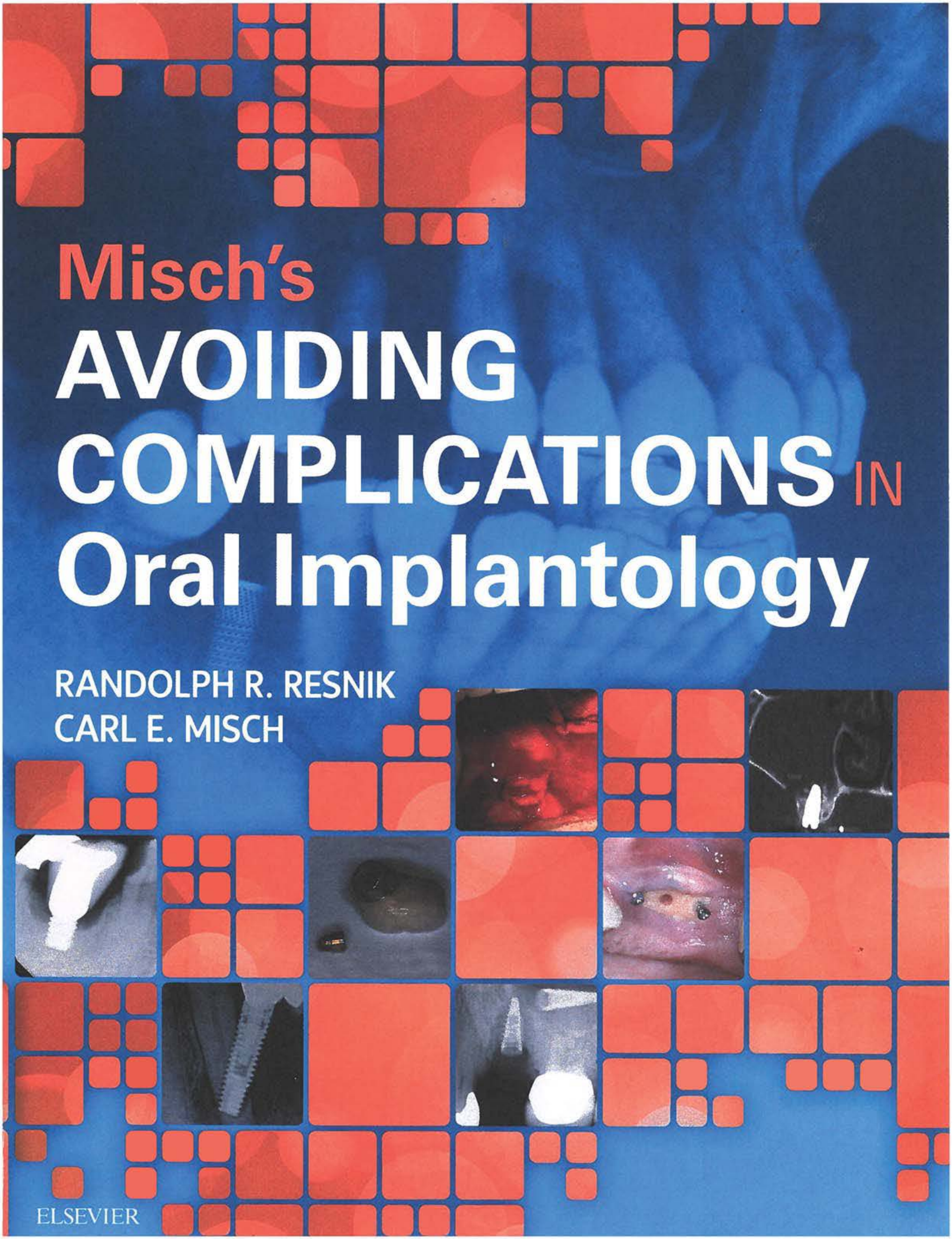

Misch's AVOIDING COMPLICATIONS IN Oral Implantology

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BOX 18.4 Treatment of Peri-Implant Mucositis/Peri-Implantitis

Patient Self-Administered Mechanical and/or Chemical Plaque Control

Toothbrushes
Toothpastes
Antimicrobial rinses/flossing/oral irrigators
Topical application of gel
Systemic antibiotics
Probiotic *Lactobacillus reuteri*–containing tablets

Professional Nonsurgical

Mechanical plaque control
- Hand instruments
- Powered instruments

Chemical plaque control
- Local delivery of antibiotics
- Chlorhexidine
- Phosphoric acid
- Ozone, oxygen, and saline solution

Mucogingival
Prostheses

Peri-Implantitis

Nonsurgical

Different mechanical instruments
- Nonmetal instruments
- Rubber cups
- Air abrasive
- Metal instruments
- Burs

Adjunctive treatments
- Microbiologic test
- Local antimicrobials
- Systemic antimicrobials

Disinfect titanium surfaces
- Antiseptics
- Air polishing
- Laser

Mucogingival
Prostheses

Peri-Implantitis

Surgical

- Animal studies
- Open flap debridement
- Surface decontamination
- Regenerative approach
  - Biologics
  - Guided tissue regeneration
  - Guided bone regeneration

