spread over the teeth and gums protects the sutures. This coating serves as a kind of bandage and allows the eating of soft foods and drinking of liquids after surgery. The typical procedure takes between one and two hours and usually involves only one or two quadrants per visit. The sutures remain in place for approximately one week. Pain medication is prescribed and antibiotic treatment is begun.

### **Mucogingival surgery**

This periodontal surgery procedure corrects defects in the morphology, position and/or the amount of gingiva (gum tissue). Mucogingival surgery are concerned with:

- increasing the width of attached gingivae
- eliminating pull on the free gingival margin by fraenulae or muscle pull
- covering gingival clefts or recession.

### **Laterally repositioned flaps**

Used to cover isolated areas of recession.

### **Free gingival grafts**

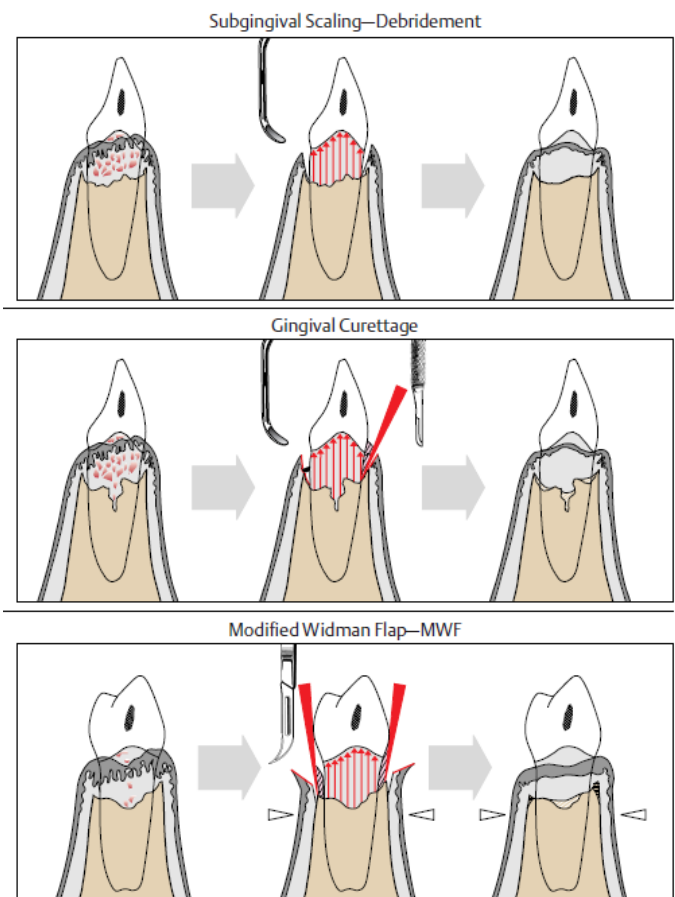
Used to cover isolated areas of recession.

### **Subgingival Scaling (Debridement), Closed Root Planing**

Removal of the biofilm and any concretions from the root surfaces is often the only therapy necessary for shallow pockets (gold standard), and is the obligatory pretreatment in severe cases prior to surgical intervention. The instruments indicated include primarily curettes and ultrasonic devices. The initial situation, the procedure itself, and the therapeutic result are depicted (left— middle— right).

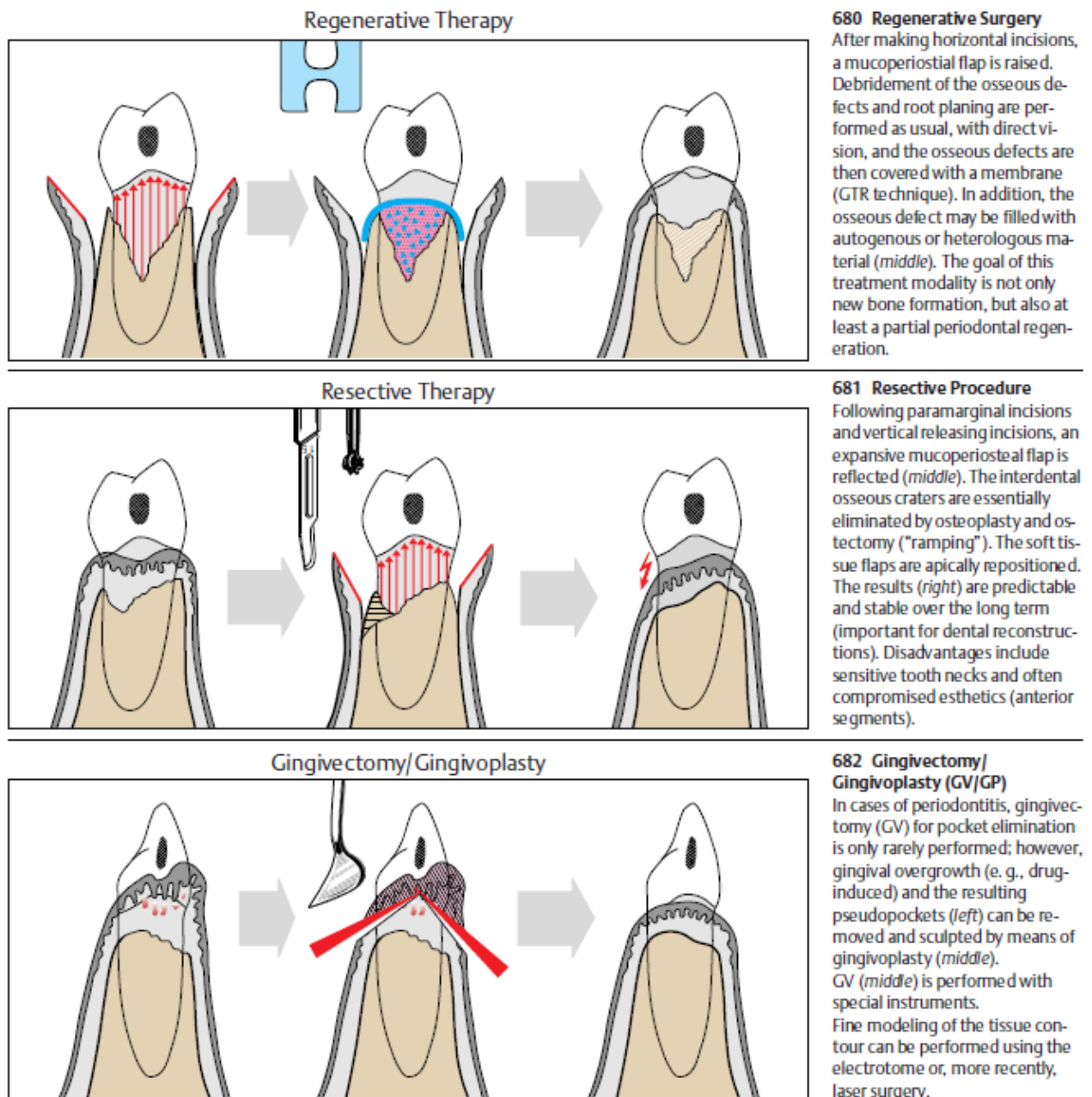
### **Gingival Curettage**

This includes removal of the pocket epithelium and the infiltrated/ infected connective tissue. This procedure never represents definitive treatment for periodontitis. It is performed in combination with the essential therapeutic measures including closed and/or open root cleaning/planing. For gingival curettage, the double-edged universal curettes are indicated (left in the middle picture) or fine scalpels may be used for sharp dissection.



### ***MWF— Modified Widman Flaps***

After performing a “scalloping” paramarginal incision (internal GV) and additional marginal and interdental incisions, a “partially mobilized” mucoperiosteal flap is elevated to the level of the alveolar crest. Cleaning of the root surfaces using curettes or ultrasonic scalers is performed with direct vision (“access flap”). Re-adaptation of the flaps following treatment is accomplished with interdental sutures.



### **Diagnosis/Preparation**

Many factors contribute to periodontal disease, and the process that leads to the need for surgery may occur early or take many months or years to develop. Early primary tooth mobility or early primary tooth loss in children may be due to very serious underlying diseases, including hereditary gingival fibromatosis, a fibrous enlargement of the gingiva; conditions induced by drugs for liver disease; or gum conditions related to leukemia. Patient-related factors for chronic periodontal disease include systemic health, age, oral hygiene, various presurgical therapeutic options,

and the patient's ability to control plaque formation and smoking. Another factor includes the extent and frequency of periodontal procedures to remove subgingival deposits. Gum inflammation can be secondary to many conditions, including diabetes, genetic predisposition, stress, immuno-suppression, pregnancy, medications, and nutrition.

The most telling signs of early gum disease are swollen gums and bleeding. If gingivectomy is considered, consultation with the patient's physician is important, as are instruction and reinforcement with the patient to control plaque. Gingiva scaling and root planning should be performed to remove plaque and calculus to see if gum health improves.

The protective responses of the body and the use of dental practices to overcome the pathology of periodontal disease may be thwarted and the concentration of pathogens may be such that plaque below the gum line leads to tissue destruction. Refractory periodontitis, or the form of periodontal disease characterized by its resistance to repeated gingival treatments, and often also associated with diabetes mellitus and other systematic diseases, may require surgery to remove deep pockets and to offer regenerative procedures like tissue and bone grafts.

The level of damage is determined by signs of inflammation and by measuring the pocket depth. Healthy pockets around the teeth are usually between 0.04–0.11 in (1–3 mm). The dentist measures each tooth and notes the findings. If the pockets are more than 0.19–0.23 in (5–6 mm), x rays may be taken to look at bone loss. After conferring with the patient, a decision will be made to have periodontal surgery or to try medications and/or more gingival scaling.

**Risks for infection must be assessed prior to surgery.** Certain conditions, including damaged heart valves, congenital heart defects, immunosuppression, liver disease, and such artificial joints as hip or knee replacements, put the oral surgery patient at higher risk for infection. Ultimately, the decision for surgery should be based upon the health of the patient, the quality of life with or without surgery, their willingness to change such lifestyle factors as smoking and bad nutrition, and the ability to incorporate oral hygiene into a daily regimen. Expense is also a factor since periodontal surgery is relatively expensive. Long-term studies are still needed to determine if such medications as antibiotic treatments are superior to surgery for severe chronic periodontal disease.

### **Aftercare**

Surgery will take place in the periodontist's office and usually takes a few hours from the time of surgery until the anesthetic wears off. After that, normal activities are encouraged. It takes a few days or weeks for the gums to completely heal. Ibuprofen (Advil) or acetaminophen (Tylenol) is very effective for pain. Dental management after surgery that includes deep cleaning by a dental hygienist will be put in force to maintain the health of the gums. Visits to the dentist for the first year are scheduled every three months to remove plaque and tartar buildup. After a year, periodontal cleaning is required every six months.

### **Risks**

Periodontal surgery has few risks. There is, however, the risk of introducing infection into the bloodstream. Some surgeons require antibiotic treatment before and after surgery.

### **Normal results**

The gold standard of periodontal treatment is the decrease of attachment loss, which is the decrease in tooth loss due to gingival conditions. Normal immediate results of surgery are short-term pain; some gum shrinkage due to the surgery, which over time takes on a more normal shape; and easier success with oral hygiene. Long-term results are equivocal. One study followed 600 patients in a private periodontal practice for more than 15 years. The study found tooth retention was more closely related to the individual case of disease than to the type of surgery performed. In another study, a retrospective chart review of 335 patients who had received non-surgical treatment was conducted. All patients were active cases for 10 years, and 44.8% also had periodontal surgery. The results of the study showed that those who received surgical therapy lost more teeth than those who received nonsurgical treatment. The factor that predicted tooth loss was neither procedure: it was earlier or initial attachment loss.

### **Morbidity and mortality rates**

The most common complications of oral surgery include bleeding, pain, and swelling. Less common complications are infections of the gums from the surgery. Rarer still is a bloodstream infection from the surgery, which can have serious consequences.

