

Quintessentials
口腔临床要点快速掌握系列

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牙周非手术治疗

Successful Periodontal Therapy:
A Non-surgical Approach

- Peter A Heasman
Philip M Preshaw [编 著]
Pauline Robertson
► 闫福华 [主 译]


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内容提要

“口腔临床要点快速掌握系列”是由国际著名的 Quintessence 出版集团近期出版的一套介绍口腔各科基本技术,最新医学理论的口腔专业丛书。丛书 2002 年起陆续出版发行,我社第一时间引进国内,以便国内读者同步了解国际口腔技术发展的新情况。本书由国际知名口腔专家编写,摆脱了一般专著的照本宣科的编撰风格,一切从临床实践出发,通过大量实例,讲解了牙周病非手术治疗的目的及临床疗效、口腔宣教阶段的治疗、牙周器械及其使用、全身性危险因素的处理、局部危险因素的处理、辅助治疗、牙周支持治疗等内容。本书采用中英对照的编排方式,对提高读者的专业英语水平大有裨益,适合临床口腔医师和口腔医学生阅读。

责任编辑 杨 淮 林 菲

序

成功的牙周治疗对于牙齿的长期保留非常重要。非手术治疗在牙周治疗中可称之为是一门艺术，其成功有赖于诸多因素共同作用，包括疾病发展的复杂性、各种发病的危险因素、牙周诊断的技术、患者的管理及其就诊的动机、医生对新知识新技术的运用等，同时，不应忘记长期严格的牙周支持疗法与积极的常规牙周治疗一样重要。本书是丛书中有关牙周病学的第3本，薄薄的一本书却涵盖了上述如此众多的内容，以及其他一些相关的内容。

作为“口腔临床要点快速掌握系列”丛书的主编，本人阅读此书时有一种在不断学习的感觉，颇受启发，增长了不少新的知识。口腔医学生、临床实习技师，以及每位临床医师在阅读时若能与临床实践结合起来，一定会受益匪浅。

主 编 **Nairn Wilson**

前 言

本书目的在于为牙科医师处理牙龈病和牙周病患者提供图文并茂的最新指南。本书首先讲述了非手术治疗的目标，随后是洁治阶段治疗的步骤和方法、刮治和根面平整及其所使用的工具、常见危险因素的处理以及牙周辅助治疗，最后论述了牙周支持治疗的重要性，此内容与普通牙科医师及那些已在牙周治疗中心接受过非手术治疗的患者息息相关。

希望读者阅读完本书，能达到以下目的：

- 了解非手术治疗后牙周伤口愈合情况。
- 认识到非手术治疗的局限性。
- 对目前化学、机械菌斑控制的产品有所了解。
- 了解牙周洁治、刮治及根面平整的器械。
- 了解确定和处理全身因素和局部因素的重要性。
- 了解确定和处理局部解剖因素和医源性因素的重要性。
- 了解目前牙周辅助治疗方法中的全身和局部用药原则，懂得如何根据临床实际情况选择最适合的产品。
- 熟悉牙周支持疗法的目标及其实现的途径。
- 重视患者依从性问题，懂得如何辨别并纠正依从性不佳的问题。

致 谢

感谢以下人员提供的帮助：感谢纽卡斯尔牙科医院影像科的 Janet Howarth 女士提供的专业影像照片；感谢 David Jacobs 博士提供图 5-1；感谢 Shakil Shahdad 博士提供图 5-2 和图 5-3；感谢 Robert Wassell 博士提供图 5-5；感谢 Dean Barker 博士提供图 5-8~图 5-10；感谢登士柏英国公司提供图 3-4，图 3-6，图 3-7，图 3-9，图 3-10 和图 3-14。感谢 Iain Chapple 教授提供图 3-15，图 5-7 和图 5-11，感谢 Suzanne Noble 女士让我们使用图 3-16，图 3-17 和图 3-18。以下图片已经获得作者和出版社的许可：图 2-4 (Heasman, Millett, Chapple. 健康和疾病状态下的牙周组织及正畸学. 牛津: 牛津大学出版社, 1996), 图 5-5 (Barnes, Walls. 老年口腔医学. 牛津: Wright, 1994), 图 5-20 (Heasman, Preshaw, Smith. 牙周病学彩色图谱. 伦敦: Churchill Livingstone, 1997)。感谢 Iain Chapple 和 Damien Walmsley 提供封面照片；同时也要感谢 George Warman 和 Dental Update 出版社允许我们再次使用这些照片。

