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METRONIDASOL SEBAGAI SALAH SATU OBAT PILIHAN UNTUK PERIODONTITIS MARGINALIS

Abstract

Marginal periodontitis is one of the periodontal diseases which is characterized by the presence of periodontal pockets and tooth mobility. The most predominant bacteria in periodontal disease are anaerobic gram-negative rods such as *Actinobacillus actinomycetemcomitans*¹, *Porphyromonas gingivalis*, *Prevotella intermedia* and *Bacteroides forsythus*. Metronidazole is an bacteriocidal antibiotic that can be used to treat periodontitis because it can suppress the growth of *Actinobacillus actinomycetemcomitans*. Periodontal disease also involves aerobic bacterial infection, so the combination of metronidazole and amoxicillin is required in marginal periodontitis therapy. Both of these antibiotics also produce a synergistic effect because amoxicillin can increase the absorption of metronidazole so the concentration becomes higher in the gingival sulcus fluid and can reach the limit of MIC (minimum inhibitory concentration).

Keywords : metronidazole, marginal periodontitis

Periodontitis marginalis merupakan salah satu dari penyakit periodontal yang ditandai dengan adanya *pocket* periodontal dan kegoyangan gigi. Bakteri yang paling dominan pada penyakit periodontal adalah bakteri anaerob batang gram negatif seperti *actinobacillus actinomycetemcomitans*, *porphyromonas gingivalis*, *prevotella intermedia* dan *bacteroides forsythus*. Metronidazol merupakan antibiotik bakteriosid yang dapat digunakan untuk mengobati periodontitis karena dapat menekan pertumbuhan bakteri *actinobacillus actinomycetemcomitans*. Penyakit periodontal juga melibatkan infeksi bakteri aerob, sehingga kombinasi metronidazole dan amoksisilin sangat dibutuhkan dalam terapi penyakit periodontitis marginalis. Kedua antibiotik ini juga menghasilkan efek sinergis karena amoksisilin dapat meningkatkan penyerapan metronidasol sehingga konsentrasinya menjadi lebih tinggi dalam cairan sulkus gingiva dan dapat mencapai batas MIC (minimum inhibitory concentration).

D Indonesia penyakit gigi dan mulut yang paling banyak diderita adalah karies atau gigi berlubang dan penyakit periodontal, baik oleh anak-anak maupun dewasa serta prevalensi penyakit periodontal yang tinggi sering ditemukan pada populasi muda dan dewasa. Periodontitis marginalis merupakan salah satu dari penyakit periodontal¹. Beberapa penelitian menunjukkan bahwa penyakit periodontal dikaitkan dengan beberapa penyakit lain yaitu peradangan. Mengobati peradangan tidak hanya dapat membantu mengobati penyakit periodontal, tetapi juga dapat membantu memperbaiki kondisi peradangan khronis lainnya².

PEMBAHASAN

Periodontitis marginalis

Periodontitis marginalis adalah peradangan pada jaringan pendukung gigi atau jaringan periodontal yang ditandai dengan adanya *pocket* periodontal dan kegoyangan gigi³. Mikroorganisme plak dan periodontal merupakan faktor utama yang menimbulkan kelainan pada jaringan periodontal. Bakteri yang paling dominan pada penyakit periodontal adalah bakteri anaerob batang gram negatif seperti *actinobacillus actinomycetemcomitans*, *porphyromonas gingivalis*, *prevotella intermedia* dan *bacteroides forsythus*. Bakteri-bakteri ini berperan penting dalam perkembangan penyakit periodontal seperti pembentukan *pocket periodontal*, kerusakan serat periodontal dan tulang alveolar⁴. Reaksi inflamasi oleh karena bakteri-bakteri dalam plak menyebabkan terjadinya penurunan progresif dari periodontal ligament dan alveolar bone, dan akhirnya terjadi mobilitas serta kehilangan gigi⁵.