### **Alternatives**

Alternatives to periodontal surgery include other dental procedures concomitant with medication treatment as well as changes in lifestyle. Lifestyle changes include quitting smoking, nutritional changes, exercise, and better oral hygiene. There have been some medication advances for the gum infections that lead to inflammation and disease. Medication, combined with scaling and root planing, can be very effective. New treatments include antimicrobial mouthwashes to control bacteria; a gelatin-filled antibiotic "chip" inserted into periodontal pockets; and low doses of an antibiotic medication to keep destructive enzymes from combining with the bacteria to create plaque.

## **Topic 2. Orthopedic and orthodontic interventions in the oral cavity in periodontal diseases.**

*Malocclusion* is a common finding, although it is not usually serious enough to require treatment. Those who have more severe malocclusions may require orthodontic and sometimes surgical treatment (orthognathic surgery) to correct the problem. Correction of malocclusion may reduce risk of tooth decay and help relieve excessive pressure on the temporomandibular joint. Orthodontic treatment is also used to align for aesthetic reasons.

Malocclusions may be coupled with skeletal disharmony of the face, where the relations between the upper and lower jaws are not appropriate. Such skeletal disharmonies often distort sufferer's face shape, severely affect aesthetics of the face and may be coupled with mastication or speech problems. In these cases the dental problem is, most of the time, derived from the skeletal disharmony. Most skeletal malocclusions can only be treated by orthognathic surgery.

Malocclusions can be divided mainly into three types, depending on the sagittal relations of teeth and jaws, by Angle's classification method. However, there are also other conditions e.g. crowding of teeth, not directly fitting into this classification.

*Occlusal trauma* has been defined as injury to the periodontium resulting from occlusal forces that exceeds the reparative capacity of the attachment apparatus. Trauma from occlusion refers to tissue injury due to distorted occlusion. An occlusion that produces such injury is called a traumatic occlusion. Acute trauma from occlusion can result from an abrupt occlusal impact on bitten objects, restorations or prosthetic appliances that interfere with or alter the occlusal forces on teeth.

Chronic trauma from occlusion is more common than acute trauma and develops from gradual changes in occlusion produced by tooth wear, drifting movement, extrusion of teeth, combined with parafunctional habits such as bruxism and clenching.

Trauma from occlusion is considered the primary etiological factor, and the only local alteration to which a tooth is subjected is from occlusion. Secondary trauma from occlusion occurs when the adaptive capacity of the tissues to withstand occlusal forces is impaired by bone loss resulting from marginal inflammation. The periodontium becomes more vulnerable to injury, and previously well-tolerated occlusal forces become traumatic.

*Traumatic occlusion* can cause a thickening of the cervical margin of the alveolar bone in addition to a widening of the periodontal ligament.

There are a number of physiological results which are evidence of occlusal trauma. These symptoms include:

- Tooth mobility
- Fremitus
- Tooth migration
- Pain
- Sensitivity to hot or cold

- Pain while chewing or percussion
- Wear facets

### ***Diagnosis***

Microscopically, there are various features which accompany occlusal trauma. These features include the following:

- Hemorrhage
- Necrosis
- Widening of the periodontal ligament
- Bone resorption
- Cementum loss and tears

There are two different types of occlusal trauma, primary and secondary. Primary occlusal trauma occurs when a greater than normal occlusal force is placed on the teeth. This can occur from parafunctional habits, such as bruxism or chewing and biting habits.

The associated excessive forces can be grouped into three categories, duration, frequency and magnitude.

Secondary occlusal trauma occurs when normal or excessive occlusal forces are applied to the teeth with compromised periodontal attachment. This contributes harm to a system which is already damaged. Secondary occlusal trauma typically occurs when there is a pre-existing periodontal condition.

The diagnosis and assessment (flowchart) of occlusal trauma is not merely made based on a single examination, due to the necessarily progressive nature of injury. Orthodontic correction is usually restricted to cases where tooth malpositions are the prime cause of trauma. There are certain additional factors such as morphology, prognosis of the teeth involved, direction and magnitude of movement required that will influence the decision of whether or not orthodontic tooth movement is indicated.

Limited orthodontic mechanotherapy assumes that either the traumatic lesion is the only evidence of a malocclusion or that the patients have been informed of the mode of management aimed at comprehensive treatment of malocclusion and have rejected the same.

Before orthodontic appliances are removed, the clinician should ensure that occlusal interferences are eliminated. This assessment should be made in both static and functional excursion. Investigations that may aid this decision may include visual inspection using articulating paper, occlusion, mobility assessment, radiographs and the use of the lately developed computer-aided occlusal evaluation systems.

Once traumatic occlusion has been eliminated via tooth movement, and other treatment goals are obtained the patients appliance can be debonded and retention phase started. Retention should be custom-designed for each patient taking into account the nature of the initial malocclusion and periodontal status of the patient.

A dental splint is an appliance designed for the immobilization or stabilization of loose/mobile teeth.

Splint: Any apparatus, appliance, or device employed to prevent motion or displacement of fractured or movable parts.

Dental splint: An appliance designed to immobilize and stabilize loose teeth.

*Splinting, of abutments:* The joining of two or more teeth into a rigid unit.

Splinting is a viable treatment option in developing a therapeutic occlusion.

- It prevents mobility which interferes with function.
- It helps in favorable force distribution to the remaining periodontium.
- Provides rest during periodontal wound healing
- Provides comfort/support in performing function, \*in cases of reduced/weakened periodontium.

*Tooth mobility:* The movement of a tooth in its socket resulting from an applied force. Pathological tooth mobility is caused by inflammation of the periodontium that leads to the loss of the periodontal attachment or due to parafunctional forces exerted on the periodontium or both. Therefore, the proper diagnosis of the aetiology of tooth mobility is the key for successful treatment of mobile teeth. A number of treatment considerations must be considered to treat trauma from occlusion.

This includes one or more of the followings:

- Occlusal adjustment.
- Management of parafunctional habits.
- Temporary or long-term splinting.
- Orthodontic treatment.
- Occlusal reconstruction.
- Extraction of selected teeth.

To stabilize mobile teeth, especially teeth with

- progressive mobility.
- Pathologic migration.
- To promote periodontal healing.
- To improve patient comfort.
- Prosthetic rehabilitation with multiple abutments.
- Orthodontic retention.
- Repositioning or re-implantation of avulsed teeth in cases of post-acute trauma.
- Splinting teeth in primary or secondary occlusal trauma.

***Classification of splints:***

*I. According to duration:*

*Temporary or provisional:* They are used to assist healing after injury or •after surgical treatment. They should be reasonably easy to apply to mobile teeth and also easy to remove after healing has taken place. Are placed for less than 2 months. •If adequate stabilization has not taken place in that time a more permanent form of splinting is necessary. Examples are composite resin splint on acid etched surface with no tooth preparation, wire and acrylic splint, orthodontic bands, acrylic bite-guards.

*Semi-permanent:* They are placed for months to years. May be employed during an observational •period before determination of the long-term prognosis. Examples are: composite resin splint with •tooth preparation in the anterior region, removable cast chrome-cobalt alloy frameworks incorporating finger clasps

for retention, wire placed in continuous posterior MODs amalgams and subsequently filled with composite resins.

*Permanent/Definitive:* They are placed for the life of the teeth. •It is employed during complex oral rehabilitation where abutments are highly mobile or where a few abutments must support the entire prosthesis. Examples are fixed splints like inlays or crowns and removable splints like chrome-cobalt partial denture with extensions covering the lingual surfaces of the teeth to be protected.

*II. According to design:*

*Removable:* It can be removed by the patient.

*Fixed:* It cannot be removed by the patient. Fixed \*prosthesis works as a permanent splint

*III .According to fabrication technique:*

*Direct:* fabricated inside the mouth. \**Indirect:* fabricated outside the mouth in the lab. \*

*IV. According to tooth preparation:*

*Intracoronaral:* where the splint takes retention \*form inside the crown, with cavity preparation.\**Extracoronaral:* where the splint takes, retention form the external surface of crown. e.g Ligaturewire, night guards. etc.,

### **Splints:**

It is a removable appliance fabricated in acrylic .

It is constructed such that the acrylic extends over the occlusal / incisal surface of the tooth thereby fixing & stabilizing it .

#### **1. Measure and cut the fibre**

Measure the length of fibre needed by using, for example, a periodontal probe or dental floss. Cut the appropriate amount of the ever Stick PERIO fibre with the silicone bed using sharp scissors

#### **2. Clean the teeth**

The entire length of the fibre splint must be bonded to tooth surfaces. Clean the tooth surfaces and approximal areas with a paste of pumice and water, rinse and air-dry the area. Place wedges in the interdental spaces as necessary, so that the spaces to be cleaned are not filled with composite. If you are working without wedges, be careful not to block these spaces with composite.

#### **3. Etch the tooth surfaces**

In the area of the splint etch the tooth surfaces and approximal areas thoroughly with ortho-phosphoric acid. Preferably etch a slightly wider area than necessary rather than too little. The recommended enamel etching time for surface-retained areas is 45 to 60 seconds. Rinse with water and air-dry the tooth surfaces after etching. As with all bonded restorations, a dry operating field is absolutely necessary. A rubber dam isolation is highly recommended.

#### **4. Bond the tooth surfaces**

Use the adhesive bonding technique for bonding teeth according to the instructions of the bonding agent manufacturer. Apply the bonding agent to the entire area to be bonded. Light-cure the bonding agent as described by the manufacturer.

#### **5. Apply flowable composite**



Apply a continuous thin layer of flowable composite (for example, StickFLOW) on the teeth including the approximal areas. Leave enough space for cleaning the interdental spaces. Do not cure the composite during this phase.

#### **6–7. Position and light-cure the fibre**

Place the fibre bundle on top of the uncured flowable composite. Aim to place the fibre as incisally as possible in the anterior area. Make sure that it will not be in occlusion. Position one end of the fibre bundle first by pressing it down with the Stick STEPPER instrument. Pre-cure the fibre in place, one tooth at a time, for about five seconds, using a curing light. The wide-tipped StickSTEPPE instrument shields the rest of the fibre from light. As the fibre is made of light-conducting material, it is recommended to direct the light-curer away from the uncured fibre bundle. Press the fibre into the approximal areas as well. Make sure that the interdental spaces are not blocked with fibre and composite.

#### **8. Cover and finish the splint**

After pre-curing, cover the entire fibre splint with a thin layer of composite. Note that in surface-retained areas the fibre bundle can be coated with a thin layer (0.5 mm) of flowable composite. Then light cure the whole retainer for 40 seconds, one tooth or coverage area of the light-curer at a time. Be careful not to cut the fibre when finishing/polishing the splint.

**Topic 3. General medical treatment of patients with periodontal disease.  
Indications, groups of drugs, treatment regimens, prescription of medicines.**

**Treatment Strategies**

In order to determine the appropriate treatment or combination of treatments that best fit their unique situation, patients must work closely with their dental professionals.

***Treatments for periodontal disease may include:***

- Professional cleaning to remove tartar and plaque buildup
- Scaling and root planing to the depth of the pockets, sometimes with local anesthesia
- Use of a locally or systemically applied antibiotic drug to reduce the bacterial load in the pockets and help lead to reduction of the inflammation
- A daily oral hygiene treatment plan for between professional visits
- Surgical repair of the diseased tissues
- Removal of the damaged tooth

Local antimicrobial delivery into periodontal pockets may be further classified as providing either nonsustained or sustained subgingival drug delivery. Nonsustained subgingival drug delivery provides high pocket concentrations of the antimicrobial agent for only short time periods. Subgingival irrigation with antiseptic agents lacking substantivity for oral tissues (povidone-iodine) is examples of nonsustained subgingival drug delivery. Sustained subgingival drug delivery provides retention of the within periodontal pockets. Controlled drug release can be provided with subgingival irrigation of agents intrinsically substantive for tooth root surfaces (aqueous tetracycline) or pocket placement of commercial antimicrobial fibers, gel or films.

