Advances in Periodontal Surgery

A Clinical Guide to Techniques and Interdisciplinary Approaches

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Editor

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Preface

Like many aspects of health care, technological innovations in materials science, as well as development of new tools and techniques, drive advances in periodontal therapy. In this volume, I have attempted to provide the reader with a compilation of advanced knowledge of surgical periodontal therapy. In some respects, significant advancements are evident, such as the development of novel tools and surgical techniques for treatment of periodontal and mucogingival defects or as noted by advances in the use of laser energy to treat periodontal and peri-implant diseases. Conversely, other techniques, such as periodontal resective surgery, have changed very little over time. Here, I have compiled works from gifted clinicians specifically geared toward surgical treatment for the periodontal patient.

This volume is divided into five parts, each of which addresses a specific topic. Part I, *Key Considerations of Periodontal Surgery*, discusses patient-driven factors and practical ways both clinicians and patients can incorporate qualitative and quantitative patient information to monitor and self-motivate patients to help improve periodontal outcomes. This is followed by a decision tree-style discussion of resective versus regenerative therapy. This serves as an introduction to Part II, *Resective Techniques of Periodontal Surgery*, and Part III, *Regenerative Techniques of Periodontal Surgery.* Here, the discussion focuses on the use of technology-driven approaches (stem cells, lasers, videoscopes, biomimetics) as well as traditional approaches (resective surgery) in periodontal surgery. Next, Part IV, *Mucogingival and Periodontal Plastic Surgery*, shifts the focus to treatment of periodontal surgery associated with management of soft tissues. Finally, Part V, *Interdisciplinary Management of Periodontal Surgery*, discusses team management of patients requiring orthodontic, endodontic, or restorative dental care. Here, the reader will find useful and practical information related to interdisciplinary care of the periodontal patient.

My sincerest thanks and appreciation to each author for making this volume a reality. Despite the substantial demands of time and talent these experts face on a daily basis, it is humbling to witness their dedication to their craft and willingness to share their knowledge and experience with others.

Chicago, IL, USA — Salvador Nares

Dedication and Acknowledgment

To Celia, my loving wife. As my late grandfather, Samuel said to me “Son, you hit the jackpot.” Thirty years later, I could not agree with him more. Her love, strength, patience, and understanding shine each and every day we spend together. I could not have asked for a better life companion. Here’s to another 30 years! To my precious daughters Monica, Marissa, and Melinda, gifts from Heaven. How quickly time passes, you’ve each grown into beautiful young ladies! You bring joy and energy and have enriched our lives more than you will ever know. To my parents Carmen and Ruben, who selflessly gave of themselves year after year for my brothers Ruben Jr. and Albert and me. Their smiles, hugs, wisdom, and sage advice are always welcomed and appreciated.

To Drs. Hallmon, Rees, and Iacopino whose patience, guidance, and discipline were and remain greatly appreciated. I could never repay them enough for all they did for me during my years of clinical and scientific training. Thank you.

To my current and former students and residents through the years. To quote Winston S. Churchill “We make a living by what we get. We make a life by what we give.” And although I thought I was the one “giving,” I was truly the one “receiving.” Thanks to these wonderful young women and men for the many smiles, trials, triumphs, and wonderful moments we have spent together. It has been my privilege to witness each of you blossom into talented clinicians and clinician-scientists. Our profession is in great hands going forward.

To all my friends and colleagues in the periodontal and scientific community, your dedication, passion, and ingenuity are truly inspirational.

Finally, I would like to thank the many gifted clinicians for their contributions in making this volume a reality.