Heasman 教授向在本书起草阶段提供帮助的 Lynne, Sophie 和 Christopher 致谢。Preshaw 博士感谢他的妻子 Sarah 的帮助和支持。Pauline Robertson 女士也对她丈夫 Brian 以及她家庭的支持表示感谢。

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第 1 章 非手术治疗的目 的及临床疗效

The Goals and Clinical Outcomes of Non-Surgical Treatment

目 的

本章旨在简要介绍牙周非手术治疗的目 的，并回顾其临床疗效。

要 点

从业人员在阅读完本章后，应对以下方面内容有所了解：

- 牙周非手术治疗的愈合过程。
- 口腔卫生宣教和牙周器械处理两阶段治疗后的临床情况。
- 非手术治疗的局限性。

牙周袋——牙周的病理环境

牙周袋是病理性加深的龈沟，袋内壁为溃疡的上皮衬里，根方为结合上皮，剩余的壁由病变根面（牙周治疗

Aim

This chapter aims to outline the goals of non-surgical periodontal treatment and to provide an overview of the clinical outcomes that are expected following treatment.

Outcome

After reading this chapter the practitioner should have an understanding of:

- the healing events that follow non-surgical treatment
- the magnitude of the clinical changes and outcomes expected following the hygiene (or initial) and instrumentation (or corrective) phases
- the limitations of non-surgical treatment.

The Periodontal Pocket – A Pathological Environment

A periodontal pocket is a pathologically deepened gingival crevice. The lateral and apical boundaries of the pocket are the ul-

的重点部位) 组成。

病变根面受到龈下牙石和菌斑的感染, 且含有持续与宿主防御系统相抗争的致病因素。牙菌斑为一种生物膜, 是由附着在牙齿光滑表面的微生物实体组成。细菌附着于牙面上, 并产生胞外多聚物基质使得细菌间互相粘附。微菌落形成后许多新的菌种参与了生物膜组成, 随后生物膜内即含有多种多样的细菌及其代谢状态。龈沟液 (gingival crevicular fluid, GCF) 可从许多通道流出, 向细菌提供营养, 并将一些废物排泄出来。菌斑生物膜是可以发展的, 细菌能够繁殖并在根面其他地方定植形成新的菌落。

生物膜中的绝大多数细菌是厌氧菌, 厌氧菌的胞壁含有大量的内毒素脂多糖 (lipopolysaccharide, LPS)。研究表明绝大多数 LPS 只是松散地粘于根面或与根面连在一起, 尤其是在不规则根表面、根面凹槽或吸收陷窝等处更是如此, 但少量的 LPS 即可能导致

cerated epithelial lining of the pocket wall and the junctional epithelium respectively. The remaining "wall" of the defect comprises the diseased root surface - the "target" for periodontal treatment.

The diseased root surface is contaminated with subgingival calculus deposits and a layer of dental plaque, which contains the periodontal pathogens that constantly challenge and compromise the host's defence mechanisms. Dental plaque is now regarded as a biofilm, which essentially is an organised community of bacteria that forms on a non-shedding surface such as a tooth. Bacteria attach to the tooth and produce a matrix of extracellular polymers to help bind them together. Microcolonies form and new species join the biofilm which then contains diverse species and metabolic states. Gingival crevicular fluid (GCF) flows through the many channels in the aggregation to provide nutrients and to remove some of the waste products. The biofilm is viable and bacteria can proliferate to establish new colonies on other parts of the root surface.

The majority of bacteria in an established biofilm are recognised, anaerobic organisms with cell walls containing powerful lipopolysaccharide (LPS) based endotoxins. Studies have shown that the vast majority of LPS is only loosely bound to, or associated with, the root surfaces al-

根面污染。根面的龈下结石可能也被 LPS 污染。图 1-1 为病变根面示意图。

非手术治疗的目的

非手术治疗的总体目的是创造一个与牙周组织生物相容的环境，要想达到这一目的所要做的工作有：

- 通过去除根面的 LPS/ 内毒素来

though a small percentage of the total LPS may cause subsurface contamination, in particular at sites of root surface irregularities, root grooves or resorption lacunae. Subgingival calculus on the root surface may also be contaminated with LPS. Diagrammatic representations of a diseased root surface are shown in Fig 1-1.