Locally applied antimicrobial agents should be safe, stable, substantive, efficacious, cost effective, patient compliant, achieve effective concentrations. Factors affecting the bio-availability of an antimicrobial agent are solubility, pH and ion-binding capacity, delivery vehicle-drug interaction and metabolism.

***Supragingival irrigation***

Home irrigation devices allow the patient to deliver medicaments into the periodontal pocket at home on more frequent basis than is practical with professional gingival irrigation, the ability of the device to gain a access to the depth of periodontal pocket and the manual dexterity of the patients are the limiting factors . The mechanism of action of irrigation occurs through the direct application of a pulsed or steady stream of water or other solution. Studies have found pulsation and pressure to be critical components of an irrigation device. The pulsation creates two zones of hydrokinetic activity. The impact zone is where solution initially contacts the surface and flushing zone is where solution reaches into the subgingival sulcus. The outcome of hydrokinetic activity is subgingival penetration . Home irrigation devices include supragingival and subgingival devices. Irrigation with a standard jet tip is generally called supragingival irrigation. Tip is placed coronal to gingival margin. Oral irrigation devices with traditional jet tip results in greater access of medicament to periodontal pocket when compared with rinsing alone. A 90 degree angle of application to the tooth surface provides 71% penetration in shallow pockets. These devices may be useful in delivering of medicaments in cases of gingivitis with

shallow pocket depths, they are less useful in delivering medicaments in periodontitis patients with deeper pockets. They are mainly used for full mouth irrigation.

#### *Subgingival irrigation*

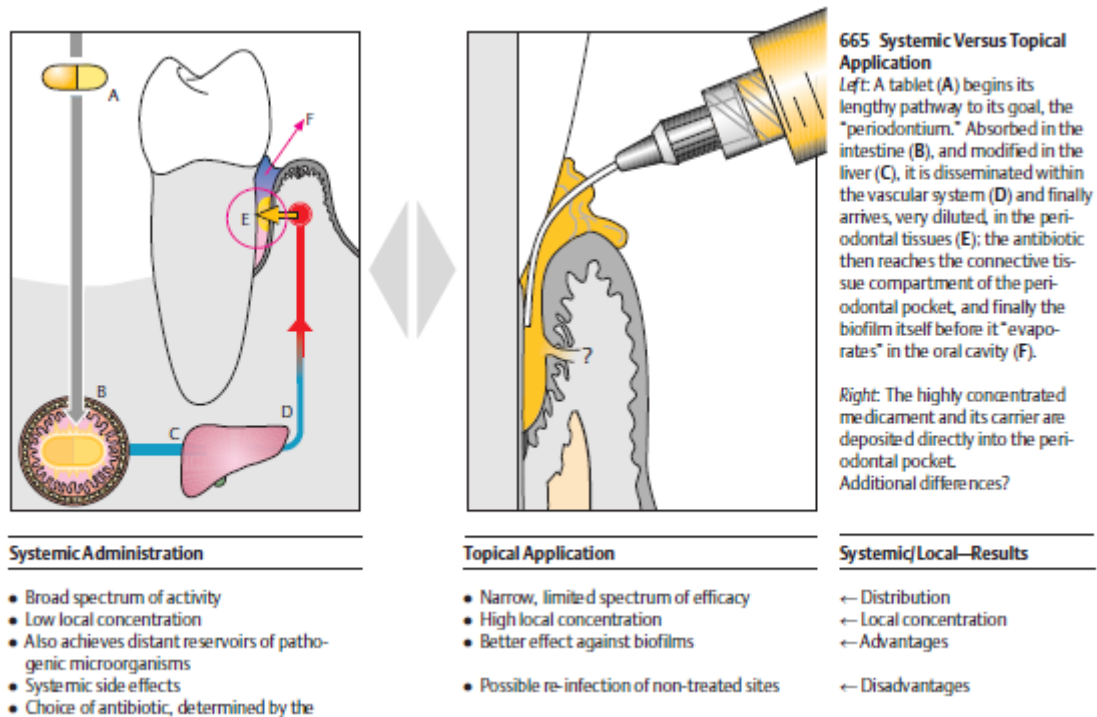
Irrigation with the soft, site specific tip is often called subgingival irrigation. This also refers to placement of tip, which is placed slightly below the gingival margin. These devices generally include blunt end metal cannula that the patient inserts into the periodontal pocket, this increases the depth of penetration of fluid but has the potential for injury owing to the metal tip.

The subgingival tip is generally used for the localized irrigation of specific site, such as a deep pocket, furcation, implant, or crown and bridge. Studies have shown that it can deliver solution into a pocket of 6mm or less up to 90% of its depth. In pockets greater than 6mm, the depth of penetration has been shown to 64%. Professional subgingival irrigation device include a wide range of powered and manually operated irrigations. Irrigation using a syringe with blunt end cannula attached to an oral irrigator can penetrate to 71.5% of the pocket depth in pocket 3.5 to 6 mm deep. Vehicles tested for sustained periodontal pocket delivery of antimicrobial agents include solution pastes, hollow fibre, acrylic strips, monolithic fibres, resorbable cellulose, collagen and biodegradable gel

#### *Local antimicrobial agents*

A local route of drug delivery can attain 100-fold higher concentrations of an antimicrobial agent in subgingival sites compared with a systemic drug regimen. For example, local placement of a tetracycline-releasing ethylene vinyl acetate monolithic fiber can yield tetracycline concentrations in excess of 1300 Fg/ml in gingival crevicular fluid over 10 days. In comparison, repeated systemic doses of tetracycline- HCl can only provide tetracycline levels of 4-8 pg/ml in gingival crevicular fluid.

Disadvantages of local antimicrobial treatment of periodontitis include difficulty in placing therapeutic concentrations of the antimicrobial agent into deeper parts of periodontal pockets and furcation lesions. Personal application of antimicrobial agents by patients as a part of their home self-care procedures is frequently compromised by the patient's lack of adequate manual dexterity, limited understanding of periodontal anatomy, and poor compliance and performance with recommended procedures.



The task of professionally applying local antimicrobial agents in periodontitis patients with numerous advanced lesions distributed throughout their mouth is time-consuming and labor-intensive. Nonsustained subgingival drug delivery is limited by a only brief exposure of the target microorganisms to the applied antimicrobial agent. Antimicrobial agents locally applied into periodontal pockets do not markedly affect periodontal pathogens residing within adjacent gingival connective tissues and on extra-pocket oral surfaces (tongue, tonsils and buccal mucosa), which increases the risk of later reinfection and disease recurrence in treated areas. Local agents used for irrigation includes chlorhexidine, povidine iodine, stannous fluoride ,hydrogen peroxide.

### *Antibiotics*

The physical removal of biofilm has proven to be the most effective method for treating periodontal disease. The use of adjunctive antibiotic therapy, either systemic or topical, is controversial. Some studies show superior results with antibiotic use while others show no clinical difference. There is a general consensus that antibiotics should not be used as a monotherapy in the treatment of periodontal disease. Antibiotics as a stand-alone treatment are ineffective at diminishing intact subgingival biofilms.

Antibiotic therapy is generally used as a follow up treatment after conventional mechanical therapy. Aggressive periodontitis may use systemic antibiotics as an adjunctive therapy.

There are many systemic antibiotics on the market. The most commonly used include tetracycline, ciprofloxacin, metronidazole and the penicillins, including amoxicillin and amoxicillin/clavulanate acid (Augmentin®). Tetracycline is bacteriostatic, targets both gram<sup>[SEP]</sup>positive and gram negative organisms, and has become bacterial resistant. Ciprofloxacin is bactericidal, targets gramnegative rods, and may cause gastrointestinal discomfort. Amoxicillin and Augmentin are both bactericidal, with Augmentin targeting a more narrow spectrum than amoxicillin.

Augmentin was developed due to amoxicillin's bacterial resistance from penicillinase enzyme sensitivity.

Of the many systemic antibiotics available, there is no consensus as to an ideal dose and duration. The choice of antibiotic should be made on an individual basis. In addition to serious adverse effects, like anaphylactic shock, microbial resistance is a growing concern. Other issues with oral antibiotic administration are patient adherence and adequate absorption from the gastrointestinal tract.

Understanding that the periodontal disease process may be initiated by bacteria but the individual's host response was critical to the progression of this disease led to the FDA approval of doxycycline at a sub-antimicrobial dose (20mg twice daily). When administered at this low dose, doxycycline does not cause the long term side effects seen with other systemic antibiotics. Randomized double blind placebo controlled trials demonstrated reduction in probing depths, improvement in clinical attachment levels and decreased bleeding on probing when used as an adjunct with scaling and root planing.

A recent review evaluating non-surgical chemotherapeutic strategies for the management of periodontal disease determined that "systemic antibiotics reach the periodontal tissues by transudation across serum, then cross the crevicular and junctional epithelia to enter the gingival sulcus." By the time the systemic antibiotic reaches the gingival sulcus it no longer has an adequate concentration to achieve the desired antimicrobial effect. This supports the fact that the mechanical disruption of biofilm must be included in the treatment of periodontal disease.

Atridox® is a 10% doxycycline hyclate gel and is prepared by mixing powder and liquid from two syringes. The antibiotic is administered into the gingival sulcus through a cannula. Absorption lasts up to 21 days, while therapeutic drug levels in the gingival crevicular fluid start to decline at 7 days. The most notable drawback is the high level of clinician skill needed to deliver this therapy as the material tends to come out of the pocket as the syringe is being pulled out of the sulcus. The majority of the time, more than one site can be treated depending on the depth and size of the pockets.

Arestin® is comprised of spheres embedded with 2% minocycline HCl that is slowly released and holds the therapeutic dose in the gingival crivicular fluid for 14-21 days. The most notable drawback for Arestin is the delivery dose. The syringe holds pre-set doses that may not be sufficient for every site. This results in the need to reapply in the same pocket.

Currently, resorbable antibiotics such as Atridox® and Arestin® are the topical antibiotics of choice. The American Academy of Periodontology (AAP) supports that local adjuncts, when compared with scaling and root planning alone, provide limited improvement. Locally administered antibiotics still require a strict health history review to verify there are no known allergies. Even though these medications are applied topically, as opposed to oral administration, the same precautions apply.

#### *Antiseptics*

Unlike topical controlled-released antibiotics, oral rinses do not penetrate deep into the gingival sulcus. Despite this limitation they do show benefit when used adjunctively for gingival inflammation. Oral rinses are also of great value in post

surgical healing. Substantivity is a crucial component when considering the effectiveness of a mouthrinse. This term refers to the adherent qualities of a mouthwash and its ability to be retained. Saliva has a natural flushing property making it difficult to maintain an antimicrobial effect. Research shows a significant antibacterial effect up to 7 hours after mouthrinses with high a substantivity property.

First generation antimicrobials include phenolic, sanguinarine, quaternary compounds. Listerine® and its generics are phenolics, which possess the only ADA Seal of Acceptance among the first generation antimicrobials. Listerine contains 26.9% alcohol, alters the bacterial cell wall, and has 36% gingivitis reduction. Cepacol® and Scope®, quaternary ammonium compounds, contain 14% and 18.9% alcohol respectively, increase bacterial cell wall permeability causing cell lysis, and reduces gingivitis approximately 15%.<sup>1</sup>

Second generation antimicrobials include cetylpyridinium chloride (CPC) and chlorhexidine (CHX). A commercial name for CPC is Crest® Pro-Health®, which contains 0.07% CPC. Bacteria cells are killed by cellular pressure, resulting in a similar efficacy as Listerine. Chlorhexidine has many commercial products including the availability of a nonalcoholic version by Sunstar Americas, Inc. Peridex® by 3M Espe and Periogard® by Colgate® Professional are two examples of popular chlorhexidine-based products. Their active ingredient is 0.12% chlorhexidine. Cell death results from altered osmotic equilibrium. CHX efficacy in the reduction of certain aerobic and anaerobic bacteria has been shown to be as high as 97% after 6 months of use. CHX has 29% gingivitis reduction. The gingivitis reduction percents listed above for both first and second generation antimicrobials are based on efficacy data published by manufacturers.

