SUPPORTIVE PERIODONTAL THERAPY

OUTLINE

Patients may or may not be successful in removing plaque after completing active periodontal therapy, requiring continuing attention to a maintenance program that lowers the risk of subsequent disease progression. The term "SUPPORTIVE PERIODONTAL THERAPY" was coined to convey the critical requirement for therapeutic interventions to support the patient's own efforts to control periodontal infection throughout the maintenance and recall phase of periodontal therapy.

INTRODUCTION

Periodontal disease is a result of opportunistic infection (Lang et al 1985) by infective organisms which cannot be eliminated from the mouth over a prolonged time, and so far, we have no way to boost the patient's immune responses to the extent that these organisms would be innocuous. 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 the staff. Patients not maintained in a supervised recall programme after active treatment show obvious signs of recurrent periodontitis. The more often patients present for the recommended supportive periodontal treatment; the less likely they are too loose teeth.

DEFINITION

Supportive Periodontal Therapy is *defined as* the essential need for therapeutic measures to support the patient’s own efforts to control periodontal infections and to avoid re-infection. The integral part of SPT is the continuous diagnostic monitoring of the patient in order to intercept with adequate therapy and to optimize the therapeutic interventions to the patients need. This phase is carried out immediately after Phase 1 therapy so that all parts of the oral cavity are able to retain the *same degree of health* that has been attained following Phase 1 therapy

SUPPORTIVE PERIODONTAL THERAPY (SPT) can be categorized as either

PRIMARY: It is essentially preventive and population based. The aim is to deliver cost effective dental health care measures through community education programs to limit the

development of gingivitis and in the longer term, to prevent the progression of gingivitis to periodontitis.

SECONDARY: It is the palliative maintenance of post treatment stability. The aim of the palliative SPT is to limit the rate of progression of the disease who are unable to achieve adequate level of plaque control

REFRACTORY PERIODONTITIS

A condition where one or more forms of periodontitis are unresponsive to treatment despite excellent patient compliance and delivery of periodontal therapy that ordinarily is successful in arresting the progression of periodontitis. *GPT 2001*

RECURRENT PERIODONTITIS

A condition where periodontitis has been successfully treated but then recurs. *GPT 2001*

Reason for recurrence

- Incomplete subgingival plaque & calculus removal
- Bacteria present in the gingival tissues in chronic and aggressive periodontitis cases
- Bacteria associated with periodontitis can be transmitted between spouses and other family members.
- Subgingival scaling alters the microflora of periodontal pockets.

RATIONALE FOR SPT:

Another possible explanation for the recurrence of periodontal disease is the microscopic nature of the dentogingival unit healing after periodontal treatment. Histologic studies have shown that after periodontal procedures, tissues usually do not heal by formation of new connective tissue attachment to root surface but result in long junctional epithelium that is weaker and inflammation may rapidly separate it from tooth.

OBJECTIVES

- To prevent the progression and recurrence of periodontal disease in patients who have previously been treated for gingivitis and periodontitis.
- To prevent the loss of dental implants after clinical stability has been achieved.

- To reduce tooth loss by monitoring the dentition and any prosthetic replacements of the natural teeth.
- To diagnose and manage, in a timely manner, other diseases or conditions found within and related to the oral cavity.

IMPORTANCE OF MAINTENANCE VISIT

- Nyman et al.-1977 reported that patients who were not on maintenance therapy after surgical treatment for advanced periodontal disease exhibited loss of attachment 3-5 times greater than documented for the natural progression of periodontal disease. Tooth loss in some periodontal patients has been shown to be inversely proportional to the frequency of periodontal maintenance (Wilson et al 1987)

- Studies have shown the efficacy of periodontal maintenance (PM) and have shown that recurrent periodontitis can be prevented or limited by optimal personal oral hygiene or through periodic periodontal maintenance.
- In a group of periodontal patients treated but not maintained, Becker et al (1984) reported a tooth loss of 0.22 teeth by the patients at the end of 1 year, which is similar to that found in periodontal patients without treatment.
- Loe et al [1978, 1986] conducted a longitudinal investigation to study the natural development and progression of periodontal disease.
- The first study group established in Oslo, Norway in 1969, consisted of 565 healthy male patients between 17 to 40 years of age. Members of this group experienced maximum exposure to conventional dental care throughout their lives. The results of this study showed that the Norwegian group, as the members approached 40 years of age, had a mean individual loss of attachment of slightly above 1.5mm, and the mean annual rate of attachment loss was 0.08mm for interproximal areas and 0.10mm for buccal areas.
- The second study was established in Sri Lanka in 1970 the workers had never been exposed to any programs relative to the prevention or treatment of dental diseases. The Srilankans as they approached 40 years of age the mean individual attachment loss was 4.5mm , and the mean annual rate of progression was of the lesion was 0.30mm for interproximal areas and 0.20mm for buccal areas. This study suggests