Penatalaksanaan penyakit periodontal ini terdiri dari empat tahap yaitu, tahap sistemik, tahap higienik, tahap koreksi dan tahap penunjang. Tahap sistemik berhubungan dengan kondisi sistemik penderita yang mungkin mempengaruhi atau menyebabkan penyakit periodontal, yang selanjutnya juga akan berdampak pada rencana terapi. Apapun hubungannya dengan penyakit sistemik, pada tahap sistemik fokus perawatan penyakit periodontal ditekankan pada masalah infeksi yang selalu terjadi, sehingga perlu dilakukan pemberian antimikroba, berupa

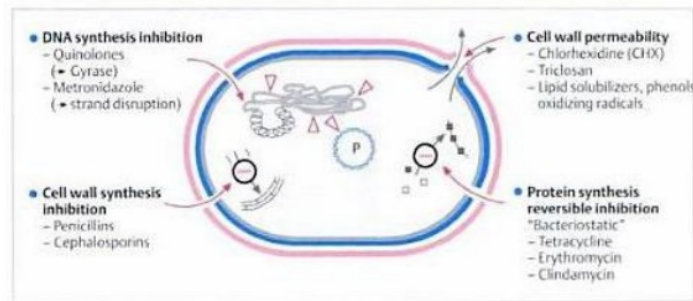
pemberian antibiotika secara lokal atau sistemik dan antiseptik. Tahap higienik dari penatalaksanaan penyakit periodontal adalah menghilangkan faktor lokal penyebab penyakit periodontal seperti plak dan kalkulus dengan cara *scaling* dan *root planning*. Penderita juga harus diberi instruksi yang benar untuk menjaga kebersihan mulutnya. Memulihkan kebersihan mulut yang optimal merupakan tujuan dari tahap ini. Memperbaiki kerusakan yang ditimbulkan oleh penyakit periodontal termasuk dalam tahap koreksi seperti penyesuaian oklusi dan tindakan bedah. Setiap penderita yang mengalami terapi periodontal memerlukan tindak lanjut yang terus menerus karena penyakit periodontal merupakan penyakit khronis yang perlu dilakukan re-evaluasi⁶.

METRONIDASOL

Metronidasol menunjukkan aktivitas antibakteri terhadap semua kokus anaerob dan basil gram negatif anaerob, termasuk berbagai spesies *bacteroides*, maupun basil gram positif anaerob pembentuk spora⁷. Metronidazol merupakan antibiotik bakteriosid yang dapat digunakan untuk mengobati periodontitis terkait dengan *actinobacillus actinomycetemcomitans*⁸.

Farmakodinamika

Metronidazol adalah senyawa dengan berat molekul rendah yang berdifusi melintasi membran sel mikroorganisme anaerobik sebagai *prodrug* dan diaktifkan dalam sitoplasma bakteri atau organel-organel tertentu dalam protozoa. Molekul metronidazol dikonversi menjadi nitroso radikal bebas dengan reduksi intraseluler, yang meliputi transfer elektron untuk kelompok obat nitro. Bentuk obat menjadi sitotoksik dan dapat berinteraksi dengan molekul DNA yang menyebabkan hilangnya struktur helix DNA dan putusya untai DNA, sehingga terjadi penghambatan sintesa DNA dan matinya sel. Obat ini aktif terhadap bakteri hanya dengan metabolisme anaerob^{9,10}.



Sumber : Wolf *et al.* 2004. Periodontology. 3 rd ed. NewYork : Thieme

Farmakokinetik

Obat ini biasanya diabsorpsi sebanyak 90% setelah pemberian oral, mencapai konsentrasi dalam plasma 8-13 μ g/ml dalam 0,25 sampai 4 jam setelah dosis tunggal 500 mg. Waktu paruh metronidasol dalam plasma sekitar 8 jam, dan volume distribusinya hampir sama dengan volume distribusi air total di dalam tubuh. Metronidasol berpenetrasi dengan baik ke dalam berbagai jaringan dan cairan tubuh, termasuk sekresi vagina, cairan semen, air liur, dan air susu ibu. Konsentrasi terapeutik juga tercapai di dalam cairan serebrospinal⁷. Metronidazol didistribusikan secara luas di seluruh tubuh dan setelah dosis oral, dapat dideteksi dalam saliva dan cairan sulkus gingiva. Setelah lima hari dengan dosis 250 mg tiga kali sehari, tingkat metronidazol dalam cairan sulkus gingiva menunjukkan rentang yang jauh lebih besar dan dapat hampir 50% lebih tinggi dari konsentrasi serum¹¹. Lebih dari 75 % metronidasol dieliminasi dalam urin yang sebagian besar berupa metabolit dan hanya sekitar 10 % ditemukan dalam bentuk tak berubah. Urin dapat berwarna coklat kemerahan karena pigmen dari obat. Metabolisme obat ini terutama di hati¹².