The Aims of Non-Surgical Treatment

The overall aim of non-surgical treatment is to create an environment that is biologically compatible with healing of the periodontal tissues. This is most likely to be achieved by:

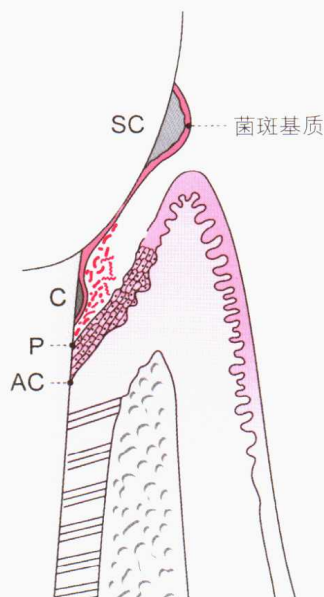
- decontamination by removing LPS/

图 1-1 慢性牙周炎时牙周袋病变情况示意图。溃疡的袋上皮沿着根面向根方爬行。龈上、下牙石的表面覆盖一层菌斑，龈下菌斑为生物膜，其表面还松散地附着微生物群体

SC：龈上牙石；C：龈下牙石；P：牙周袋的底部；AC：结合上皮最根方的细胞

Fig 1-1 Diagrammatic representation of a periodontal pocket for a patient with chronic periodontitis. The pocket epithelium, which is ulcerated, has migrated down on to the root surface. Calculus deposits are present both supra- and subgingivally and these deposits are covered with a layer of plaque. The subgingival plaque may also be regarded as a biofilm with a complex population of loosely adherent microorganisms on its surface

SC, supragingival calculus. C, subgingival calculus. P, the most apical extent of the periodontal pocket. AC, the most apical cell of the junctional epithelium



消除感染。

- 干扰或去除根面生物膜。
- 去除根面的龈下结石。

实验研究表明温和的水流能去掉约 39% 的 LPS，而根面洗刷则可进一步去掉 60%。这提示非手术治疗的口腔卫生宣教阶段有助于扰乱菌斑生物膜、并去除袋内约 99% 以上的内毒素，上述结果前提为假设患者在清洁牙齿时器具能到达牙周袋的整个深度，但对于深度超过 5mm 的牙周袋，这是很难达到的。实际上，牙周袋越深，没被干扰的菌斑生物膜就可能剩得越多。

因此，根面的器械处理（以往称根面平整）是很有必要的。根面器械处理这一术语是用来描述去除内毒素、扰乱菌斑生物膜及去除龈下牙石的整个程序方法（亦称为根面清理）。用超声器械可以去尽根面所有可探查到的龈下牙石，且可去掉牙周袋内松散的内毒素及根面表层坏死的牙骨质（图 1-2）。研究表明超声器械最有效的应用在于其可与根面多方位接触。虽然那种根面要刮到硬且光滑为止的观念已基本淘汰，但是对于一些难以去除的龈下牙石仍需在根面施加较大的压力。

endotoxins from the root surface

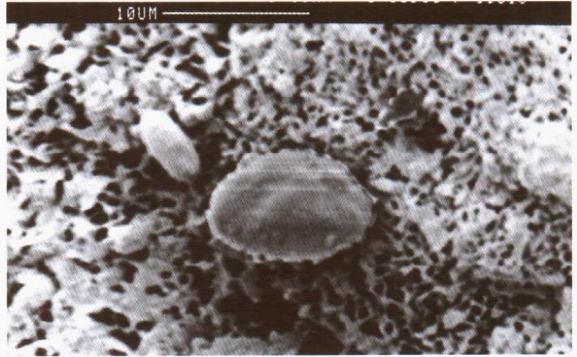
- disrupting and eliminating the biofilm from the root surface
- removing the bulk of subgingival calculus from the root surface.

Laboratory studies have shown that a gentle stream of water can remove about 39% of the LPS whilst brushing the root surface eliminates a further 60%. This suggests that the hygiene phase of non-surgical treatment may be instrumental in disrupting the biofilm and eliminating up to 99% of endotoxins in the pocket. Such a hypothesis of course makes the assumption that the patient is able to access the entire depth of the pocket during cleaning. This is seldom achieved for pockets that are greater than 5mm in depth. Indeed, the deeper the pocket, the more residual, undisturbed biofilm is likely to remain.