Other antimicrobials include oxygenating, chlorine dioxide, and zinc chloride agents. Peroxyl® is an oxygenating agent with the active ingredient of hydrogen peroxide. It has anti-inflammatory properties as well as a bubbling action to clean and alleviate discomfort. Short term studies have produced controversial findings. Oxyfresh®, a 1% chlorine dioxide agent, has minimal plaque reduction. It is a stable, free radical and an oxidant with algicidal, bactericidal, cysticidal, fungicidal, sporicidal, and viricidal properties. Oxyfresh is primarily used for the treatment of halitosis. Breath Rx® is a zinc chloride agent designed to odorize sulfhydryl groups with zinc ions. It claims to be a scientific bad breath treatment specifically designed to help treat the causes of bad breath and the symptoms.

Antimicrobial mouth rinses have been linked to several side effects; some more serious than others. First generation compounds like Listerine can cause a burning sensation and bitter taste. Chlorhexidine can cause supragingival calculus build-up and staining. Research has demonstrated permanent damage to enamel through erosive pH levels and abrasive antimicrobial toothpastes.<sup>1</sup> Carcinogenic changes have been linked to the use of oxygenating agents and mouth rinses containing alcohol.

### *Nutraceuticals*

As antibiotic resistance becomes more of a concern, health care providers looking for alternate adjunctive periodontal therapies for their patients. Some examples of nutraceuticals include herbal and nutritional supplements and the future of this type

of therapy is promising. There are approximately 500,000 plant species, with only 1% having been photochemically investigated. Herbal plant extracts have been shown to reduce the level of biofilms influencing the level of bacterial adhesion. This has shown results with the reduction of periodontal disease. Some herbs such as *Coptidis rhizome* extract and *Hamamelis virginiana*, are used as bactericidal agents against oral bacteria while others such as cranberry, *Polygonum cuspidatum* and *Mikania* are used to inhibit adhesion.

The use of probiotics in the control of periodontal pathogens is emerging. Probiotics are “live microorganisms, which when administered in adequate amounts confer a health benefit on the host.” Simply put, they are healthy bacteria that displace unhealthy or pathogenic bacteria.

A reduction in gingivitis and dental plaque has been shown with the administration of *L. reuteri* Prodentis® gum chewed twice daily in patients with moderate to severe gingivitis.<sup>14</sup> GUM® Perio Balance®, marketed by Sunstar Americas, is a once daily lozenge with *L. reuteri* Prodentis® that claims a reduction in moderate to severe plaque and bad breath. EvoraPlus™ from Oragenics, Inc. is another new probiotic for oral health and is used once daily. This supplement contains a combination of three bacterial strains *Streptococcus uberis* KJ2, *S. oralis* KJ3, and *S. rattus* JH145, and claims a reduction in periopathogens within the periodontal pocket.

## **Topic 4. Diet therapy for patients with periodontal disease (nutritions, recommendations)**

### **Role of Nutrition in Periodontal Diseases**

Although the primary etiology of periodontal disease is bacterial; host & environmental factors modulate the severity of disease.

These factors are:

- Genetics
- Chronic diseases
- Tobacco use
- Socio-economic level
- Education level
- Frequency of dental visits

“Local & systemic nutrition”

- The last factor has 2 types of effects on the development of periodontal diseases
- Direct effects of nutrient deficiencies have already been discussed in previous slides.
- It is important that dental professionals be able to identify pts. at risk for poor nutrition, which may compromise their immune response & place them at higher risk of infection.
- Deterioration of oral health is highly co-related with deterioration of general health; making it essential that the pt. be well nourished in order to respond to the challenge of infectious disease like periodontal disease.

Nutrition and Older Adults.

- Older adults have lesser intake of food.
- This causes deficiency of nutrients; predisposing them to infections.

### **Causes of nutritional deficiency in old age:**

- physical conditions (disability)
- medical conditions (oral disorders, GIT diseases, metabolic diseases)
- psychosocial conditions (living alone, bereavement, depression)

Immune senescence: term given to the process of decline of immune response with age.

### **Nutritional consideration in Surgical Patient**

- Nutrition affects a surgical patient through its effect on the healing of the surgical wound.
- Wound healing requires energy derived from various nutrients in following ways1. Proteins: strength of fracture repair



- Vit.A: epithelialisation, collagen synthesis, cross linking, fibroblast differentiation
- Vit.C: co-factor in hydroxylation of lysine & proline in collagen synthesis
- Vit.D & Calcium : healing of hard tissues
- Vit.E: decreases damage from oxygen free radicals
- Vit.K: activation of clotting factors

#### Nutrition Strategies to enhance Immunity & Prevent Infection

- The Food Guide Pyramid is one of the ways to make people understand how to eat healthy.
- It explains how much & what should be included for a balanced diet.

#### *Dietary Guidelines*

1. A nutritionally adequate diet should be consumed through a wise choice from a variety of foods.
2. Additional food & extra care be required during pregnancy & lactation.
3. Exclusive breast feeding should be practised for upto 6 months; & continued upto 2 years.
4. Food supplements should be introduced to infants after 6 months.
5. Adequate & appropriate diet should be taken by children & adolescents; both in health and disease.

#### Effect of Nutritional Deficiencies on Infection <sup>[11, 12, 13]</sup>

Nutrient	Deficiency effect on immune response
Protein	Dec. salivary anti-microbial properties Dec. Immunoglobulin production Dec. lysozymes Dec. activation of lymphocytes Dec. antibody production Inc. bacterial adhesion
Vit.A	Dec. immune cell differentiation Dec. antigen response Dec. antibody production Dec. immunoglobulin production Dec. lymphocyte production Inc. bacterial adhesion
Vit.E	Dec. antibody response Dec. phagocytic function Dec. cytotoxic T-cell activity
Nutrient	Deficiency effect on immune response
Vit.C	Dec. antibody response Dec. phagocytic function Dec. cytotoxic T-cell activity
Vit.B complex	Dec. antibody synthesis Dec. cytotoxic T-cell activity Dec. lymphocyte response Dec. lymphocyte production Dec. phagocytic function
Zinc	Dec. antibody response Dec. phagocytic function Dec. B & T cell proliferation
Iron	Dec. antibody response Dec. phagocytic function Dec. B & T cell proliferation

**Topic 5. Physiotherapy of patients with periodontal disease (electrophoresis, fluctuorisation, light therapy, laser therapy ).**

*Physiotherapy* is performed after the removal of dental deposits, arresting of acute inflammatory process. Some procedures (UV-radiation, hydrotherapy, laser therapy, aeroionotherapy, etc.) can sometimes be performed from the very beginning of the complex treatment.

**Various physiotherapeutic methods are used for treatment:**

1. Electrotherapy: a) direct current (electrophoresis, vacuum electrophoresis) b) pulse current of low frequency and low voltage (diadynamotherapy, fluctuorization); c) pulse currents of high (HF), ultrahigh (UHF) and super-high (SHF) frequency (darsonvalization, diathermy, diathermocoagulation, electrorhythm therapy, UHF-therapy, microwave therapy).
2. Ultrasound therapy.
3. Aeroionotherapy
4. Phototherapy (UV light therapy, laser therapy).
5. Vacuum therapy.
6. Hydrotherapy.
7. Massage.
8. Heat and cold treatment.
9. Magnetic therapy.
10. Oxygen therapy.

The above list does not cover all currently available physiotherapy procedures, which are constantly invented.

***Direct current.***

***Electrophoresis***, a method of administration of drugs into body tissues using a direct electric current, is often used in the treatment of periodontal diseases. Depending on the place of drug administration, dental, supragingival and intranasal electrophoresis; ionic (galvanic) “collar” according to Scherbak, etc. is distinguished. In electrophoresis, the active electrodes are applied to the gingival margin through a hydrophilic pad soaked in the drug substance. The passive electrode is fixed in the hand or on the forearm. The pad of the passive electrode is moistened with tap water or isotonic sodium chloride solution. *Electrophoresis* is prescribed in *acute and exacerbated chronic catarrhal and hypertrophic gingivitis, periodontitis* after elimination of active inflammation, and *parodontosis*.

In *hypertrophic gingivitis* electrophoresis with 10% solution of calcium chloride alternately from an anode and a cathode is recommended. This provides the deposition of calcium and chlorine ions in the gum tissue for anti-inflammatory (calcium) and cytotoxic (chlorine) action, which ensures a lasting clinical effect. electrophoresis with ascorbic acid (5%), vitamin P (1%), solutions of trypsin, ribonuclease (1 mg / mol) from the anode and aqueous solution of aloe extract, 1% solution of nicotinic acid, vipraxon, heparin solution (1:15) from the cathode, mud extract, ozokerite, etc. is used to influence the exudative processes.

In *parodontosis*, electrophoresis with 1-2-4% of solution of sodium fluoride, 2,5% of solution of calcium glycerophosphate is recommended and in hyperesthesia of hard tooth tissues electrophoresis with solutions of thiamine chloride with novocaine

is advisable. Electrophoresis with drugs, listed above, improves mineral metabolism and trophism of periodontal tissues. If it is necessary to administer complex drugs consisting of differently charged ions, electrophoresis is carried out alternately on one day from the negative, in another - from the positive pole.

**Diadynamotherapy** is the use of modulated sinusoidal pulse current for therapeutic purposes. The mechanism of physiological action of diadynamic current is based on the redistribution of ions in tissues, changes in the permeability of membranes and cell membranes, improvement of blood circulation, trophism, analgesia, etc. This increases the protective properties of tissues; they accumulate biologically active substances (heparins, histamine-associated substances, etc.), and others. In the treatment of periodontal disease, the most appropriate use of diadynamic current is with the simultaneous administration of drugs into the tissue (diadynamophoresis).

**Fluctuorization** is the use of alternating current with randomly varying forces, frequency and duration of oscillations for therapeutic purposes. For these purposes, three forms of current are used: bipolar symmetric, partially rectified and direct pulsating current. The first two forms of current have anti-inflammatory and analgesic effects. Constant pulsating current can be used for electrophoresis with drugs (fluctuorophoresis). Fluctuorization is indicated in the treatment of acute forms of gingivitis, periodontitis and parodontosis.

**Alternating current.**

**Darsonvalization** is electrotherapy, performed using devicesgenerators of high-frequency alternating current of low power, high voltage, which gives a sharply attenuating discharge. D'Arsonval currents suppress the sensitivity of peripheral nerve receptors, giving the analgesic effect, reduce itching in tissues, dilate blood vessels, improve tissue trophism, relieve vascular spasm, increase WBC migration, etc. Darsonvalization is indicated in chronic gingivitis, generalized periodontitis, parodontosis.

**Electrorhythm therapy** is based on the use of a low-power output sinusoidal current with a frequency of 2000 Hz and modulated at a low frequency (5-100 Hz) in the form of sawtooth rhythmic pulses. Currents are used in two modes: two-stroke and rectified. The method of electrorhythm therapy has a stimulating, electrophoretic and pronounced analgesic effect on tissues; provides a deeper diffuse and prolonged effect of drugs, especially on the hard tooth tissues and skin.

**UHF-therapy** is one of the types of electrotherapy. The mechanism of physiological action of the ultrasonic field is provided by the physic-chemical changes in the colloids of molecules closely related to thermal and oscillatory effects. There are athermic, oligothermal and thermal doses. The field of weak intensity stimulates, and strong - suppresses the functional activity of the organism. Under the influence of the UHF field, the capillaries dilate, their blood circulation accelerates, macrophage activity increases, tissue acidity decreases, edema decreases, metabolic processes improve, the growth of young connective tissue accelerates, the sensitivity of nerve receptors decreases, and so on. UHF therapy is used in acute gingivitis, exacerbation of periodontitis, abscess.