Dosis dan efek samping

Dosis untuk pengobatan periodontitis adalah 250 mg diberikan tiga kali sehari selama 8 hari. Efek samping yang ditimbulkan pada terapi metronidasol adalah sakit kepala, mual, mulut kering, dan berasa logam di mulut⁹.

Indikasi

Obat ini digunakan untuk infeksi yang disebabkan oleh bakteri anaerob kokus dan anaerob batang gram negatif termasuk berbagai spesies *bacteroides*, maupun anaerob batang gram positif pembentuk spora⁷. Metronidasol menyembuhkan infeksi genital yang disebabkan oleh trikomoniasis, amebiasis hati dan giardiasis¹³. Sehubungan dengan aktifitas metronidasol terhadap bakteri anaerobik kokus dan bakteri anaerob batang gram negatif serta positif, maka obat ini juga digunakan untuk dalam pengobatan penyakit periodontal¹¹.

Interaksi

Penggunaan metronidasol bersamaan dengan barbiturat dapat menyebabkan efektifitas metronidasol menurun. Metronidasol juga dapat meningkatkan efek antikoagulan bila diberikan pada pasien yang menerima terapi antikoagulan oral. Kadar metronidasol dalam plasma dapat ditingkatkan oleh obat-obat seperti simetidin yang menghambat metabolisme pada mikrosom hati¹⁴. Selama terapi dengan metronidasol, tidak boleh minum alkohol karena dapat menimbulkan efek disulfiram yaitu intosikasi asetaldehida berupa vasodiatasi perifer, muka merah, jantung berdebar-debar, dan nyeri kepala¹³.

Kombinasi metronidasol dan amoksisilin untuk terapi periodontitis marginalis

Periodontitis merupakan infeksi berbagai bakteri patogen, sehingga terapi kombinasi semakin dianggap penting. Terapi kombinasi tersebut termasuk metronidazole-amoksisilin (250 mg - 375 mg) setiap 3 kali sehari selama 8 hari untuk *actinobacillus actinomycetemcomitans* dan berbagai infeksi periodontal anaerob¹⁵.

Alasan penggunaan kombinasi metronidasol dan amoksisilin dalam perawatan periodontal adalah untuk mengatasi infeksi yang melibatkan bakteri berspektrum

luas. Metronidasol mencakup bakteri anaerob dan amoksisilin mencakup bakteri fakultatif aerob yang terlibat dalam infeksi. Penggunaan kombinasi metronidasol dan amoksisilin ini dapat menekan pertumbuhan bakteri *Actinobacillus actinomycetemcomitans*, *Porphyromonas gingivalis*, *Prevotella intermedia*, *Treponema denticola*, *Treponema forsythia*, dan *Fusobacterium nucleatum*. Kedua antibiotik ini akan menghasilkan efek sinergis karena amoksisilin dapat meningkatkan penyerapan metronidasol sehingga konsentrasinya menjadi lebih tinggi dalam cairan sulkus gingiva dan dapat mencapai batas MIC (minimum inhibitory concentration). Metronidasol memiliki efek oral pada mikrobiota subgingiva dan dapat menembus cairan sulkus gingiva dan saliva. Amoksisilin juga sangat efektif terhadap kebanyakan patogen periodontal dan menunjukkan aktivitas antimikroba tingkat tinggi yang dicapai dalam cairan sulkus gingiva¹⁶.