that without interference, periodontal lesions progress continually and at a relatively even pace. Further analysis of the Sri Lankan study showed that- All areas showed gingival inflammation but attachment loss varied tremendously.

- 8% - Rapid Progression – 9mm
- 81% - Moderate Progression – 4mm
- 11% - No Progression - < 1mm (at age 35 years)

- A longitudinal study of patients with moderate to advanced periodontitis at the UNIVERSITY OF MICHIGAN showed that the progression of periodontal disease could be stopped for 3 years post operatively regardless of the modality of treatment. With long term observations the average loss of attachment was only 0.3mm over 7 years. The results indicated a more favorable prognosis for treatment of advanced periodontal lesions.

MAINTENANCE AFTER PERIODONTAL TREATMENT

- In a pioneer study on this subject, Suomi et al (1971) found a mean annual loss of 0.03 mm of periodontal support in well maintained patients, whereas those receiving only one oral examination and no further reinforcement in oral hygiene, showed an annual mean loss of 0.1mm of periodontal support.
- Similar results were found by Axelsson (1981) demonstrating that frequent prophylaxis and oral hygiene have a significant effect on the maintenance of periodontal support following the treatment of the disease. These well controlled studies clearly show that periodontal support can be adequately maintained if frequent prophylaxis, including oral hygiene instruction, is carried out, while the results with inadequate maintenance are poor.

Position paper given by the American Academy of Periodontology (1998) recommends….

- An update of the Medical and Dental histories
- Examination of extra- and intraoral soft tissues
- Dental examination
- Radiographic review

- Evaluation of the patient's oral hygiene performance
- Periodontal evaluation and Risk assessment
- Supra- and Subgingival removal of Bacterial plaque and calculus
- Retreatment of Disease when indicated.

THERAPEUTIC GOALS OF SPT

- Prevent or minimize the recurrence and progression of periodontal disease in patients who have been previously treated for gingivitis, periodontitis, and peri-implantitis.
- Prevent or reduce the incidence of tooth loss by monitoring the dentition and any prosthetic replacement of natural teeth.
- Increase the probability of locating and treating in a timely manner, other diseases or conditions found within the oral cavity.

Parameters for monitoring periodontal health during SPT

Loss of attachment of 2 mm or more and the associated deepening of the periodontal pocket or gingival recession; Bleeding on probing; Suppuration or Exudate; Gingival Recession, Furcation involvement, Caries, Open contacts and status of occlusion and arch relationship, including any anomalies, Clinical history; Loss of Alveolar Bone, Crown-Root ratio; Increase in Mobility; Changes in the patient's Immune system and response; Effectiveness in daily removal of Bacterial Plaque, Smoking; Patient's Age; Root Surface Smoothness; Evidence of Calculus or Root Surface Accretions;

Factors to be considered in determining the recall interval include the following (Caffasse et al 1990)

- Severity of The Disease: The more severe the disease, the more frequently the patient may need to be seen.
- Effectiveness of Home Care: The better the home care, the less frequently the patient needs to be recalled.

- Age of The Patient: When there is an equal degree of destruction, a younger patient needs to be seen more frequently to achieve a stable result over a long period of the life span than an older patient.

- Degree of Control of Inflammation Achieved: When the results approach closer to total health the less frequently the patient has to be recalled. But in many cases, where there is severe destruction, the results may not near total health. In these cases the goal of treatment to achieve health should be as ideal as possible and the recall should be more frequent.

- Host Response: Host-bacterial interaction plays a significant role in maintenance. In patients where systemic factors may be negatively affecting the host response, the recall interval should be reduced, to try to restore the host-bacterial balance by better controlling plaque accumulation.