**Microwave therapy** is the use of electromagnetic field of the microwave range. Microwaves are able to penetrate into the body tissue to a depth of several centimeters. At the sites of penetration the energy is absorbed by the structures according to their density and converted into endogenous heat. Under the influence of microwaves, blood vessels dilate, blood circulation accelerates, trophism and metabolism become to normal, the sensitivity of nerve endings is reduced, the regeneration process is stimulated, and so on. The non-thermal effect of microwave therapy is manifested in various intramolecular physicochemical reactions. At a dose of 5-7 watts at an exposure of 5-7 minutes, microwaves have *antiinflammatory, antispasmodic and analgesic effects*. Indications for microwave therapy are the same as for UHF therapy.

In the treatment of periodontal disease **ultrasound**, which enhances metabolism, activates the activity of enzymes, increases the permeability of the membrane, while releasing biologically active substances, is also used. The effect of ultrasound on tissues is considered as a kind of micromassage of cells. **Ultrasound** is used to administer drugs into tissues, phonophoresis (e.g., vitamins D, E, group B, sodium fluoride, etc.). Ultrasound oscillations from 0.8 to 20 MHz can be used to diagnose tissue damage (ultrasonic bioecholocation). This is a lifelong method of studying the structure of periodontal bone tissue. It allows evaluating the density of tissues. The method is successfully used to diagnose and estimate the quality of treatment. Ultrasound is also used to remove dental deposits. Through the contact acoustic environment, namely, water, dental deposits are effectively and easily removed by the light massaging movements of the tip in the surface of the tooth neck and crown.

**Aeroionotherapy.** Aerosol method of drug administration is used in acute inflammatory diseases and exacerbation of chronic periodontal diseases. The principle of operation of inhalators is based on spraying drugs with a stream of compressed air into small particles that penetrate freely into the periodontal tissue. Due to the huge absorption capacity of the mucous membrane of the mouth and respiratory tract, aerosol inhalations, in addition to local action on periodontal tissue, have a general resorptive effect: improve lymph and blood circulation, activate metabolism.

**Phototherapy.** *Ultraviolet radiation* has anti-inflammatory, desensitizing, stimulating metabolic processes and regenerating effect; it is widely used in prominent inflammation of periodontal tissues. The most effective are short ultraviolet rays (253.7 nm). Conical metal nozzles make it possible to direct the rays locally into the oral cavity. **Laser therapy** is the use of electromagnetic waves emitted by quantum generators, with monochromaticity, coherence (single-phase waves). *Helium-neon laser* radiation is the most widely used. Such radiation has a therapeutic effect of a wide range: antiinflammatory, because it normalizes the disturbed microcirculation and permeability of the vascular wall; analgesic; thrombolytic; improves metabolic and redox processes in tissues; stimulates the regeneration process, factors of local and general immune protection of the body, etc. Intravenous laser irradiation of blood is used in combination with other prescriptions in the treatment of severe forms of generalized periodontitis, ulcerative necrotic stomatitis.

The method reduces the duration of treatment, increases the remission period, has an analgesic effect, stimulates regeneration processes.

*Contraindications* are diseases with severe clinical course, cardiovascular diseases (myocardial infarction, aortic aneurysm, circulatory failure of II-III degree), tuberculosis intoxication, diabetes mellitus at the uncompensated stage, blood diseases.

*Vacuum therapy.* The essence of treatment is the formation of hematomas on the gums in the area of the transitional fold as a result of exposure to reduced pressure (up to 40 mm Hg). At each session, 4-6 hematomas are formed on different parts of the gums, which, when resorbed, act as biogenic stimulants, activating trophic, immunobiological and regenerative processes. In periodontal tissues, conditions are created for the arrest of the inflammatory process, etc. *Indications* are chronic catarrhal and hypertrophic gingivitis, occurring with congestion, generalized periodontitis without discharges from the periodontal pockets and parodontosis.

*Vacuum massage* is a type of vacuum therapy. In areas of short-term vacuum in the gums and the transitional folds of the mucous membrane of the vestibule of the mouth, microhematomas are formed. The process of moving of the vacuum areas throughout the periodontium is a kind of massage. As a result, blood circulation in periodontal tissues improves, stagnation and hypoxia are eliminated, metabolism, redox processes are improved, and regeneration processes are activated.

*Hydrotherapy.* Hydrotherapy is the irrigation of the oral cavity with various saturated liquids or aqueous solutions from special devices and apparatus at a pressure of 1.5-2.0 atm. Under the influence of hydrotherapy, the receptor apparatus and capillary network are simultaneously irritated and the aerosol effect of the drugs used is manifested. Tinctures and decoction of medicinal herbs (chamomile, sage, kalanchoe, eucalyptus, plantain, etc.) are the most effective, as well as sea water, and mineral waters; water saturated with carbon dioxide, oxygen; water subjected to magnetic processing; light solutions of furacillin, hydrogen peroxide, dimexid, galascorbic acid, 2% citral solution, etc. For irrigation special nozzles are used: hollow tubes, curved along the dental arch with many small holes. The jets of fluid coming through the holes of the nozzle on the gums, create different levels of impact on the tissues, improve blood circulation, trophism, therapeutic and prophylactic effect.

*Massage.* Vibration massage is a rhythmic repetition of vibration movements on the surface of the areas. Such type of massage improves blood circulation, metabolic processes, tissue trophism, accelerates regeneration processes. Special vibrating massagers and vibrating toothbrushes of industrial production are use. There are many attachments to the dental tip that vibrate during the operation of the drill. The massage facilitates active hyperemia of the gums, the capillary network dilates and the blood circulation accelerates, the metabolic processes in the periodontal tissues improve, the phenomena of hypoxia are eliminated. Massage improves lymph flow, which promotes the resorption of inflammatory exudate, reduces tissue swelling. Under the influence of massage, the protective properties of periodontal tissues are enhanced.

*Digital automassage* improves blood and lymph circulation, stimulates metabolism and increases gas exchange in periodontal tissues. This type of massage leads mechanical irritation of numerous receptors of gums which include the reflex mechanisms causing therapeutic effect. The gums are massaged with the forefinger, placing it on the transition fold at the base of the interdental papilla. Then make a movement of the finger to its top - from 6 to 10 movements, in each area covering 2-3 papillae of the gums. Finish the massage with a hygienic rinse. *Contraindications* are exacerbated course, the presence of abscesses, erosions, canker sores, ulcers, neoplasms.

***Heat treatment.*** Deep heating of heat treatment takes an important place in the complex treatment of periodontal diseases. Curative mud has an effect on periodontal tissues due to its chemical, physical and biological properties. Sulphide mud, peat, sapropels are used for medical purposes. The therapeutic effect of mud applications is based on a complex reflex process. Biogenic stimulants and microelements that affect sensitive receptors are absorbed through the mucous membrane and vascular and metabolic processes are stimulated. Active hyperemia develops, outflow accelerates, the pH of the medium changes to the alkaline side. Paraffin and ozokerite treatment is one of the types of heat treatment. Paraffin is a mixture of high molecular weight carbohydrates with high heat capacity and low thermal conductivity. It has a pronounced thermal and compression effect. Ozokerite, or the earth wax, whose melting point is 52-68 ° C, has compression and thermal properties. To increase the ductility of paraffin and ozokerite in the heating process, you can add Vaseline or Vaseline oil. It is applied to the area of the pathological focus. It has a soothing, anti-inflammatory, analgesic and antispastic effect.

***Cryotherapy.*** Cryotherapy, or local hypothermia, is a method of treatment based on the use of low temperatures. Under their influence on the focus of lesion complex physical, chemical and biological processes take place in periodontal tissues: painful sensitivity decreases, tissue swelling decreases, protein decomposition and processes of absorption of decay products of tissues and microorganisms are slowed down, hypoxia and acidosis, formation, secretion and secretion decrease, the phagocytic activity of leukocytes increases, reparative processes are stimulated; a rupture of the cell membrane occurs due to intracellular crystallization of water, denaturation of cellular proteins until cell death, and others. Advantages of cryotherapy are painlessness, limited destructive effect, pronounced hemostatic effect, favorable clinical course of the wound process with the formation of a delicate scar. Liquid nitrogen, freon, etc. are used as freezing liquids. The complex treatment of periodontal diseases includes methods of cryotherapy, contact cryodestruction and cryo-curettage.

***Magnetic therapy.*** The constant magnetic field has an anti-inflammatory, antispasmodic, analgesic effect on the human body, accelerates reparative processes and others. For the treatment of periodontal diseases, dentogingival caps and toothbrushes with built-in permanent magnets are used. Permanent magnets are sources of a constant magnetic field, the magnetic field lines of which are concentrated in the pathology zone. The magnetic cap is periodically used by patients for 20-30 days. Under the influence of the magnetic field, swelling, redness, bleeding

gums, exudate from periodontal pockets decrease. The magnetic toothbrush provides daily magnetic massage of periodontal tissues. A combination of electrophoresis, laser therapy in combination with magnetic therapy is effective. Applications, irrigation, rinsing, mouthwashes, hydromassage with pre-magnetized drugs can be recommend.

**Oxygen therapy.** Periodontal diseases are accompanied by varying degrees of oxygen starvation. This condition also contributes to the depletion of vitamin C, increase vascular permeability, disorders of all types of metabolism. As a result of hypoxia deoxidized metabolic products accumulate in the periodontal tissues, resulted in chronic tissue hypoxia. Disorders of energy metabolism are one of the pathogenetic links in the development of dystrophic changes in periodontal tissues. Consequently, the local administration of oxygen into periodontal tissues is one of the pathogenetic methods of treatment and is widely used in clinical practice. The simplest methods are tissue saturation with cotton swabs soaked in hydrogen peroxide, potassium permanganate, irrigation or aerosol spraying with these solutions that is a hydrotherapy when the water jet or drug solution is enriched with oxygen (oxygen baths, oxygen punches, etc.).

The use of *physiotherapy methods* (namely electrotherapy) is contraindicated in malignant neoplasms, benign tumors of the maxillofacial area, decompensated forms of diseases of the cardiovascular, respiratory and endocrine systems; blood diseases, active tuberculosis, pregnancy.

## **Topic 6. Supportive therapy of patients with generalized periodontitis, periodontal disease.**

*Supportive periodontal treatment (SPT)* is an integral part of periodontal therapy. Supportive Periodontal therapy is the preferred term for those procedures from early referred to periodontal maintenance or periodontal recall and includes maintenance of dental implants. The SPT varies greatly from office to office, therapist to therapist, patient to patient, and for the same patient over time. Preservation of the periodontal health of the treated patient requires as positive a program as that required for the elimination of periodontal disease.

The continuing periodic assessment and prophylactic treatment of periodontal structures, permitting early detection and treatment of new and recurring disease is supportive periodontal therapy. Procedures performed at selected intervals to assist the periodontal patient in maintaining oral health. As part of periodontal therapy, an interval is established for periodic ongoing care. Maintenance procedures are under the supervision of the dentist and typically include an update of the medical and dental histories, radiographic review, extraoral and intraoral soft tissue examination, dental examination, periodontal evaluation, removal of the bacterial flora from crevicular and pocket areas, scaling and root planning where indicated, polishing of the teeth, and a review of the patient's plaque control efficacy. Periodontal maintenance procedures following active therapy is not synonymous with a prophylaxis.

The objectives of SPT are to prevent the occurrence of new disease and prevent the recurrence of previous disease.

- Preservation of alveolar bone support (radiographically).
- Maintenance of stable, clinical attachment level.
- Reinforcement and re-evaluation of proper home care.
- Maintenance of a healthy and functional oral environment to prevent occurrence of new disease.

Preservation of the periodontal health of the treated patient requires as positive a program as that required for the elimination of periodontal disease. After Phase I therapy is completed, patients are placed on a schedule of periodic recall visits for maintenance care to prevent recurrence of the disease<sup>7</sup>.