Kesimpulan dan Saran

Metronidazol merupakan senyawa nitroimidazole dengan spektrum yang luas dan aktif terhadap protozoa dan bakteri anaerobik, sehingga dapat digunakan untuk mengobati periodontitis marginalis. Sehubungan dengan adanya bakteri aerob yang turut menyertai peradangan pada periodontitis marginalis baik secara lokal maupun sistemik , maka disarankan agar penggunaan metronidazol dalam pengobatan periodontitis marginalis dikombinasikan dengan amoksisilin

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Metronidazol merupakan senyawa nitroimidazole dengan spektrum yang luas dan aktif terhadap protozoa dan bakteri anaerobik. Sehubungan dengan aktifitas metronidasol terhadap bakteri anaerobik kokus dan bakteri anaerob batang gram negatif serta positif , maka obat ini digunakan untuk dalam pengobatan penyakit periodontal.

Infeksi fokal rongga mulut dapat berasal dari infeksi pulpa gigi atau jaringan periodontal. Infeksi ini berhubungan dengan mikroflora kompleks yang terdiri dari kurang lebih 200 spesies pada periodontitis apikalis dan lebih dari 500 spesies pada periodontitis marginalis. Faktor penyebab terbanyak adalah bakteri anaerobik bentuk batang. Bakteri penyebab periodontitis terdiri dari bermacam-macam bakteri, seperti bakteri anaerob batang gram negatif dan kokus gram positif (Poulet *et al.*, 2004). Menurut Martinez dan Ruiz (2005), bakteri yang

paling dominan pada penyakit periodontal adalah bakteri batang gram negatif anerob yang terdapat didaerah subgingiva seperti *actinobacillus actinomycetemcomitans*, *porphyromonas gingivalis*, *prevotella intermedia* dan *bacteroides forsythus*. Bakteri-bakteri ini berperan penting dalam perkembangan penyakit periodontal seperti pembentukan *periodontal pocket*, kerusakan serat periodontal dan tulang alveolar.

Reaksi inflamasi oleh karena bakteri-bakteri dalam plak menyebabkan terjadinya penurunan progresif dari periodontal ligament dan alveolar bone, dan akhirnya terjadi mobilitas serta kehilangan gigi (Coventry *et al.*, 2000).

Penatalaksanaan Periodontitis Marginalis

Menurut Prayitno (2003), penatalaksanaan penyakit periodontal ini terdiri dari empat tahap yaitu, tahap sistemik, tahap higienik, tahap koreksi dan tahap penunjang.

Tahap sistemik berhubungan dengan kondisi sistemik penderita yang mungkin mempengaruhi atau menyebabkan penyakit periodontal, yang selanjutnya juga akan berdampak pada rencana terapi. Apapun hubungannya dengan penyakit sistemik, pada tahap sistemik fokus perawatan penyakit periodontal ditekankan pada masalah infeksi yang selalu terjadi, sehingga perlu dilakukan pemberian antimikroba, berupa pemberian antibiotika secara lokal atau sistemik dan antiseptik. Menurut Slots (2002), saat ini pemberian kombinasi antibiotika secara sistemik adalah yang sering dilakukan karena bakteri pathogen penyebab penyakit periodontal sangat bervariasi. Adapun antibiotika yang diberikan adalah kombinasi metronidasol 250 mg dan amoksisilin 375 mg sebanyak tiga kali sehari selama delapan hari. Selain itu dapat pula kombinasi metronidasol dan ciprofloksasin 500mg sebanyak tiga kali sehari selama delapan hari.

Tahap higienik dari penatalaksanaan penyakit periodontal adalah menghilangkan faktor lokal penyebab penyakit periodontal seperti plak dan kalkulus dengan cara *scaling* dan *root planning*. Penderita juga harus diberi

instruksi yang benar untuk menjaga kebersihan mulutnya. Memulihkan kebersihan mulut yang optimal merupakan tujuan dari tahap ini.

Memperbaiki kerusakan yang ditimbulkan oleh penyakit periodontal termasuk dalam tahap koreksi. Adapun tindakan yang dilakukan adalah penyesuaian oklusi dan tindakan bedah.

Setiap penderita yang mengalami terapi periodontal memerlukan tindak lanjut yang terus menerus karena penyakit periodontal merupakan penyakit khronis yang perlu dilakukan re-evaluasi.