The need for professional intervention is, therefore, crucial and this includes root surface instrumentation, a term which is used in preference to root planing. Root surface instrumentation describes the procedure that is necessary to eliminate endotoxins, disrupt the biofilm and, when present, remove subgingival calculus from the root surface (also called root surface debridement). Root surfaces that have no detectable subgingival calculus may be instrumented by passing an instrument such as an ultrasonic sealer lightly over the surface.

图1-2 扫描电镜可见牙周炎患牙根面多孔的、坏死的牙骨质

Fig 1-2 Scanning electron microscope view of a periodontally involved root surface showing porous and necrotic cementum



This will remove the loosely associated toxins and the majority of the outermost, necrotic cementum on the root surface (Fig 1-2). Research shows that the most effective use of ultrasonic instruments involves multiple light passes of the instrument over the root surface. The presence of tenacious, subgingival calculus will, however, necessitate the use of greater pressure to the root, although the belief that the root surface has to be meticulously “planed” until it is hard and smooth is now largely outdated.

牙石的清除

牙石本身并不会导致牙周疾病，但由于下列几个原因而被看作是牙周病的促进因素：

- 所有牙石表面均覆盖一层菌斑。
- 龈上牙石妨碍刷牙及牙间隙的清理。

Elimination of Calculus

Calculus is not the cause of periodontal disease, but may be regarded as a contributory factor, for several reasons including:

- all calculus has a coating layer of dental plaque
- supragingival calculus impedes toothbrushing and interdental cleaning

- 龈下牙石使龈下清洁变得困难，且在菌斑生物膜形成初期可作为细菌定植的中心。
- 龈下牙石能够吸收细菌内毒素。
- 龈上、下牙石可能使牙周探诊产生误差。

基于上述原因，尽管某些孤立残留的龈下牙石可能已经不影响牙周愈合，但尽可能地去除牙石仍然很重要。一些研究结果亦与此一致，表明即便在牙周手术中可直视情况下也难将根面的牙石完全绝对去尽。探诊深度超过5mm的牙周袋很难保证没有牙石和菌斑，因此非手术治疗时不应忽略根面残留的沉积物，而应尽量重视它，这一点很重要。

全口抗感染的概念

通过全口抗感染这一牙周疾病新疗法的介绍，人们逐渐认识到消除那

- subgingival calculus may act as both a barrier to subgingival cleaning and a focus for the colonization of bacteria during the first stage in the formation of a biofilm
- subgingival calculus may absorb bacterial endotoxins
- supra- and subgingival calculus may impede the passage of periodontal probes, thereby falsifying borderline probing depth measures.

For these reasons, it is important to try to remove as much of the calculus as possible, although some residual, isolated deposits of subgingival calculus are likely to be compatible with periodontal healing. This observation is consistent with studies that have shown that even under optimal conditions of access during periodontal surgery absolutely calculus-free root surfaces following root surface instrumentation are hardly ever achieved. With the understanding that pockets with probing depths of >5mm are exceptionally difficult to render plaque and calculus free, it is almost certain that residual deposits are more likely to be the rule rather than the exception with a non-surgical approach.

The Concept of Full-Mouth Disinfection

The importance of eliminating the biofilm and bacteria that have freedom of

些能在口腔中自由活动且能作为牙周感染和再感染病因的细菌和菌斑生物膜的重要性。全口抗感染包括了传统的根面沉积物的清除,但建议在随后24h内完成2次以上的复诊,口腔卫生措施的宣教也应在复诊期间完成。提出这种疗法是因为许多牙周潜在致病菌如牙龈卟啉单胞菌、伴放线放线杆菌也存在于一些非牙周部位,如舌背、口腔黏膜、唾液或扁桃体表面,若不能迅速地将这些部位所有的细菌清除掉,那么治疗过的牙周袋可能会被再感染。因此复诊次数越少,来自未治疗区域再感染的机会就越少。

根面器械处理结束后即可用不同剂型的葡萄糖酸氯己定来辅助抗感染治疗(表1-1),但是尚无明显证据支持氯己定在器械处理过程中对全口抗感染的辅助作用具有临床意义。

movement around the oral cavity, and are the cause of periodontal infections and re-infections, has been recognised by the introduction of full-mouth disinfection as a novel treatment strategy for periodontal diseases. Full-mouth disinfection involves the conventional removal of root surface deposits, usually over two visits within 24 hours of one another. Instruction in oral hygiene procedures is also given at one or both visits. This treatment recognises, however, that many of the potent pathogens, such as *Porphyromonas gingivalis* and *Actinobacillus actinomycetem-comitans*, are also commonly found at non-periodontal sites such as on the dorsum of the tongue, on the oral mucosa, in saliva, or on the mucosal surface of the tonsils. Re-infection of treated pockets is, therefore, likely unless an attempt is made to eliminate the organisms from all of these niches and as quickly as possible. The fewer the number of visits, the less chance there is for re-infection from (as yet) untreated sites.

