Failure of periodontal treatment
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Treatment failures appear to occur more frequently in periodontology than in other dental disciplines. Inappropriate patient selection, incomplete diagnostic procedures, errors in diagnosis or prognosis, treatment difficulties, unsupervised healing, and the absence of maintenance therapy may be causes of such failures. A regular recall program can largely prevent such failures. (Quintessence Int 1994;25:449–457.)

Introduction

Analysis of a periodontal treatment failure can contribute more to practical understanding than can the description of a “nice” success. Periodontal treatment failures seem to arise relatively frequently, possibly because, among other reasons, the periodontist works in a field characterized by the presence of plaque, and the marginal periodontium remains more or less exposed to microorganisms—depending on the intensity and quality of oral hygiene—even after successful primary care. Not only does the amount of plaque play a role, but the pathogenicity of the microorganisms and the immune status of the patient, his or her “resistance,” are also factors.

Causes of treatment failure

To discuss treatment failures, the concept of successful periodontal treatment must be defined first. In the past, treatment was only considered successful when there was radical elimination of pockets; today, the concept of treatment success is defined more modestly:

1. Bleeding (inflammation) is stopped.
2. Pocket activity is eliminated.
3. Probing depth is significantly reduced.
4. Gain of attachment is achieved.
5. Tooth mobility is stabilized.

According to this definition of successful treatment, the following clinical parameters must be classified as treatment failure:

1. Bleeding on probing is continued.
2. Symptoms of activity in addition to bleeding (exudate or pus) are seen in response to probing.
3. Probing depth is not reduced or continues to increase.
4. Attachment loss is progressive.
5. Tooth mobility is increased.

The causes of failure are manifold. In addition to the fact that periodontal therapy always takes place in regions exposed to plaque formation, failures may be ascribed to the following factors:

1. Incorrect patient selection
2. Incomplete diagnostic procedures, improper diagnosis, and incorrect prognosis
3. Difficult (or inappropriate) treatment
4. Unsupervised healing
5. Absence of maintenance therapy

Incorrect patient selection

A patient is inappropriately selected for comprehensive periodontal therapy if, despite repeated efforts, he or she cannot be motivated to maintain proper oral hygiene. Such patients are programmed for treatment failure.

The effort required to train the patient in proper oral hygiene procedures is enormous and is underestimated by most dentists. Just telling the patient repeatedly not to forget to brush, or giving a quick demonstration on a
model, simply does not suffice. Rather, the disease must be explained, perhaps on the basis of a bleeding index. The explanation proceeds to a description of the bacterial cause of periodontitis (plaque). Finally, oral hygiene measures, particularly interdental hygiene, are taught and checked repeatedly.

Incorrectly selected patients also include those patients who have a serious systemic disease that could promote periodontitis. The disease categories involved include metabolic diseases, such as insulin-dependent juvenile diabetes; blood dyscrasias, such as pancytopenia; the various leukemias, cyclic neutropenia, drug-induced agranulocytosis, and erythroblastic anemia; side effects of various drugs, such as hydantoin, cyclosporine, and nifedipine; immunodeficiency, such as infection with human immunodeficiency virus; genetic syndromes, such as Down's syndrome, Papillon-Lefèvre syndrome, Chédiak-Higashi syndrome, hypophosphatasia.

As an example of this group of patients, a 27-year-old woman with Down's syndrome (mongolism, trisomy 21) is shown (Fig. 1). Of course, patients afflicted by
such conditions require special attention and must be treated. The total treatment plan, however, is more likely to be a radical one. Teeth with advanced loss of attachment are extracted. The therapy often can be only symptomatic.

Incomplete diagnostic procedures, improper diagnosis, and incorrect prognosis

The seriousness of the disease must be established exactly through the diagnostic procedures, not only for the entire dentition, but also for each tooth individually and for each side of a tooth. In addition to this periodontal morphology, is also important to describe the pathobiology of the periodontal state: Is it a case of adult periodontitis (AP), rapidly progressive periodontitis of a young adult (RPP), or (rarely) localized juvenile periodontitis (LJP)? Depending on the phase of the disease, and on the form of its course, treatment plans and prognoses will vary. For example, therapy of rapidly progressive periodontitis must be more radical than that of adult periodontitis, if failure is to be avoided.