Terapi penyakit periodontal pada tahap sistemik difokuskan pada perawatan masalah infeksi baik infeksi jaringan periodontal maupun infeksi khronis yang ditimbulkan ataupun yang dihasilkan sehingga perlu dilakukan pemberian antimikroba, berupa pemberian antibiotika secara lokal atau sistemik dan antiseptik.

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periodontitis

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ts rapid destruction of the periodontium and can lead to early tooth loss in the affected individuals if not diagnosed early. It frequently encounter patients with aggressive periodontal disease and should be able to diagnose and manage this disease. The dentist to diagnose, inform, and treat the periodontal patient accurately, using referral and nonsurgical, surgical, and the exponential rate of developments in periodontal research, regenerative therapy, tissue engineering, and genetic in regard to options at managing the disease. This article attempts to describe the current treatment options along with a management of generalized aggressive periodontitis patients.

ilities.

implies is a type of periodontitis where there is rapid destruction of periodontal ligament and alveolar bone which by individuals generally of a younger age group but patients may be older. It tends to have a familial periodontitis is an autosomal dominant triad with reduced penetrance. Parents, offspring and siblings of patients affected 50% risk of this disease.

Classification of Periodontal diseases and conditions in 1999, the classification of periodontal diseases was revised. Aggressive periodontitis now replaces the term "juvenile or early onset periodontitis". Aggressive periodontitis can be further classified based on the specific features of the disease process.

Localized aggressive periodontal disease has a circumpubertal onset. Intraoral/radiographic examination reveals that the disease process is characterized by interproximal attachment loss on at least two permanent teeth, one of which is a permanent molar, and the other is a premolar or incisor. Several species of bacteria are detected in the localized form; however, Aggressive periodontitis produces several virulence factors that help it evade the host's defense mechanisms. Following the initial assault, there is a robust serum antibody response to the infecting agents, overcoming the neutrophil function abnormalities and inflammation. [4]

Generalized aggressive periodontal disease usually affects men and women over the age of 30, although patients may be older. Generalized aggressive periodontitis is characterized by a weak serum antibody response to the initial assault [4]. This response, along with the periodontal pathogen virulence factors, intraoral/radiographic examination reveals that the disease process has generalized interproximal bone loss affecting at least three permanent teeth, including the first molars and incisors. This attachment loss is episodic in nature and has periods of quiescence of variable duration. Aggressive periodontitis is primarily associated with *Actinobacillus actinomycetemcomitans* and *Porphyromonas gingivalis* and other bacteria involved in the etiology of aggressive periodontitis are *Eikenella corrodens* and *Capnocytophaga*. Not all of the features of Aggressive periodontitis need to be present or will be present in all cases.

aspects Aggressive periodontitis can be distinguished from chronic periodontitis. It is defined by following
 ntitis patients are clinically healthy.
 estruction.

isease -

inconsistent with severity of periodontal tissue destruction.
 illus actinomycetemcomitans and in some populations Porphyromonas gingivalis may be elevated.
 phenotype including elevated levels of PGE2 and IL – 1 N38;.
 and bone loss may be self arresting.

Virulence Factors Of Actinobacillus Actinomycetemcomitans [7],[4]

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has a arsenal of virulence factors that attack the host and compromise the periodontium. Because this periodontal
 ructive nature, the dental practitioner needs to employ systemic antibiotics in addition to surgical and/or nonsurgical

logy has developed the following parameter on treatment of Aggressive periodontitis. Patients should be informed of
 tives, potential complications, expected results, and their responsibility in treatment. Consequences of no treatment
 gressive periodontitis appropriately can result in progressive and often lead to rapid loss of periodontal supporting
 rognosis and could result in tooth loss.

alter or eliminate the microbial etiology and contributing risk factors for periodontitis, thereby arresting the
 he dentition in comfort , function , and appropriate esthetics and to prevent the recurrence of disease. In addition ,
 apparatus, where indicated may be attempted. Due to complexity of aggressive periodontal diseases with regard to
 the microbial flora , control of diseases may not be possible in all instances. In such cases , a reasonable treatment
 the disease.