*There are 4 parts of SPT namely:*

1. Preventive SPT
2. Trial SPT
3. Compromise SPT
4. Post treatment SPT

- **Preventive SPT:** Intended to prevent inception of disease in those who currently do not have periodontal pathology (eg, patients at high risk for development of periodontal or peri-implant problems because of systemic disease or dexterity problems that prevent practicing hygiene).<sup>7</sup> Trial SPT : designed to maintain border line periodontal conditions over a period to further assess the need for corrective therapy for problems such as –

- inadequate attached gingiva,
- gingival architectural defects, or



- furcation defects, while maintaining periodontal health throughout the balance of the mouth.

- **Compromise SPT:** designed to slow the progression of disease in patients for whom periodontal corrective therapy is indicated, but cannot be implemented for reasons of health, economics, inadequate oral hygiene, or other considerations, or when recalcitrant defects persist after corrective treatment.

This type also includes situations in which periodontal or peri-implant defects persist after corrective therapy attempts (eg: patients with moderate chronic periodontitis or periimplantitis who cannot undergo treatment because of current gastric cancer treatment).

- **Post treatment SPT:** designated to prevent the recurrence of disease and maintain the periodontal health achieved during therapy. Transfer of the patient from active treatment status to a maintenance program is a definitive step in total patient care that requires time and effort on the part of the dentist and staff. Patients must understand the purpose of the maintenance program, and the dentist must emphasize that preservation of the teeth depends on maintenance therapy. Patients who are not maintained in a supervised recall program subsequent to active treatment show obvious signs of recurrent periodontitis (e.g., increased pocket depth, bone loss, or tooth loss)<sup>7,9,10</sup>.

### **PHASES OF PERIODONTAL TREATMENT**

- Preliminary phase
- Treatment of emergencies such as dental or periapical or periodontal abscesses. Extraction of hopeless teeth and provisional replacement if needed.
- Non surgical phase (**phase 1 therapy**)

*Plaque control and patient education:*

1. Diet control.
2. Removal of calculus and root planning.
3. Correction of restorative and prosthetic irritational factors.
4. Excavation of caries and restoration.
5. Antimicrobial therapy.
6. Occlusal therapy.
7. Minor orthodontic therapy.
8. Provisional splinting and prosthesis.

Evaluation of response to non surgical phase II.

#### **Surgical phase (phase 2 therapy)**

1. Periodontal therapy, including placement of implants
2. Endodontic therapy

#### **Restorative phase (phase 3 therapy)**

1. Final restorations
2. Fixed and removable prosthodontics appliances
3. Evaluation of response to restorative procedures
4. Periodontal examination

## Topic 7. Prevention of periodontal diseases

Prevention of gingivitis refers to inhibition of the development of clinically detectable gingival inflammation or its recurrence. It is currently unknown whether low levels of gingival inflammation are compatible with maintenance of oral health or should also be considered a risk for development of periodontitis in susceptible individuals. Primary prevention of gingivitis aims to avoid the development of more severe and widespread forms of gingivitis that may ultimately convert to periodontitis.

Prevention of periodontitis may be primary or secondary. Primary prevention of periodontitis refers to preventing the inflammatory process from destroying the periodontal attachment; it consists of treating gingivitis through the disruption/removal of the bacterial biofilm and the consequent resolution of inflammation. In addition, adjunctive interventions including pharmacological modification of the disease-associated biofilm and host modulation have been explored.

Secondary prevention of periodontitis refers to preventing recurrence of gingival inflammation, which may lead to additional attachment loss in successfully treated periodontitis.

**Primary prevention** – prevention of the diseases

1. Health educations
2. Nutrition programs
3. Oral examinations

**Secondary prevention** – treatment of early symptoms of the diseases



1. Professional oral hygiene
2. Screening of the diseases
3. Surgical intervention

**Tertiary prevention** – treatment of periodontal diseases preventing their progressions, complications and providing appliances to restore functions, include rehabilitation.

Both at the population and at the individual subject level, prevention (and treatment) of gingivitis is a critical component for the prevention of periodontitis. Furthermore, the control/management of risk factors for periodontitis such as smoking and diabetes form an important part of prevention of periodontitis.

Prevention of periodontal disease consists of patient-performed control of the dental biofilm and professional interventions. In developed countries, the above approaches have been used for several decades. Their application at the population level has been associated with an overall improvement in the levels of oral cleanliness, a decrease in gingival inflammation and in the prevalence of mild to moderate periodontitis (Eke et al. **2012**). In the majority of these countries, however, the prevalence of severe periodontitis has not decreased.

Similar to approaches adopted in the prevention of other common chronic diseases, effective prevention of periodontitis requires the combined involvement of policy makers, health professionals and empowered individuals.

It is noted that the oral health care team comprises different professional figures in different countries. These should participate in the professional delivery of prevention as determined by the competent governing laws.

The aim of this consensus was to identify effective approaches to improve: (i) plaque control at the individual and population level (oral hygiene), (ii) control of risk factors, and (iii) preventive professional interventions.

The scope of this consensus is to review the evidence supporting approaches for the prevention of periodontal diseases in self-caring adults without disabilities and to provide specific recommendations to the public, oral health professionals and policy makers. Specific recommendations were developed based on the evidence and the expert opinion of the group participants. Each recommendation for oral health care professionals and the public/patient was rated in terms of strength of the recommendation and in terms of the level of evidence underlying it. This was accomplished with a modification of the GRADE system as utilized in a previous workshop supported by the European Federation of Periodontology (Tonetti & Jepsen [2014](#)). The effectiveness of specific preventive tools and technologies is discussed in the consensus of group II (Chapple [2015](#)), while adverse events of prevention of periodontal disease are discussed in the consensus of group IV of this workshop (Sanz [2015](#)). Principles extending prevention to dental implants are discussed in the consensus of group III of this workshop (Jepsen [2015](#)).

### **Behaviour Change Counselling for Tobacco Use Cessation in the Dental Setting**

As smoking is a risk factor shared among several of the most prevalent diseases of mankind including periodontitis, avoiding tobacco consumption also contributes to periodontitis prevention.

The systematic review (Ramseier & Suvan [2015](#)) identified strong evidence that brief interventions in the dental setting increase the smoking cessation rate. While the reported quit rate was in the range of 10–20% at 12 months (Carr & Ebbert [2012](#)), the magnitude of the effect seen in these studies is comparable to that described in similar studies in general health care settings (Fiore et al. [2008](#)). Six of the eight studies in the review that supported the effectiveness of brief interventions to quit smoking in the dental setting were performed in the dental office.

Evidence demonstrates that patients welcome and expect involvement of oral health professionals in smoking cessation.

A limitation of the evidence is the lack of consistency of definition of specific interventions in the dental setting. However, a “brief intervention” in this context is generally a short conversation with the patient of up to 5 min., which provides advice and includes a degree of counselling regarding tobacco use.

Recommendations

#### **Oral health professionals**

Oral health professionals should be aware that brief interventions in the dental setting increase the smoking cessation rate. The health benefit is both for oral (periodontal) health and for general health.

Strength of recommendation: High, level of evidence 1.

Oral health professionals should adopt validated smoking cessation counselling approaches in their practice.

Strength of recommendation: High, level of evidence 1.

Oral health professionals should routinely adopt, as a minimum, a brief intervention using the AAR approach:

- Ask (ask every patient about tobacco use)
- Advise (advise every tobacco user to quit, provide information on 1. the effects of tobacco use on oral health, 2. the benefits of stopping tobacco use, and 3. available methods for quitting)
- Refer (offer referral to specialist smoking cessation services, if available)

Strength of recommendation: High, level of evidence 1.

### **Patients**

Patients need to be informed of the oral health benefits of avoiding or quitting tobacco use and of its harmful oral health effects.

Strength of recommendation: Good practice point.

Patients should be aware of the role of the dental team in supporting them to quit tobacco use.

Strength of recommendation: High, level of evidence 1.

### **Policymakers**

Public health policy makers should be aware of the role of the dental team in supporting patients to quit tobacco use. They should give consideration to adopting remuneration for practitioners undertaking brief interventions for tobacco use in dental practice settings.

### **Education**

Smoking cessation courses should be part of undergraduate dental and dental hygienist curricula as agreed in European guidelines on professional competencies (Cowpe et al. [2010](#)). As a minimum, oral health professionals should be competent to carry out “brief interventions” based on the AAR approach.

### **Research**

To investigate the most effective way to encourage oral health professionals to implement routine brief intervention procedures into their practice.

To investigate optimal techniques for smoking cessation counselling such as motivational interviewing.

To investigate the costs and benefits of implementation of brief interventions for tobacco use in dental settings.

### **Behaviour Change Counselling for Promotion of Healthy Life Styles in the Dental Setting**

With regard to promotion of healthy lifestyles in the dental setting, the systematic review (Ramseier & Suvan [2015](#)) identified limited evidence that brief interventions in the dental setting can have positive influences on other healthy lifestyle behaviours, particularly enhancing fruit/vegetable consumption.

Unlike the large body of evidence in the field of tobacco cessation, there is very limited data available on other lifestyle interventions; there is insufficient evidence to interpret further the data on these interventions and no recommendations can be made at this time other than the need to further explore the potential of such interventions in the context of clinical and public health research.

### **Risk Factor Assessment Tools for the Prevention of Periodontitis**

Different individuals demonstrate varying susceptibility to onset and progression of periodontitis (Løe et al. **1986**). Consequently, the application of uniform preventive protocols will rarely meet the individual needs resulting in under-provision of care to some individuals and over-provision to others. This can result in increased burden of disease, unwanted side effects as well as suboptimal allocation of resources. This is an important issue for both primary and secondary prevention.

It is important to note that in general, prediction tools based on risk factors allow the *grouping* of patients according to different levels of average risk, they do not however allow the accurate prediction of *individual* patient outcomes (prognosis). Previous literature shows that risk factors and combinations thereof typically have poor performance for individual risk prediction (Wald et al. **1999, 2005**). Nonetheless, the provision of patient care guided by the assessment of patient level risk for the progression of periodontitis may be an advantageous approach for the individual patient (Rosling et al. **2001**).

The systematic review (Lang et al. **2015**) reached the following conclusions:

Five different risk assessment tools have been described. These tools consist of various combinations of patient level factors.

Three of these were evaluated on longitudinal data demonstrating an association between the risk score and disease progression (PRC, PRA, and DRS).

One of the tools (PRA) has been externally validated in multiple supportive periodontal care (SPC) populations in several countries. Data showed an association between the risk categories and the outcome (AL/tooth loss).

The review could not identify any study investigating whether the application of the tools would result in clinical benefits for the individual patient.

The development, validation and evaluation of clinical prediction rules are a multistage process. Periodontal risk assessment tools are in the early stages of this development process. While several tools have been proposed, the implications of patient stratification using these tools in terms of clinical decision-making are unclear, and their efficacy/effectiveness in terms of improvement of periodontal care and clinical outcomes has not been evaluated.

In the absence of evidence, clinicians still need to make decisions on the provision of both primary and secondary prevention. The context of primary and secondary prevention differs: secondary prevention is focused on the segment of the population at higher risk (as demonstrated by having had the disease). As recommended by the consensus report of group 4 of this workshop, these patients should participate in a life-long professionally supervised, secondary prevention program. These subjects still have a continuum of risk for recurrence of periodontitis, display different severity of destruction, and are characterized by individual

preventive needs. These could either be met providing maximum care to every patient such as described in the classic study by Axelsson & Lindhe (**1981**, Axelsson et al. **1991**), or by a more tailored approach informed by the patient's risk profile and disease history. Given this dilemma, the consensus considers risk assessment tools as a way to capture the complexity of the patient profile to inform clinical decision-making.

There was also consensus that these tools may be useful to communicate risk to the patient and potential preventative targets.