As an example, Fig 2 depicts a case of well-advanced...
rapidly progressive periodontitis that is not recognizable through a diagnosis made by simple observation. Only the most careful probing of each tooth side, analysis of radiographs, and determination of tooth mobility will reveal the severity of the disease, which requires a correspondingly extensive treatment.

Another case is that of a caries-free 20-year-old patient (Fig 3). Initial observation indicates serious gingivitis caused by plaque. Again, only careful probing, determination of tooth mobility, and analysis of the radiographs make it clear that she has severe postjuvenile periodontitis. If only gingivitis is diagnosed in such a patient, and treatment is limited to removal of supragingival plaque and calculus, tooth loss would result in a short time and thus there would be a failure of treatment.

**Difficult (or inappropriate) treatment**

The chief purpose of a causal periodontitis therapy is the elimination of subgingival plaque, that is, cleaning the root surface. Subgingival scaling can be performed
conservatively (closed), or open debridement can be performed after formation of a surgical flap. As simple as scaling sounds, its application in practice may be quite difficult. Inconsistent treatment, however, inevitably leads to failure.

Several difficulties can stand in the way of subgingival scaling: an uneven course of the pocket floor, the micromorphology of the root surface, and the macro-morphology of the root.

Uneven course of the pocket floor. The extracted anterior tooth in Fig 4 clearly illustrates the extraordinarily uneven course of the pocket floor. This is a case of severely advanced periodontitis, and the tooth was extracted. The course of the pocket floor can be irregular, however, even in the early and middle stages of the disease. Although a very deep pocket may exist on one side of the tooth, there may be little loss of attachment on another surface. The course of the pocket floor even may have undercut regions, so that it is very difficult — particularly during a closed procedure — to reach the pocket floor with the curette and thus to achieve thorough root cleaning. If large masses of bacteria remain deep in the pocket, failure is certain.

Micromorphology of the root surface. Occasionally small resorptive regions (lacunae) are present on the root surface (Fig 5). These may be up to 80 μm deep and cannot be reached by curettes or other instruments, whether used in closed or open debridement procedures. Microorganisms that promote recurrences remain in these niches.

Macromorphology of the root. In practice, almost no single-rooted teeth have round or oval cross sections. Roots usually have hourglasslike depressions. Occasionally, teeth have fused roots that often run together in a deep groove (Fig 6). Such grooves act as a “guide plane” for bacteria. They are largely inaccessible to curettes. It may be possible to open the grooves slightly and to polish them with diamonds in an open procedure during the early stages of periodontitis, but failures are frequent in teeth with such unfavorable macromorphology.

The matter becomes even more complicated in the molar region. Cleaning the roots when open furcations exist is particularly difficult. The variety in macromorphology of these teeth is shown in Fig 7. As a rule, furcations must be treated with open debridement procedures. Despite treatment, these sites remain as minor sites of resistance that can lead to failure. Only hemisection and apicoectomy of such teeth may lead to success.

Unsupervised healing

Many failures arising soon after completion of treatment can be traced to the absence of supervision of the healing process. When the closed or open root cleaning is finished, removal of the dressing or the stitches does not mark the end of treatment. Rather, the treated region must be professionally cleaned supragingivally at intervals of about 2 weeks. The oral hygiene status of...
Fig 5a  Electron micrograph of a root surface after planing with a 15-μm Perio-diamond (Intensiv SA). The root surface is clean on the smooth surfaces. It shows fine scratches following the treatment. (arrow) A resorption lacuna, approximately 0.15 × 0.50 mm, is present. The cracks on the root surface are artificial, arising from the preparation of the specimen for electron microscopy.

Fig 5b  Enlargement of Fig 5a. The lacuna is thoroughly filled with bacteria.

Fig 5c  Bacteria in the lacuna depicted in Figs 5a and 5b. The bacteria were inaccessible to the finest Perio-diamonds.

Fig 6a  A bony pocket reaching almost to the apex becomes visible during a flap operation on the maxillary right central incisor. This tooth has two fused roots. Periodontally, it is no longer treatable.

Fig 6b  Same tooth after extraction. Two fused roots end in a groove in which the infection is borne apically.
Fig 7 (left) Mandibular and (right) maxillary molars. Approximately two thirds of the roots were separated apically. Note the large variety of root fusions and furcations. If periodontal disease reaches these sites, treatment, whether open or closed, is hardly possible. As a rule, only parts of such teeth can be retained after amputation of single roots or hemisection.