io(13)

As soon as periodontitis has been diagnosed, a comprehensive periodontal treatment plan must be developed. The treatment of periodontitis consists of four phases: systemic, hygienic, corrective, and maintenance / supportive therapy. Pihlstrom described the systemic phase as the first phase, focusing on the diseases and their impact on the etiology or treatment of the disease. The focus of therapy in the hygienic phase is on the removal of bacterial plaque and calculus as possible.[8] The corrective phase focuses on procedures to correct the periodontal disease.[9] In the maintenance/supportive phase, recall and therapy outcomes are assessed. Systemic and/or corrective phases. As treatment progresses through the four phases, the dentist uses both surgical and medical therapy. The use of systemic antibiotics is in agreement with good medical practice because the bacterial load is high prior to the use of antibiotics. Systemic antibiotics are considered only for those who exhibit continued loss of periodontal mechanical periodontal therapy.

In the treatment of periodontitis, the following should be considered for patients who have aggressive periodontitis: determine if systemic disease is present in children and young adults who exhibit severe periodontitis, particularly if the disease is resistant to therapy. Consultation with the patient's physician may be indicated. Modification of environmental risk factors may be indicated.

Systemic antibiotics are often ineffective. However, in the early stages of disease, lesions may be treated with adjunctive antimicrobial therapy in conjunction with planning with or without surgical therapy.[3]

Depend upon patient compliance and delivery of periodontal maintenance at appropriate intervals, as determined by the dentist. The eruption of permanent teeth should be monitored to detect possible attachment loss. In the treatment of aggressive diseases, evaluation and counselling of family members may be indicated.

Use:

Systemic antibiotics instead of topical ones. Systemic antibiotics reach the periodontal pathogens via serum at the site of infection, and with gingival epithelial and connective tissues. The antibiotic's diffusion into the connective tissue and the penetration of Actinobacillus actinomycetemcomitans invades those areas where topical agents are less effective at achieving high concentrations. Actinobacillus actinomycetemcomitans can achieve higher gingival crevicular fluid concentration than systemic agents.[10] Systemic antibiotics also penetrate other periodontal sites. Disadvantages include adverse drug reactions and uncertain patient compliance in children and adolescents.

In the treatment of periodontitis, treated and evaluated appropriately, and has not responded favourably to conventional therapy, the use of systemic antibiotics may be indicated.

Many practitioners believe that to obtain the best results in the treatment of Actinobacillus actinomycetemcomitans, whether localized or generalized, the use of an adjunctive antibiotic along with mechanical therapy is necessary. A systemic antibiotic is necessary to penetrate the epithelial surface of the pocket. Widespread disease may require the use of systemic antibiotics into the treatment plan. Culture and sensitivity testing are strongly recommended to select the most efficacious. When culture and sensitivity testing are not feasible, the practitioner has to make the choice of antibiotic based on clinical presentation and history.[12]

Suggestions:
without regard to meals
with food (helps eliminate
if the stomach distress)
without regard to meals
without regard to meals
with food (helps eliminate
if the stomach distress)
1 hour before or 2 hours
and
without regard to meals
1 hour before or 2 hours
and
1 hour before or 2 hours
and

Suggested Oral Antibiotic Dosages (Walker C< Karpinia K 2002)[12]:

[Click here to view Full Image](#)

omycetamcomitans associated aggressive periodontitis , the practitioner might choose tetracycline HCL , or one of minocycline hydrochloride), in conjunction with conventional therapy. If a favourable response is not obtained with be particularly aggressive the combination of amoxicillin and metronidazole would be suggested.

n treatment of aggressive periodontitis cases using the combination of metronidazole plus amoxicillin. Van t use of metronidazole (250 mg, tid) and amoxicillin (375 mg , tid) , simultaneously administered for a period of 10 root planning, eliminated Aactinobacillus actinomycetamcomitans in 97 % or more of the patients and resulted in ges, treatment regimens, and absorption suggestions for the administration for the administration of systemic wing table :

therapy into the treatment protocol for aggressive periodontitis should be based on accurate scientific knowledge d for an adjunctive antibiotic should be firmly established in the clinician's mind as well as the expected outcome of

erapy is:

gns of gingival inflammation;