Recommendations

## **Topic 8. The role of professional and personal hygiene in preventing periodontal disease.**

One of the most commonly performed preventive measures in adults in countries with organized dental services is professional mechanical plaque removal (PMPR), with or without concomitant oral hygiene instructions (OHI).

PMPR comprises supra-gingival and sub-marginal plaque and calculus removal using hand instruments (scalars, curettes), or powered instruments (sonic, ultrasonic, rotating devices, air polishing). The intention is to remove deposits from the tooth surface, extending into the gingival sulcus. This is done to allow adequate patient-performed oral hygiene.

The systematic review (Needleman et al. **2015**) on PMPR for prevention as defined above, resulted in the following findings:

There is little value in providing PMPR without OHI to reduce gingivitis.

A single episode of PMPR followed by repeated OHI is as effective as repeated PMPR in reducing gingivitis at least up to 3 years follow-up.

There are no published randomized controlled trials (RCTs) to directly inform on the efficacy of PMPR for primary and secondary prevention of periodontitis as opposed to the indirect evidence derived from gingivitis treatment studies

### **Recommendations**

The available evidence and expert opinion led the working group to make the following recommendations:

#### **Oral health care professionals**

Repeated and individually tailored OHI is the key element in achieving gingival health.

Strength of recommendation: Moderate, Level of evidence 1.

PMPR both supra-gingivally and sub-marginally as deep as necessary to remove all soft and hard deposits is required to allow good self-performed oral hygiene.

Strength of recommendation: Good practice point.

PMPR as the sole treatment modality is inappropriate in patients with periodontitis.

Strength of recommendation: Good practice point.

An appropriate periodontal diagnosis should determine the selection of the type of preventive care.

Strength of recommendation: Good practice point.

#### **Patients**

Remove plaque effectively with the methods prescribed and regularly checked by the dental team to achieve and maintain gingival health.

Strength of recommendation: High, level of evidence 1.

Seek professional supervision in tailoring and monitoring oral hygiene and PMPR to remove all deposits and allow good oral hygiene.

Strength of recommendation: High, level of evidence 1.

#### **Public**

Consider proper oral hygiene as part of a health conscious lifestyle.

Recommend regular visits with an oral health professional for periodontal screening, check of oral hygiene and the need to receive professional tooth cleaning.

## Research

There is urgent need for research on the direct impact of PMPR and OHI on secondary prevention.

The relative contribution of PMPR and OHI needs to be investigated, including frequency, types of interventions, patient reported outcome measures and health economics.

There is a need to investigate whether there is a threshold of gingival inflammation (in terms of both severity and duration) which is compatible with long-term periodontal health.

## Psychological Approaches to Behavioural Change for Improved Plaque Control in Periodontal Management

Whilst it is recognized that self-performed oral hygiene is the key component of prevention of periodontal disease and that long-term successful outcomes of periodontal therapy are contingent upon effective and consistent oral hygiene practices, the general population does not consistently achieve appropriate plaque control (Petersen & Ogawa **2005**). It is therefore necessary to facilitate behavioural changes conducive to enhanced plaque control. The public need to acquire positive attitudes towards behavioural change and to achieve actual behavioural change conducive to enhanced plaque control.

Oral health professionals need to identify and adopt effective techniques that help patients change oral health behaviour, but there is consensus that, in general, oral health care providers lack a structured, proven approach to facilitate behavioural changes that improve plaque control.

The systematic review (Newton & Asimakopoulou **2015**) on psychological approaches to behavioural change for improved plaque control in periodontitis patients indicates that change in oral hygiene behaviour is:

### Related to patient-perceptions of

- harmful consequences,
- their own susceptibility to periodontitis and
- their benefits from change,

### Facilitated by

- goal setting (i.e., identifying with the patient the change to be made),
- planning (i.e., working with the patient to decide when, where and how they will undertake the behaviour change)
- self-monitoring (i.e., encouraging the patient to assess their own behaviour in relation to the goals)

Based on this evidence a reasonable approach to facilitate behavioural change with oral hygiene practices is the incorporation of Goal setting, Planning and Self-monitoring (GPS).

Recommendations

### **Oral health professionals**

Oral health professionals need to routinely adopt an effective individual oral hygiene program for their patients. This requires incorporating behavioural change techniques.

Strength of recommendation: High, level of evidence 1.



Behaviour change for the delivery of OHI can be based on the GPS approach:

- Goal setting (including instruction in an appropriate technique to achieve that goal),
- Planning and
- Self-monitoring

Strength of recommendation: Moderate, Level of evidence 5 (expert opinion).

Delivery of OHI includes assessing Patients' perceptions regarding harmful consequences, their own susceptibility, their benefits of change and their self-efficacy in order to identify and address perceptions which might hamper patient's motivation for behavioural change. Motivational interviewing might be one appropriate methodology for this.

Strength of recommendation: Moderate, Level of evidence 5 (expert opinion).

The OHI should be based on the careful selection of tools (type of toothbrush and type of interdental kit) and techniques for use tailored to the needs and preferences of the patient.

Strength of recommendation: High, level of evidence 1.

### **Policymakers**

One possible barrier to the adoption of current best practice in behaviour change is the lack of an explicit remuneration for such practices. Dental health policy makers should give consideration to adopting such remuneration for practitioners undertaking behavioural change approaches for oral hygiene promotion in dental services.

### **Dental educators**

Education of oral health professionals should include methods of behavioural change approaches like GPS. There is a need to develop specific educational and training materials for both the oral health care team (dental practitioners, specialists, hygienists, oral health promotion staff) and the entire healthcare team.

### **Research**

Additional research is needed to develop validated methodologies that can be used as a structured approach to facilitate behavioural change amongst (i) dental practitioners, and (ii) patients and the public.

Studies and practitioners must clearly distinguish between enhancing (i) *motivation*, i.e., a positive attitude towards engaging in a behaviour, and (ii) *volition*, i.e., strategies for implementing the change (Gollwitzer **1993**).

Studies must include self-efficacy as a predictor of behaviour change and a possible target for intervention.

Research is needed to assess the cost/benefit of an approach that actively integrates health behaviour change in dental practice.

**Topic 9. Dispensary of patients with periodontal diseases. Stages, documentation, evaluation of the effectiveness of clinical examination.**

Clinical examination of patients with periodontal disease is an integral part of preventive health protection system-wide direction, his particular method of introduction of health protection. The basic tasks of screening such active detection of early forms of disease and risk factors, patient survey, dedicated.

Clinical examination of patients with periodontal disease have a preventive component of the entire health care system, the specific method of its implementation in public health practice. Active detection of early forms of disease and risk factors. The main service is the organizational form local shop principle. The dispensarization are organized by population, kids, teens, students, workers of industrial enterprises and agriculture, in-patients, persons with disabilities, pregnant, and patients to other specialists.

Prior to this work, attract all physicians of stomatological profile regardless of the place of work. Best medical exercise in those institutions where there are periodontological rooms (office).

The selection of the dispensaries operate during routine preventive examinations, rehabilitation, treatment admissions.

The examinations shall be such persons:

- at the age of 30 years without clinical symptoms of periodontal disease, but in respect of which the local or shared risk factors. Regardless of age if there is chronic gingivitis, the initial degree general periodontitis.
- at the age of 50 years with I, II, III degree general periodontitis or periodontosis.
- people with idiopathic periodontal disease that occur against the backdrop of common diseases (blood disease, endocrine diseases and the like). You should also consider the people who have an increased risk of periodontal disease, as well as persons with abnormalities of occlusion and position of teeth, pregnant, period sexual ripening.

**According to existing normative acts define the following dispenser group.**

- Healthy (D1) – do not require treatment.
- Almost healthy (D2), where there is stabilization process (up to 1 year with gingivitis, periodontitis, periodontosis and over 2 years). This group also include young persons without clinical signs of periodontal disease. But since discovered risk factor (common diseases, abnormalities of the teeth and other).
- In the person in need of treatment (D3) – a group of patients with gingivitis, general periodontitis and periodontosis

**Clinical dispensarization each group has its own characteristics.**

Group D1 inspect once a year. During the review of individual patient to give a piece of advice from oral hygiene.

A person from a group D2 conduct survey 1 once a year. Preventive treatment for removal of dental deposits, treatment of diseases selective grinding in the teeth recommendations of oral hygiene, physiotherapeutic procedures and the like.

When any form of gingivitis D3 patients undergo a second course of treatment after every 6 months. At the time of the subgroup of patients with remission of active treatment is transferred to the monitoring group. In the case of tangible improvement

and stabilization process lasts during the year, the patient is transferred to the group D2.

When general periodontitis therapies were 2 times a year. If in the course of the year there is remission, patients are transferred to the second subgroup.

When general periodontitis therapies were 3-4 times a year. If in the course of the year there is remission, patients are transferred to the second subgroup.

In the case of an integrated course of periodontosis disease treatment are 2 time in years with I, II degree and 4 with III.

At the start of each patient's clinic history of outpatient dental patient (№ 043/0), statistical card (№ 0-25-2/0 and № 30/0, journal of preventive oral reviews of oral cavity (№ 049/0).

On average, each therapist, dentist, who leads the general reception of patients, should be serviced by 100-120 should be serviced by, a doctor 300-350 people of the year.

After a course of treatment, patients spend monitoring reviews. The term control reviews and the duration of treatment depends on the severity of the disease background and pathology.

In chronic gingivitis control overview 1 time in years, with periodontitis initial and I degree – 2 times in years, II degree – 3 times in years, III degree – 4 times in years.

With parodontosis I degree – 1 time in year; II degree – 1-2 times in years; III degree – 2 times in years;

To evaluate the effectiveness of prophylactic medical dispensation there are quantitative and qualitative indicators.

The first and second stages of dispensation are evaluated as follows:

- a) fullness girth of dispensation;
- b) timely detection of disease;
- c) timely take on dispensation accounting;
- d) share of the accounting.

In the third phase, the following criteria:

- a) the fullness of events;
- b) timeliness of the re-examinations;
- c) percentage of persons transferred from the active treatment group in the monitoring group;
- d) percentage of persons withdrawn from dispensationo accounting throughout the year;
- e) the average multiplicity of active reviews per patient per year;
- f) the proportion of patients who do not appear on the checklist review.

**Qualitative indicators of dispensation characterize:**

- the frequency of recurrences;
- duration of remission;
- the percentage of patients with a clinical well-being and clinically x-ray remission of disease.

As a result of dispensation the following results are possible:

- recovery;
- phase stable remission;
- good;
- unchanged;
- bad.

In the case of regularly held of dispensation the complex of medical actions gradually decreases. A sine qua non for the effective of dispensation is a clear design an outpatient card, card of dispensation monitoring, register of patients.

## CONCLUSIONS.

Complementing the study at the Faculty of Dentistry by analyzing and studying the information array of this textbook, each student will be able to achieve the goal of studying the discipline of "Therapeutic Dentistry", namely to be ready to work in a dental clinic, to study the anatomical and morphological features of the structure of periodontal tissues; clinical methods of examination of patients with periodontal diseases; the ability to use basic dental instruments, materials and dental equipment, to collect anamnesis of the patient's life and diseases; ability to conduct X-ray, functional and laboratory examination of patients with generalized periodontitis, to determine the nature and principles of treatment of patients with different stages of periodontitis in a therapeutic dentistry clinic.