BASIC PARADIGMS FOR THE PREVENTION OF PERIODONTAL DISEASE

- The Etiology of Gingivitis and Periodontitis is fairly well understood. However the causative factors i.e the microbial challenge which induces and maintains the inflammatory response, may not be completely eliminated from the dentogingival environment for any length of time. This requires the professional removal of all microbial deposits in the Supra and Subgingival areas at regular intervals since the *Recolonization* will occur following the Debridement procedures leading to *Reinfection* of the ecologic niche and hence giving rise to further progression of the disease process.

- Morrison et al 1979 –Beagle dog model with naturally occurring periodontal disease. Test group: SRP + daily tooth brushing and polishing for 3 years and the control group: No SRP or OHI. Every 6 months teeth of opposing jaw of both groups had SRP. Results showed reduction in PPD and gain in CAL in test animals and were maintained throughout irrespective of SRP. Increased PPD and attachment loss was seen in control group. However in the jaw quadrants where SRP was done, the periodontal destruction was less pronounced. SPT at regular intervals to a certain extent compensate for sub optimal personal oral hygiene standard. After SRP - Quantity and quality of sub gingival microbiota is significantly altered and re-establishment takes several months. (Listgarten et al,

1978). From all these studies it is evident that periodontal treatment is *Ineffective* in maintaining periodontal health if supportive maintenance care is neglected, denied or omitted.

PATIENTS AT RISK FOR PERIODONTITIS WITHOUT SPT:

- Various studies by **Loe** et al (1986), **Nyman et al** (1977), **Axelsson and Lindhe** (1981) have shown that patients susceptible to periodontal disease are at a high risk for reinfection and progression of periodontal lesions without meticulously organised and performed SPT. Therefore, SPT has to be aimed at regular removal of the subgingival microbiota and must be supplemented by the patient's efforts for optimal supraginginval plaque control. Hence SPT is an absolute prerequisite to guarantee beneficial treatment outcomes with maintained levels of clinical attachment over long periods of time. The maintenance of treatment results for the majority of patients has been documented over 14 years to 30 years but it has to be realised that a small proportion of patients will experience recurrent infection with progression of periodontal lesions in a few sites in a completely Unpredictable Mode. The continuous risk assessment at Subject, Tooth, site Levels therefore represents a challenge for the SPT concept.

CONTINUOUS MULTI LEVEL RISK ASSESSMENT

- Subject Risk Assessment
- Tooth Risk Assessment
- Site Risk Assessment

SUBJECT RISK ASSESSMENT:

The patient's risk assessment for recurrence of periodontitis may be evaluated on the basis of a number of clinical conditions whereby no single parameter displays a more paramount role. The entire spectrum of risk factors and risk indicators ought to be evaluated simultaneously.

Lang and Tonetti's functional diagram (2003)

1. Prevalence of bleeding on probing
2. Prevalence of residual pockets greater than 4mm

3. Loss of teeth from a total 28 teeth

4. Loss of periodontal support in relation to the patient's age

5. Systemic and genetic conditions

6. Environmental factors such as cigarette smoking.

PERCENTAGE OF SITES WITH BLEEDING ON PROBING:

Bleeding on probing represents an *objective inflammatory parameter* which has been incorporated into index systems for the evaluation of periodontal conditions. It is also used as a parameter by itself. In a patient's risk assessment for recurrence of periodontitis, BOP reflects at least in part the *patient's compliance and standards* of oral hygiene. Although there is no acceptable level of prevalence of BOP in the dentition above which a higher risk for disease recurrence is established, a BOP prevalence of 25% has been the cut -off point between patients with maintained periodontal stability for 4 years and patients with recurrent disease in the same time frame. *(Jeff et al 1994).* In assessing the patient's risk for disease progression, BOP percentages reflect a summary of the patient's ability to perform proper plaque control, the patient's host response to bacterial challenge and the patient's compliance. The percentage of BOP is therefore used as the *first risk factor* in any functional diagram of risk assessment.

PREVALENCE OF RESIDUAL POCKETS GREATER THAN 4MM

The presence of residual pockets with probing depth greater than 4mm represents to a certain extent, the *degree of success* of periodontal treatment rendered. Although this figure per se does not make much sense when considered as a sole parameter, its evaluation in *conjunction* with other parameters such as BOP/suppuration will reflect existing ecologic niches from and in which reinfection might occur. It is therefore conceivable that periodontal stability in a dentition would be reflected in a *minimal number* of residual pockets. Nevertheless in assessing the patient's risk for disease progression, the number of residual pockets with a probing depth $\geq$ 4mm is assessed as the *second risk indicator* for recurrent disease in the functional diagram of risk assessment.