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linically detectable plaque to a level compatible with periodontal health.

r aggressive Periodontitis:

l re val of contaminants and adjunctive use of antibiotics and disinfectants make up the conventional treatment for the clinician is informed that biofilm structure of dental aque confers remarkable resistance to species within the ce regarding the development of antibiotic resistance. Because of variability in design of existing studies it has not l agent, dose , and duration provide the optimal clinical and microbiologic effect in this group of patients. For these

photoactivable substance, the photosensitizer, binds to the target cell and can be activated by light of a suitable wavelength. When activated, singlet radicals of singlet oxygen are formed, which produce an effect that is toxic to the cell. This so-called photodynamic effect is a process in which light, after being absorbed by dyes, sensitizes organisms for visible light-inducing cell damage. Well known for its application in the treatment of neoplasms, there is also an interest in antimicrobial photodynamic therapy. Various organisms (including oral species) have been reported to be killed in vitro by this approach. Potential of some key enzymes (e.g., matrix metalloproteinases and serine proteases) have also been shown to be reduced by photosensitization. The bactericidal efficacy of PDT against *Porphyromonas gingivalis* and *Aggregatibacter actinomycetemcomitans* in a study using a rat model, and the results show that toluidine blue-mediated lethal photosensitization of *P. gingivalis* is effective in vivo and that this results in decreased bone loss. Sigush et al [16] showed that PDT using a photosensitizer and a laser light source is effective in reducing the periodontal signs of redness and bleeding on probing (BOP) in dogs. Histologic examination of the periodontium after PDT showed no adverse effects, even with highest light doses and toluidine blue concentration used [17]. PDT is expected to be unlikely to cause its bactericidal activity is caused by singlet oxygen and other reactive species such as singlet oxygen and singlet oxygen. PDT is of cellular targets. Photosensitization may be important in dealing with aggressive periodontitis because the disease is caused by the growth of the bacteria through the epithelium and connective tissues. Considering that PDT is not truly a mechanical therapy, residual plaque is expected to occur. Because of the lower presence of calculus, aggressive forms of disease and patients are more likely to benefit from PDT.

aggressive periodontitis being tried is use of ozonized solutions (Sorokina and Zaslavskaja, 1997). The effect of ozonized water on the reduction of bacterial plaque and dental plaque was studied by Nagayoshi et al. They found that ozonized water should be useful in reducing the bacteria in dental plaque. Ozone was found to have a potent antibacterial effect explained by the fact that it causes the peroxidation of phospholipids. Nagayoshi et al. found that ozonized water should be useful in reducing the bacteria in dental plaque. Concerning the results obtained by Agapov et al. ozone can cause stimulation of body's own immune system. In agreement with the present results of this study and in good conformity with the results obtained by Lukinykh and Kosiuga, the use of ozonized water for the treatment of the oral cavity in combination with ozone therapy. They proved that this combination mechanically and chemically decreased bacterial contamination[5].

open flap debridement either alone or as a combination with regenerative procedures. The main aim of a flap is to root and furcation areas so that a thorough instrumentation and debridement can be performed. Flap techniques such as the modified flap operation/Kirkland flap (sulcular incision flap)[19], [1] achieve this aim without eliminating the pockets.

ervation flap will be the ideal technique to minimize recession in the anterior regions due to esthetic reasons, and /sulcular incision flap will be the technique of choice in the posterior regions when opting for bone grafting and preservation flap is preferred for bone grafting when there is spacing between the teeth to obtain maximum interdental region and to prevent shrinkage of papilla on healing.

hot conditioning) with citric acid, tetracycline, or fibronectin is preferable when performing bone grafting or GTR

Factors (insulin-like growth factor (ILGF), platelet-derived growth factor (PDGF)) use of platelet-rich plasma which contains proteins like emdogain, etc. are of promising results. Application of enamel matrix proteins alone[1] or in combination with bone grafts has shown to result in the successful treatment of intrabony defects in aggressive periodontitis.

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