Contents

Part I

Key Considerations of Periodontal Surgery

1 The Miller McEntire Periodontal Prognostic Index (i.e., "The Perio Report Card") Usage in Practice

Robert A. Levine and Preston Dallas (PD) Miller

1.1 Introduction

The Miller McEntire Periodontal Prognostic Index (MMPPI), which the authors like to term "the Perio Report Card," is a simple, powerful, evidenced-based, statistically validated, and accurate motivational tool [1] which can be used daily in clinical practice with all patients (Fig. 1.1). The current score sheet has undergone multiple modifications, and individual clinicians can make further modifications to suit their practice needs. Its usage is not limited to patients presenting with periodontitis but is routinely used with periodontally healthy patients which is reviewed below in Case #1. The *benefits to the patient* are that they better understand their long-term periodontal prognosis of 15 and 30 years. Accurate prognosis can be determined by scoring the most periodontally involved molar that you plan to keep. The strength of the MMPPI is that it translates clinical outcomes into patient value [2].

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Miller-McEntire Periodontal Prognosis Index

Tooth	#	#	#	#
Date				
Furcation				
Diabetes				
Mobility				
Probing Depth				
Molar Type				
Smoking				
Age				
TOTAL				
15 Year Prognosis				
30 Year Prognosis				

*Our goal is a score of < 5

Score	15 Year	30 Year	
1	98%	94%	Excellent
2	97%	93%	
3	96%	89%	
4	95%	85%	
5	93%	80%	Good
6	90%	74%	
7	86%	66%	
8	81%	56%	Guarded
9	75%	45%	
10	67%	33%	
11	53%	22%	

Statistically, a score under 4.3 means you should never lose a tooth to periodontal disease

Smoking increases your chance of losing teeth to periodontal disease by 246%

Furcation
None = 0
1 = 1
2 = 2
3 = 3
T-T = 3 "through & through"

A1C Levels
< 6 = 0
6.1 - 7.0 = 1
7.1 - 8.0 = 2
8.1 - 9.0 = 3
> 9.1 = 4

Mobility
None = 0
1 = 1
2 = 2
3 = 3

Probing (mm)
< 5 = 0
5 - 7 = 1
8 - 10 = 2
> 10 = 3

Molar Type
Mand = 0
Max 1st = 1
Max 2nd = 2

Smoking
Non-smoker = 0
Smoker = 4

Age
1 - 39 = 0
> 40 = 1

Keys to Success:

- Brush, floss, clean your teeth and tongue daily
- Complete recommended treatment
- Adhere to the recommended maintenance schedule
- Control your blood sugar (if diabetic)
- Stop smoking or at least cut back to under 5/day

Fig. 1.1 MMPPI (Miller, Levine, Fava 2017)

1.2 Objectives and Application

The *objectives* of using this index include:

- Motivating the patient to accept treatment, complete treatment, and make the patient aware of the importance of complying with periodontal maintenance [3–5] defined as the "Keys to Success."
- To simplify scoring so that the score can not only be determined by the dentist but also by trained auxiliaries. If performed by auxiliaries, it takes no chair time from the dentist. *To help to train staff easily to score patients, it is recommended to review in a scheduled team meeting on the MMPPI (Parts 1 and 2)*[1].
- To encourage patients to make lifestyle changes to improve their overall health**.** This would include smoking cessation and blood sugar control [6, 7].
- To empower the whole "team" (dentists, dental assistants, dental hygienists, and case presenters) in its use in helping patients to attain better periodontal and systemic health as we are the "physicians of the mouth."
- To encourage the patients to refer family and friends.

For a better understanding of clinical scoring, the reader is referred to online videos and resources (see Footnote 1). Since smoking was the most significant factor, there is a video on smoking cessation on this site. Smokers should also be referred to support services for in-depth counseling and assistance.[2]

For patients with diabetes mellitus or who are suspected of having diabetes mellitus, HbA1c values need to be evaluated. An in-office HbA1c testing kit should be readily available. If the patient has not been diagnosed with diabetes mellitus and the in-office HbA1c score is elevated, the patient should be referred to a physician for the diagnosis, as this is a medical diagnosis and not a dental diagnosis. By following these objectives, we can become more of a physician of the mouth rather than just simply performing traditional dental procedures [8–10].