LOSS OF TEETH FROM A TOTAL 28 TEETH

Although the reason for tooth loss may not be known the number of remaining teeth in a dentition reflects functionality of the dentition. Mandibular stability and individual optimal

function may be assured even with a shortened dental arch of premolar to premolar occlusion i.e. 20 teeth. Some tooth loss also represents a true end point outcome variable reflecting the patient's history of oral diseases and trauma it is logical to incorporate this risk indicator as the third parameter in functional risk assessment.

LOSS OF PERIODONTAL SUPPORT IN RELATION TO AGE.

The *extent* and *prevalence* of periodontal attachment loss (previous disease experience and susceptibility) as evaluated by the height of the alveolar bone on radiographs, may represent the most obvious indicator of subject risk when related to the patient's age.

- The estimation of bone loss is performed in the posterior region on either the periapical radiographs, in which the worst site affected is estimated gross as a *percentage of the root length*, or on bitewing radiographs in which the worst site affected is measured in millimetres.

- *1 mm = 10% Bone Loss*
- The percentage is then divided by the patient's age resulting in a factor.
- Bone loss /Age

0.5 = division between low and moderate risk

1.0 = division between moderate and high risk

In assessing the patient's risk for disease progression, the extent of alveolar bone loss in relation to the patient's age is estimated as the *fourth risk indicator* for recurrent disease in the functional diagram of risk assessment. Thus a patient with higher bone loss in relation to age has a higher risk regarding this vector in a multifactorial assessment of risk.

SYSTEMIC CONDITIONS

The most substantiated evidence for modification of disease susceptibility and/or progression of periodontal disease arises from studies on *type I and Type II diabetes mellitus.* Genetic markers such as *polymorphisms of IL-1* have also show association with advanced periodontitis. Assessing the patient's risk for disease progression, systemic factors are only considered, if known, as the *fifth risk indicator* for recurrent disease in the functional

diagram. If not known or absent, systemic factors are *not taken* into account for the overall evaluation of risk.

ENVIRONMENTAL CONDITIONS

Consumption of tobacco, predominantly in the form of smoking or chewing, affects the susceptibility and the treatment outcome of patients with adult periodontitis. Smoking per se represents not only a risk marker but also possibly a *true risk factor* for periodontitis. In assessing the patient's risk for disease progression environmental factors such as smoking and stress must be considered as the *sixth risk factor* for recurrent disease in the functional risk diagram of risk assessment.

Compliance with recall system

Non-compliant or poorly compliant patients should be considered at higher risk for periodontal disease progression.

Oral hygiene

In a clinical set-up a plaque control record of *20-40% is tolerable* by most patients. It is important to realise that full mouth plaque score has to be related to the host response of the patient i.e. compared to the inflammatory parameters.

PATIENTS'S INDIVIDUAL PERIODONTAL RISK ASSESMENT (PRA):

- A *low PR* patient has all parameters within the low-risk category or at the most one parameter in the moderate risk parameter.

PATIENTS'S INDIVIDUAL PERIODONTAL RISK ASSESMENT (PRA):

A *moderate PR* patient has at least 2 parameters in the moderate category, but at the most one parameter in the high-risk category.

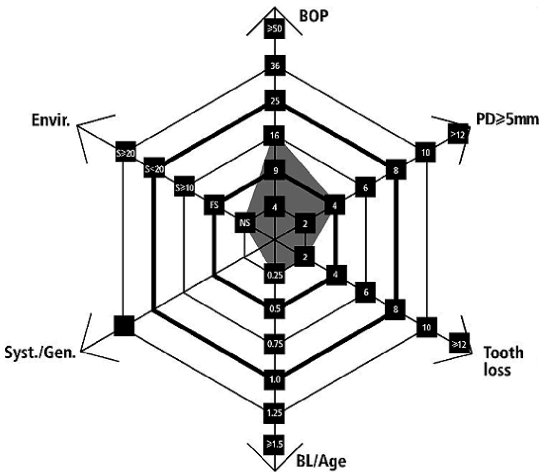

Fig 2. Functional diagram of a low-risk maintenance patient. BOP is 15%, 4 residual pockets ≥5 mm are diagnosed, 2

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PATIENTS'S INDIVIDUAL PERIODONTAL RISK ASSESMENT (PRA):

- A *high PR* patient has atleast 2 parameters in the high risk category.