Different preparations of chlorhexidine gluconate have also been used in an attempt to achieve adjunctive disinfection immediately after the completion of root surface instrumentation (Table 1-1). There is little evidence, however, to support the clinical value of the adjunctive use of chlorhexidine over mechanical instrumentation alone during full-mouth disinfection.

表 1-1 根面器械处理后不同剂型的葡萄糖酸氯己定辅助全口抗感染治疗

Table 1-1 Preparations of chlorhexidine gluconate that have been used to help achieve full-mouth disinfection after root surface instrumentation

剂 型	应 用
1% 的凝胶	用于刷洗舌背 (1min)
0.2% 漱口液	漱口 1min
0.2% 口腔喷雾剂	喷于舌部
1% 的凝胶	在 10min 内连续进行 3 次龈下冲洗
0.2% 漱口液	家庭用, 2/d, 每次 1min, 用 2 个月
0.2% 口腔喷雾剂	喷于舌部, 2/d, 用 2 个月

牙周治疗后的伤口愈合

牙周袋治疗后愈合的一个重要指标是探诊深度的减少, 这种减少很大一部分是由于牙龈炎症减轻导致牙龈组织退缩以及新的长结合上皮的形成 (图 1-3)。

龈上洁治以及患者通过改进菌斑控制方法达到牙菌斑的预防和清除可减少细菌对宿主的威胁, 从而使牙龈急性炎症得到缓解。这些变化在 1~2 周内发生, 以牙龈红肿消退、出血减少为特征 (图 1-4)。

有效的根面器械处理和龈下菌斑

Healing Following Periodontal Treatment

One of the principal signs of a healing pocket is the reduction in probing depth that follows treatment. This reduction is largely a result of the resolution of gingival inflammation leading to shrinkage of the gingival tissues and the formation of a new, longjunctional epithelium (Fig 1-3).

Supragingival scaling, prophylaxis and the removal of dental plaque as a consequence of improved plaque control by the patient reduce the bacterial challenge to the host and, as a result, there is a resolution of the acute inflammatory lesion in the gingival tissues. These changes may occur within 1-2 weeks and are characterised by reductions in gingival swelling, redness and gingival bleeding (Fig 1-4).

Efficient root surface instrumentation

图1-3 图1-2中的根面经过超声刮治后,可以看到器械引起的凹坑,但根面相对光滑

Fig 1-3 The root surface shown in Fig 1-2 has been instrumented using light application of an ultrasonic sealer. The root surface is now relatively smooth, although there are noticeable indentations as a result of the instrumentation



图1-4 上颌切牙唇侧颈部带状牙石,该牙石具有典型的龈下牙石的特点,但由于口腔卫生宣教阶段治疗后牙龈炎症消退而变成龈上牙石。由于牙石表面有菌斑,故龈缘仍有炎症

Fig 1-4 A band of calculus on the labial aspect of a maxillary incisor. This calculus has the typical appearance of a subgingival deposit. This deposit has now become supragingival due to resolution of gingival inflammation following hygiene-phase therapy. Note that the free gingival margin is still inflamed because the calculus has a surface layer of dental plaque



生物膜的破坏为根面创造了一个良好的长结合上皮生长的生物学环境。新的上皮通过半桥粒与根面牙骨质连接,这些上皮细胞来源于根面残留的健康结合上皮以及那些具有再生潜能的牙周袋上皮。当细菌被清除后,上述这些因素有助于伤口愈合。根面器械处理几天后,位于牙周袋最根方的上皮即

and disruption of the subgingival biofilm will create a root surface that is biologically compatible with the formation of the long junctional epithelium. The new epithelium adheres to the root surface through a hemidesmosomal attachment between the cells and the surface cementum. These epithelial cells are derived from the remain-