## LIST OF TEST TASKS AND QUESTIONS FOR SELF-CONTROL

1. Indicate the complex of morphological units included in the concept of "periodontium":
  - A. Gingiva, collar bone tissue, circular ligament
  - B. Gingiva, marginal periodontium, circular ligament
  - C. Gingiva, periodontium, bone tissue of the collar (alveolar) process, cementum of the tooth root
  - D. Gingiva, circular ligament
  - E. Gingiva, periodontium.
2. Patient M., 28 years old. Complaints of pain, significant bleeding and tooth mobility, which have worsened over the past 2 weeks against the background of exacerbation of chronic cholecystitis. He was not treated. Objectively: the gums of both jaws were hyperemic, swollen, with significant tartar deposits on the teeth. The depth of periodontal pockets was 4-6 mm with significant discharge of serous-purulent exudate, tooth mobility in the vestibulo-oral and medio-distal directions. The leukocyte count in the oral cavity is 470. What is your diagnosis?
  - A. Acute generalized periodontitis, I degree of course
  - B. Acute generalized periodontitis, II degree of course
  - C. Chronic generalized periodontitis, III degree of course
  - D. Acute generalized periodontitis, III degree of course
  - E. Chronic generalized periodontitis, II degree of course
3. A 45-year-old woman complains of bleeding gums for six months, which gradually increases. She notes mild weakness, malaise, headache in the evening. Objectively: the gingival margin is slightly swollen, loose, pasty, bleeds with light touch. The molars and incisors have 3-3.5 mm tooth-gingival pockets with purulent compartment. Tartar deposits on the necks of the teeth. Which examination is the most informative for determining the severity of periodontal disease in this patient?
  - A. Determination of capillary resistance
  - B. Radiography of the jaws
  - C. Assessment of the degree of tooth mobility
  - D. Schiller-Pisarev test
  - E. Determination of periodontal index
4. A 42-year-old patient complained of bleeding gums and bad breath. After the examination, a preliminary diagnosis was made: chronic generalized periodontitis of the first degree of severity. Assessment of the results of which study is most informative for establishing the final diagnosis?
  - A. Determination of tooth mobility B. Kulazhenko test
  - C. Radiography
  - D. Ketchke test
  - E. Determination of the depth of periodontal pockets
5. A 23-year-old woman complains of bleeding gums while brushing her teeth and eating solid food. Objectively: the gingival mucosa on the gingival side of both jaws is swollen, hyperemic, with a cyanotic tint, there are deposits of supragingival tartar, the Fedorov-Volodkina hygiene index is 2.0. There are no periodontal pockets.

Which research method will be the leading one in the differential diagnosis of this disease?

- A. X-ray examination
- B. Schiller-Pisarev test
- C. Determination of capillary resistance by Kulazhenko
- D. Reoparodontography
- E. Determination of leukocyte migration

6. A 22-year-old female patient complained of bleeding gums when brushing her teeth and eating hard food. Objectively: the marginal part of the gingiva on the vestibular side of the upper and lower jaws is swollen, hyperemic, with a cyanotic tint, plaque deposition, I G - 3.0. The patient is being examined by a gastroenterologist. Which of the research methods will be the main one in the differential diagnosis of this patient?

- A. X-ray examination
- B. Pysarev-Schiller test
- C. In-depth history taking
- D. Determination of leukocyte emigration
- E. Determination of capillary resistance

7. A 23-year-old patient complained of discomfort in the area of the 12th tooth. On the radiograph in the area of the apex of the root of the 12th tooth, a rarefaction with clear edges, up to 4 mm in diameter, is determined. Which treatment method is most appropriate?

- A. Tooth extraction
- B. Hemisection
- C. Cystotomy
- D. Root amputation
- E. Resection of the apex of the root

8. A 50-year-old patient has complaints of difficulty chewing food, tooth mobility, bad breath, bleeding gums. Objectively: the gums are hyperemic, the presence of tartar. Periodontal pockets within the molars of the upper jaw were 8 mm, in the rest of the teeth - 6 mm. The radiograph shows bone resorption at  $2/3-1/2$  of the root length. What is the most likely diagnosis?

- A. Generalized periodontitis of the third degree, acute course
- B. Generalized periodontitis of the second degree, chronic course
- C. Generalized periodontitis of the second degree, acute course
- D. Generalized periodontitis of the first degree, chronic course
- E. Generalized periodontitis, chronic course

9. Radiographic picture of moderate periodontitis.

- A. Destruction of the compact lamina, uniform horizontal resorption between the alveolar septa by  $1/3$
- B. Osteoporosis of the cancellous bone, horizontal and vertical resorption of the alveolar bone up to  $1/2$  of the interdental septa, widening of the periodontal gap
- C. Lack of cortical plate, horizontal resorption of alveolar bone up to  $1/2$  of the height of the interdental septa, osteoporosis and osteosclerosis

D. Uniform horizontal resorption of the alveolar ridge up to S height with preservation of the cortical plate

10. Patient N., 23 years old, complained of pain in the gums, bad breath, deterioration of the general condition. He was diagnosed with ulcerative necrotic gingivostomatitis. The most effective antimicrobial agent in this case should be considered:

- A. Metronidazole
- B. Chlorhexidine bigluconate
- C. Ethonium
- D. Chlorophelipt
- E. Sanguiritrin

11. In case of acute ulcerative gingivitis, the following are prescribed: A. Anesthetics

- B. Antibiotics, painkillers, vitamins
- C. Metronidazole, desensitizing drugs, vitamins
- D. Sulfonamides, antibiotics, vitamins
- E. General treatment is not prescribed

12. A 30-year-old patient was diagnosed with acute ulcerative gingivitis, moderate severity. Which drug should be used to remove necrotic plaque?

- A. Chlorhexidine solution
- B. Hydrogen peroxide solution
- C. Potassium permanganate solution
- D. Furacilin solution
- E. Iruksol

13. A 30-year-old man was diagnosed with acute ulcerative gingivitis, moderate severity. Drugs of which group should be used at the final stage of treatment of this disease?

- A. Antioxidants
- B. Keratoplastic drugs
- C. Antibiotics
- D. Proteolytic enzymes
- E. Keratolytic drugs

14. A 41-year-old man visited a periodontist two weeks ago. The diagnosis was made: localized severe periodontitis in the area of teeth 25, 26. After elimination of traumatic factors and anti-inflammatory therapy, the gums acquired a normal color, periodontal pockets 4-5 mm deep without exudate. Which method of periodontal pocket elimination should be preferred in this clinical case?

- A. Curettage
- B. Superficial sclerosing therapy
- C. Deep sclerosing therapy
- D. Gingivectomy
- E. Flap surgery

15. The patient, 29 years old, complains of slight pain during eating in the area of 37 tooth, bleeding gums. On examination, there is a filling on the medial surface of tooth 37, there is no contact point between teeth 37 and 36, the interdental gingival papilla is atrophied, the depth of the periodontal pocket is 4 mm. What is the root cause of this disease?



- A. Virulent microflora
  - B. Irrational filling
  - C. Insufficient hygiene
  - D. Traumatic occlusion
  - E. Reduction of local resistance
16. Patient V., 43 years old, was diagnosed with chronic generalized periodontitis of II degree of severity. Microscopic examination of the periodontal pockets revealed a significant coccal microflora, trichomonads. Which of the following medications should be used for instillations?
- A. Metronidazole
  - B. Lincomycin
  - C. Dimexide
  - D. Messulide
  - E. Dioxin
17. In patient V. in the contents of periodontal pockets found a significant degree of contamination with yeast-like fungi of the genus *Candida*. Which of the following drugs is most appropriate to use for instillations?
- A. Dioxidin
  - B. Trichopol
  - C. Clotrimazole
  - D. Dichlorophenac Na
  - E. Tinidazole
- 18.7. What is not included in the common etiologic factors of dystrophic-inflammatory diseases of periodontal tissues?
- A. Pathology of the musculoskeletal system
  - B. Pathology of the vascular system
  - C. Endocrine disorders
  - D. Hypovitaminosis
  - E. Neurotrophic disorders
19. Hypovitaminosis of which vitamin is of least importance in the development of dystrophic-inflammatory diseases of periodontal tissues?
- A. Vitamin E
  - B. Vitamin C
  - C. Vitamin A
  - D. Vitamin D
  - E. Vitamin B
20. The humoral response is one of the links in the pathogenesis of dystrophic and inflammatory diseases of periodontal tissues. Which cells are responsible for humoral immunity?
- A. T-lymphocytes
  - B. B-lymphocytes
  - C. Histiocytes
  - D. T-lymphocytes and B-lymphocytes
  - E. T-suppressors

## CONTROL QUESTIONS

1. Classification of periodontal diseases, N.F. Danilevsky.
2. Etiopathogenetic role of dental plaque in the development of periodontal diseases.
3. Non-mineralized and mineralized dental plaque, their effect on periodontal tissues.
4. The role of dental plaque microorganisms in the development of pathological changes in the periodontium.
5. Ways of spreading the inflammatory process in periodontal tissues.
6. Development of bacterial mechanism of periodontal disease pathogenesis.
7. Methods of removing dental plaque.
8. Traumatic occlusion: its types.
9. Methods of diagnosing the state of traumatic occlusion.
10. The role of malocclusion in the development of periodontal diseases.
11. Features of dental rehabilitation in periodontal diseases.
12. The role of anomalies in the anatomical structure of gum tissues in the development of periodontal diseases.
13. The role of bad habits in the development of periodontal disease.
14. Etiopathogenetic effect of neurotrophic disorders in the development of periodontal diseases.
15. Vascular disorders in the etiopathogenesis of periodontal diseases.
16. The relationship of endocrine disorders with periodontal disease.
17. Etiopathogenetic relationship of metabolic disorders with periodontal tissue pathology.
18. The role of hypovitaminosis in the development of generalized periodontitis.
19. Immunological mechanisms of pathogenesis of generalized periodontitis.
20. The state of humoral immunity and periodontal pathology.
21. Clinic of catarrhal gingivitis.
22. Clinic of granulating form of hypertrophic gingivitis.
23. Clinic of fibrous form of hypertrophic gingivitis.
24. Clinic of acute ulcerative gingivitis.
25. Clinic of chronic ulcerative gingivitis.
26. Clinic of atrophic gingivitis.
27. Clinic of desquamative gingivitis.
28. Clinic of gangrenous gingivitis.
29. Diagnosis and differential diagnosis of catarrhal gingivitis.
30. Diagnosis, differential diagnosis of hypertrophic gingivitis.
31. Diagnosis, differential diagnosis of ulcerative gingivitis.
32. Diagnosis, differential diagnosis of atrophic gingivitis.
33. Diagnosis, differential diagnosis of desquamative gingivitis.
34. Diagnosis, differential diagnosis of gangrenous gingivitis.
35. Principles of treatment of catarrhal forms of gingivitis.
36. Principles of treatment of various forms of hypertrophic gingivitis.
37. Principles of treatment of various forms of ulcerative gingivitis.
38. Symptomatic treatment of desquamative gingivitis.

39. Methods of treatment of atrophic gingivitis.
40. Methods of treatment of gangrenous gingivitis.
41. Principles of treatment of localized periodontitis.
42. Principles of treatment of generalized periodontitis.
43. Principles of treatment of periodontal disease.
44. Principles of treatment of periodontal productive processes.
45. Scheme of treatment of catarrhal gingivitis depending on the phase of development of the inflammatory process.
46. Treatment regimen for granulating form of hypertrophic gingivitis.
47. Treatment regimen for fibrous form of hypertrophic gingivitis.
48. Treatment regimen for ulcerative gingivitis of various degrees of development.
49. Treatment regimen for localized periodontitis.
50. Treatment regimen for generalized periodontitis.
51. Treatment regimen for periodontal disease.
52. Methods and means of local treatment of generalized periodontitis.
53. Methods and means of surgical treatment of generalized periodontitis.
54. Methods of curettage of periodontal pockets, its varieties.
55. Gingivotomy in generalized periodontitis.
56. Gingivectomy in generalized periodontitis.
57. Flap operations in generalized periodontitis.
58. Operations for gingival recession.
59. Flap surgeries with the use of agents that stimulate bone regeneration.
60. Types of grafts used in flap surgery.
61. Indications and criteria for the effectiveness of the method of directed tissue regeneration.
62. Surgical interventions for the formation of the vestibule of the oral cavity.
63. Operations on the frenulum, their types and techniques.
64. Tooth extraction and other surgical interventions for periodontal diseases.
65. Types of orthopedic treatment of periodontal diseases.
66. Indications and methods of selective teeth grinding.

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