The subject risk assessment may estimate the susceptibility for progression of periodontal disease. All the above factors together should be contemplated and evaluated. A functional assessment of the risk for disease progression on the subject level may help in customizing the *frequency and content* of SPT visits.

TOOTH RISK ASSESSMENT

1. Tooth Position within the dental arch
2. Furcation involvement
3. Iatrogenic factors
4. Residual periodontal support

5. Mobility

1. <u>Tooth position within the dental arch:</u> Crowding of teeth might eventually affect the amount of plaque mass formed in dentitions with irregular oral hygiene

practices, thus contributing to the development of Chronic Gingivitis, but, it remains to be demonstrated whether Tooth Malposition within the dental arch will lead to an increased risk for periodontal attachment loss.

2. Furcation involvement: It has to be understood that it's not implied that furcation involved teeth must be extracted since all prospective studies have documented a rather *good overall prognosis* for such teeth if regular supportive care is provided by a well organised maintenance program.
3. Iatrogenic factors: Overhanging restorations and Fitting Crown margins certainly represent an *area for plaque retention* and there is an abundance of studies documenting an increased prevalence of periodontal lesions in the presence of iatrogenic factors. Depending on the supragingival or subgingival location of such factors, their influence on the risk for disease progression has to
4. be considered. It has been established that slightly Subgingivally Located overhanging restorations will indeed change the ecologic niche, providing more favourable condition for establishing a Gram negative microbiota. There is also *shift in the subgingival microflora towards a more periodontopathic microbiota*, if unaffected by treatment represents an increased risk for periodontal breakdown.

A risk assessment at tooth level may be useful in evaluating the *prognosis and function* of an individual tooth and may indicate the *need for specific therapeutic measures* during SPT visits.

SITE RISK ASSESSMENT

The tooth site risk assessment includes the registration of:

1. B O P
2. Probing Depth
3. Loss of Attachment
4. Suppuration.

A risk assessment on the site level may be useful in evaluating the periodontal disease activity and determining periodontal stability or on-going inflammation. The Site Risk Assessment is essential for the *identification of the sites* to be instrumented during SPT.

CLINICAL IMPLEMENTATION

The clinical utility of the *first* level of risk assessment influences primarily the determination of the recall frequency and time requirements. It will also provide a perspective for the evaluation of risk assessment conducted at the tooth and site levels. The clinical utility of *tooth* and *site* risk assessment relates to rational allocation of the recall time available for therapeutic intervention to the sites with higher risk, and possibly to the selection of different forms of therapeutic intervention.

REFERRAL TO SPECIALIST

Mild Periodontitis- General Dentist

Moderate Periodontitis- General Dentist + Specialist

Advanced Periodontitis- Specialist

RADIOGRAPHIC EXAMINATION RECOMMENDATIONS

Patient Condition/Situation	Type of Examination
Clinical caries or high-risk factors for caries.	Posterior bite-wing examination at 12- to 18-month intervals.
Clinical caries and no high-risk factors for caries.	Posterior bite-wing examination at 24- to 36-month intervals.
Periodontal disease not under good control.	Periapical and/or vertical bite-wing radiographs of problem areas every 12 to 24 months; full-mouth series every 3 to 5 years.
History of periodontal treatment with disease under good control.	Bite-wing examination every 24 to 36 months; full-mouth series every 5 years.

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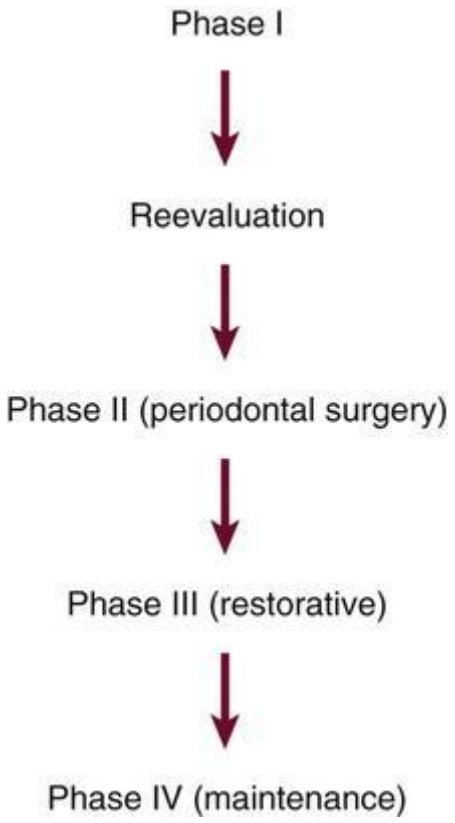
Sequence of Supportive Periodontal Treatment Visits:



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Periodic recall visits form the foundation of a meaningful long term prevention program. The interval between visits is initially set at *3 months* but may be varied according to the patient's needs. The recall hour should be planned to meet the *individual's needs*. It basically consists of *four* different sections which may require various amounts of time during a regularly scheduled visit.

EXAMINATION, RE-EVALUATION AND DIAGNOSIS:

Since patients on SPT may experience significant changes in the health status and use medications, an *update* of their information on general health issues is appropriate. *Changes in health status and medications* should be noted. In *middle-aged to elderly* patients, these aspects might have an influence on future patient management of the patient. An extraoral and intraoral soft tissue examination should be performed at any SPT visit to detect any abnormalities and to act as a screening for oral cancer. The lateral borders of the tongue and the floor of the mouth should be inspected in particular. An evaluation of the patient's risk

factors will also influence the choice of future SPT and the determination of the recall interval at the end of the maintenance visit. Following the assessment of the subject risk factors, tooth & site related risk factors are evaluated. Evaluations are performed for both teeth and oral implants. Conventional Dental Radiographs should be obtained at SPT visits. Single periapical films exposed with a paralleled view and preferably standardised technique are of great value. Bite wing radiographs are of special interest for caries diagnostic purposes. Since only approximately 10-15 minutes are available for this section, these assessments should have to be performed in a *well organised* fashion. It is preferable to have a *dental assistant* available to note all the results of the diagnostic tests unless a *voice activated computer assisted recording system* is used.

MOTIVATION, REINSTRUCTION AND INSTRUMENTATION (MRI)

This aspect uses most of the available time of the SPT visit. When informed about the results of the diagnostic procedures, the patient may be motivated either in a confirmatory way in the case of low scores or in a challenging fashion in the case of high scores. Encouragement usually has a greater impact on future positive developments than negative criticism, hence every effort should be made to acknowledge the patient's performance. Patients who have experienced a *relapse* in their adequate oral hygiene practices need to be further motivated. If the personal life situation has influenced the performance, *positive encouragement* is appropriate. Standard 'lecturing' should be replaced by an *individual approach.* Social, behavioral, cultural and economic factors – implicated as determinants in patterns of compliance. Non-compliance to periodontal maintenance cannot be solely explained by one determinant but rather may involve an individual's health beliefs, emotional intelligence, psychologic stressors and personality traits. Occasionally, the patients present with hard tissue lesions (wedge shaped dental defects) which suggest overzealous and/or faulty mechanical tooth cleaning. Such habits should be broken and the patient reinstructed in tooth brushing techniques which emphasize *vibratory* rather than scrubbing movements. Since it appears impossible to instrument 168 tooth sites in a complete dentition in the time allocated, only those sites which exhibit signs of inflammation and/or *active disease progression* will be re-instrumented during SPT visits. Hence, all the BOP positive sites and all pockets with a probing depth exceeding 5mm are carefully rescaled and root planed. Repeated instrumentation of healthy sites will inevitably result in mechanically caused continued loss of attachment (Lindhe 1982)

POLISHING, FLUORIDES, DETERMINATION OF RECALL INTERVAL

The recall hour is concluded with polishing the entire dentition to remove all the remaining soft deposits and stains. This may provide freshness to the patient and facilitates in the diagnosis of early carious lesions. Following polishing, fluorides should be applied in high concentration in order to replace the fluorides which might have been removed by instrumentation from the superficial layers of the teeth. Fluorides or chlorhexidine varnishes may also be applied to prevent root surface caries, especially in areas with gingival recession.

CONCLUSION:

All types of Periodontal and Implant Therapy require continuous follow up and periodontal maintenance care because of the constant microbial challenge and this response must be effective to prevent further tissue damage. Maintenance therapy that has proved effective over time is periodic professional visits.

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