Based on the study by Miller et al. [1], seven patient factors are highlighted to be scored that include (Fig. 1.1):

1. **Furcation involvement of the molar to be scored**:
   - none = 0,
   - 1 total furcation = 1 (does not matter if it is a Class 1, 2, or 3)
   - 2 total furcations = 2
   - T-T (through and through) furcation = 3

   (*Note: Typically when furcations are charted, the severity is noted,* i.e.*, Class 1, Class 2, and Class 3. This index only scores the number of furcations present, not the class or severity).*
2. **HbA1c levels:**
   - <6% =0
   - 6.1–7.0% = 1

[1] See https://pdmillerswebtextbook.com/.

[2] For smoking cessation help: call 1-800-QUITNOW (784-8669).

- 7.1–8.0% = 2
- 8.1–9.0% = 3
- >9.1% = 4

(Important note on scoring HbA1c: If the patient does not know their recent score, score the patient as a "2" until the patient's blood work is received. Using the MMPPI thus motivates the patient to better understand their HbA1c score and control their diabetes by lowering their blood sugar.)

3. **Mobility of the molar to be scored:**
   - none = 0,
   - 1 = 1
   - 2 = 2
   - 3 = 3 (tooth is depressible)
4. **Deepest probing depth in millimeters (mm) of the molar to be scored:**
   - <5 mm = 0
   - 5–7 mm = 1
   - 8–10 mm = 2
   - >10 mm = 3
5. **Molar type: 0–2:**
   - Mandibular molar = 0 (either a mandibular first or second molar is not significant)
   - Maxillary first molar = 1
   - Maxillary second molar = 2
6. **Smoking: either you smoke or do not smoke:**
   - non-smoker = 0,
   - smoker = 4,

   (Note: Of all categories scored, smoking was by far the most significant negative factor in determining periodontal prognosis. Using the Cox Hazard Ratio, statistically a score of 4 was assigned for smoking. The overall objective is to keep the MMPPI score below a 5. When the score is 5 or less, statistically patients never lose teeth to periodontal disease [1]*. For example, if a smoker has a score of 9, they have a 75% chance of keeping their teeth for 15 years (Fig. 1.1). If the patient stops smoking, the score becomes a 5, and they will have a 93% chance of keeping their teeth for 15 years (Fig. 1.1). While immediate cessation is desired, many patients will only stop smoking over a period of time (see online video on smoking cessation))* (see Footnote 1).
7. ***Age has a minimal and limited factor on periodontal long-term prognosis:***
   - 1–39 years of age = 0
   - 40 or > years of age = 1

Scoring and prognosis: our clinical posttreatment "target" goal is an MMPPI score of < 5:

- Score of 1 to 4 has an "excellent" prognosis
- Score of 5 to 8 has a "good" prognosis
- Score of 9 to 11 or greater has a "guarded" prognosis.

1.2.1 **Keys to Success** (Bottom Right of Fig. 1.1)

It is important to realize that the keys to success are not a promise of success but a guideline that allows the patient to succeed. All of these keys are the responsibility of the patient and if followed will produce a long-term favorable outcome. Until recently, the importance of cleaning the tongue has not been emphasized. Ninety-five percent of the bacteria left after brushing and interdental cleaning are on the posterior third of the tongue. It is impossible to remove these bacteria with a toothbrush without causing the patient to gag. To achieve this, a metal tongue scraper is required. For proper technique, view the online video on the importance of cleaning your tongue (see Footnote 1). For more information on how to further disinfect the mouth, an online video is available on the most effective, least expensive mouthwash (see Footnote 1).

Emphasizing the keys to success is an integral part of the initial examination. The goal/objective of getting to an MMPPI score of <5 does not happen without complying with all 5 of the keys to success (Fig. 1.1). If at periodontal maintenance the MMPPI score is elevated, the keys to success need to be reviewed to see in what area the patient is not compliant. For example, has the patient started smoking again?