Absence of maintenance therapy

Maintenance therapy is decisive for long-term success. Without regular recall examinations of the patient, new infections can arise over the course of time. The frequency of recall is not the same for all patients. It depends on a variety of factors: the primary diagnosis (course and severity of the disease), the success of primary treatment following the period of supervised healing, and the extent to which the patient can be motivated to cooperate. Depending on the case, the interval between recall appointments can vary from 2 months to a year. Specific examinations are necessary at each recall appointment to determine whether the results of therapy have remained stable or whether re-
currences or new infections are present. It is not necessary, however, that a complete diagnostic process take place at each recall appointment.

Some findings must be recorded at each recall appointment, but other assessments must be made at greater intervals. At each recall appointment, the gingival status, and the amount of plaque should be determined, by calculation of the indices if appropriate. At longer intervals, perhaps annually, pocket depth and the presence of symptoms of activity in single pockets should be recorded.

Oclusion, need for reconstruction, condition of restorations, tooth vitality, and existence of new carious lesions are checked at still greater intervals. New radiographs are made at approximately 4-year intervals. If pockets are found to recur or new pocket activity is noted, radiographs are prepared as indicated.

Nor are the preventive and therapeutic measures taken by the dentist and the dental hygienist the same at all recall appointments. As a rule, remotivation of the patient, assessment of oral hygiene and reinforcement of patient instruction, and removal of plaque and calculus at indicated sites are undertaken at each recall. The last of these appears to be particularly important. Scaling should not be done on all teeth. Teeth free of deposits need not be touched with a scaler. Long- and short-term studies have shown that frequently repeated scaling of sound teeth can lead to loss of attachment. However, all teeth should be cleaned and polished with low-abrasion paste and rubber tips.

At longer intervals, if pockets or pocket activity is found, subgingival scaling and new surgery (rarely, only for extensive recurrences) should be carried out.

The chairside time required for regular recall appointments intended to prevent periodontal treatment failures is, in most instances, severely underestimated. Including the time required for disinfection of the operatory and for bringing in a different patient, an hour is not an excessive amount of time to schedule for a recall appointment. After the patient is greeted, the appointment begins with the more or less extensive diagnostic measures described previously (5 to 10 minutes). A brief conversation with the patient about the present status of the oral cavity, together with the associated remotivation efforts, requires about 5 minutes. This is followed by plaque disclosure and reinstruction about oral hygiene (approximately 5 minutes).

Only after these preliminary steps are finished is instrumental removal of supragingival plaque and calculus completed at the indicated sites (20 minutes). As a rule, this includes subgingival procedures, performed without anesthesia, in pockets up to 4 mm deep. In addition to plaque, discolored, from chlorhexidine or smoking, for example, is removed (3 minutes) and all teeth are polished with a low-abrasion paste (5 minutes). After the teeth are dried, the entire dentition should be treated with topical fluoride (5 minutes). Finally, the dentist checks everything (5 minutes). After the patient is discharged, the operatory is disinfected and fresh instruments are placed (5 minutes).

The great expenditure of time for diagnosis, motivation, instruction, and actual treatment of patients with periodontitis has been noted. Maintenance therapy also takes time. Twenty-minute recall appointments are at best "alibi exercises."

Summary

Because of numerous failures, periodontal treatment is frequently discredited. Careful attention to a few important points can improve the success rate of periodontal therapy:

1. Only those patients prepared for long-term cooperation should be treated. Patients with certain serious systemic diseases tend to have recurrences. Treatment planning should be rather more radical and the therapy perhaps should be provided by a specialist or in a clinic.
2. Time cannot be saved in diagnostic procedures. Only a careful, comprehensive examination leads to a well-founded diagnosis and prognosis, and thus to a precise treatment plan.
3. The limits of successful therapy must be recognized. Far advanced periodontitis, Class III furcation involvement, and rapidly advancing disease are difficult to control over the longer term. A radical plan, including multiple extractions, is indicated.
4. Reinfection of the pockets must be prevented through supervision of the healing process by repeated cleaning of the teeth and checking of oral hygiene immediately following each active intervention (closed root planing or flap operation).
5. Long-term treatment success is possible only if the patient, once treated, is placed on a regular recall schedule.
6. Consistent periodontal therapy requires a great deal of time. That time is usually underestimated. Informing the patient about the disease (case presentation), instruction in and repeated checking of oral hygiene, supervision of the healing process and recall all are enormously time consuming. The actual
closed or open treatment is only a part—perhaps the smaller part—of the total treatment.

References


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