Important Note on "Keys to Success": *As indicated in the title, this index is a periodontal report card. To further motivate the patient at the initial exam, taking a moment to give the patient a posttreatment target score has been found to be particularly motivational. The mnemonic phrase "If you want to keep your teeth alive, keep your MMPPI score below a 5" summarizes in lay-terms the objective of the target score. The patient should be scored at each maintenance appointment. Scoring even healthy patients demonstrates to the patient your concern for their overall oral health and reinforces the importance of periodontal maintenance in keeping their MMPPI stable. Thus the patient is more likely to accept aesthetically enhancing procedures such as veneers or periodontal plastic surgery. Although periodontal disease is a major cause of tooth loss, caries remains a significant factor, especially with the rising incidence of root caries. Today patients are on many more medications than in the past. Many of these medications cause dry mouth* (i.e., *medication-induced xerostomia, MIX), which is a major cause of root caries.*

1.3 Case Examples

1.3.1 Clinical Case Example #1: Using the MMPPI in a Periodontally Healthy Patient (Amy: MMPPI Score at Initial Exam = 1): See Figs. 1.2, 1.3, 1.4 and 1.5

Amy presents to our periodontal practice (RAL) as a healthy (HbA1c <6% = 0) non-smoking (non-smoker = 0) 32-year-old female (age < 39 = 0) and a history of good compliance to preventative periodontal care at every 6 months frequency with her

Fig. 1.2 Case #1: patient presents upon referral as a 32-year-old healthy, non-smoker for periodontal plastic surgery for root coverage #24 and 25. Surgical treatment performed by Dr. Robert Levine

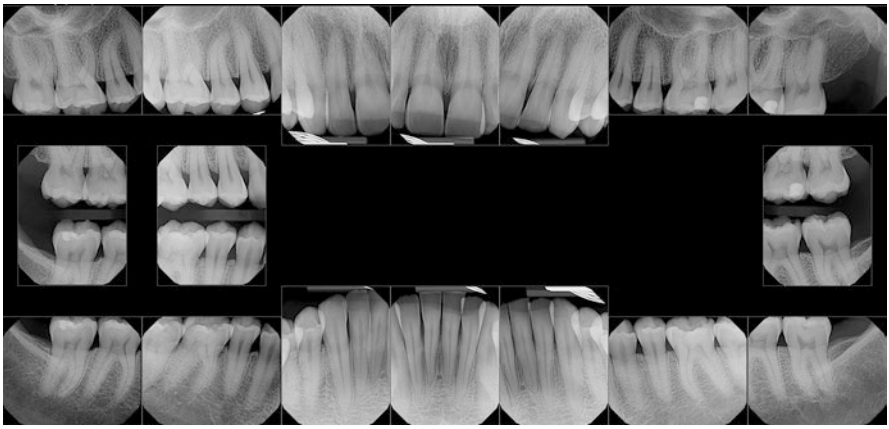

Fig. 1.3 Case #1: FMX

restorative dentist. She was referred for periodontal plastic surgery for root coverage #24 (Miller Class 2) and #25 (Miller Class 1) [11–16] (Figs. 1.2 and 1.3). A complete periodontal charting was completed as part of the initial periodontal examination including probing depths, mobility of teeth, gingival recession, and occlusion. The summary of this visit is noted in her MMPPI that was reviewed "knee-to-knee and eye-to-eye" with her (Fig. 1.4). Her deepest periodontal probing depth was 4 mm on the distal of #3 (see Fig. 1.1: probing mm <5 mm = 0) with light bleeding upon probing. The scored tooth #3 had no mobility (zero mobility = 0), and a total MMPPI score was recorded as 1 (15-year periodontal prognosis of 98% and 30-year periodontal prognosis of 94%). As noted prior, the 15- and 30-year periodontal prognosis advised the patient of an excellent long- term prognosis of not losing her teeth *due to periodontal disease*. However, there is still the possibility of losing these two teeth due to continued attachment loss, root caries, and its sequela. The use of the MMPPI in Amy's case is *highly motivational for four reasons*: she leaves the initial visit with our office with positive news on her overall case