Human studies
- Systemic antibiotics
- Access surgery
- Resective surgery
- Regeneration surgery

Retrograde Peri-Implantitis

Maintenance and Prevention

Patient self-administered preventive regimens
Supportive periodontal therapy/maintenance (professionally)
- Mechanical nonsurgical therapy
- Mucogingival
- Prostheses

Nonsurgical Management of Peri-Implantitis

Whereas the nonsurgical treatment of peri-mucositis is often successful, the nonsurgical treatment for peri-implantitis has a questionable efficacy. This is most likely due to the inability to remove the bacterial biofilm from the exposed implant surface. Usually this is more significant when the implant design involves a rough surface.[140]

The nonsurgical treatment of peri-implantitis usually involves the debridement and detoxification of implant surfaces, similar to the treatment of peri-mucositis. However, the issue that arises is that these exposed surfaces usually have concurrent subgingival pockets.

Low-Abrasive Amino Acid Glycine Powder. Low-abrasive amino acid glycine powder has been shown to be an effective treatment for removing biofilm without damaging the implant surface, hard, and soft tissues. This technique uses a special handpiece with a plastic tube nozzle with three orthogonally oriented holes. An air-powder mixture with reduced pressure is expelled through the nozzle, which prevents the formation of air emphysema complications. The nozzle is moved in a circumferential movement around the implant surface.[141]

Although more extensive studies need to be conducted as to technique efficacy, glycine powder can be incorporated into a treatment regimen. The clinician should be careful to use the powder only in areas where access is available and a posttreatment rinse can remove any residue. This modality is best utilized in cases with buccal dehiscence and or horizontal bone loss without crater or infrabony pocketing. Hu-Friedy/EMS produces a device that can be used to effectively dispense glycine air-powder mixtures (Fig. 18.35).

Ultrasonic Devices. When used for treatment of peri-implantitis, tip modifications (i.e., carbon fiber, silicone, or plastic) must be made. Care must be exercised to not use metal tips because they may alter the implant surface.

Ultrasonic devices should be used only when a plastic tip is available. Irrigation and meticulous cleaning is recommended in treatment for either open flap debridement or closed flap irrigation.

Laser. The use of lasers is becoming a more recognized treatment for peri-implantitis. Although there are many varieties of different wavelength lasers and each serves different type of purposes, only Nd:YAG laser has been showing promise.

FIG 18.35 Low-abrasive powder. Hu-Friedy glycine powder jet used to debride titanium implant surfaces.

The American Academy of Periodontology (AAP) has continued to express reservations on use of lasers in treatment of peri-implantitis disease. There is minimal evidence to support any lasers as the lone treatment modality, although the Er:YAG laser has been shown to be effective for root debridement by assisting calculus removal and reducing endotoxin.[142] It is important to note that the Er:Yag is a hard tissue laser and it is rather damaging when used on implant surfaces without careful monitoring. The damaging effect that accompanies the use of such lasers does not warrant recommendation.

Invariably, more studies are starting to gravitate toward the regeneration capability of the Nd:YAG laser. Nicholson et al published very promising results of visible osseous regeneration around failing implants.[143] In 2016, the FDA awarded clearance for the Nd:YAG LANAP Protocol for periodontal regeneration (FDA Clearance 510 (k) 151763). The LANAP Protocol results in the "true regeneration of the attachment apparatus (new cementum, new periodontal ligament, and new alveolar bone)" on previously diseased root surfaces. A companion protocol, LAPIP, may be used to address mild to moderate peri-implantitis.[143a] (Fig. 18.36).

Treatment procedure. If the clinician desires to use lasers, the first step is to verify with manufacturer whether the specific brand of lasers under consideration is suitable for implant use or not (e.g., Er-YAG hard tissue lasers are contraindicated for dental implant use). Further, a detailed treatment sequence should be acquired from the manufacturer. Each laser has various settings, different heat dispersions, and other limitations.

In general, the goal of the use of a laser is to detoxify the implant surface, being careful to not produce heat that may damage the integration of the implant.

Mild peri-implantitis. Without flap exposure, the laser may be used to perform a sulcular incision-like action around implant collar (i.e., neck). Specific soft tissue lasers are able to ablate diseased tissue around implants and create access for use with curettes.

Advanced peri-implantitis (crestal bone loss exceed 3 mm or requiring access). A sulcular incision is made around the implant (one tooth mesial to one tooth distal). A full-thickness flap is reflected, exposing the implant surface. Debridement of the implant surface is performed initially with curettes or titanium brush. The surface is irrigated with 40% citric acid, 17% EDTA (ethyl-diamine tetra acetic acid), and/or choice of antimicrobial agent. Laser settings are specific to each individual laser according to manufacturer protocol. Care should be exercised to cover all exposed surfaces (i.e., each exposed thread) for the detoxification process. Use of regenerative material (allograft and extended resorbable membrane) is highly recommended. Tissues are modified and sutured to reapproximate tissue for tension-free primary closure. The Nd:YAG LANAP Protocol (discussed earlier) can also be used with advanced peri-implantitis. In addition, there are also rescue approaches which combine laser and surgical therapies.

Note: It is critical to limit time exposure of the implant surface with the laser application to avoid overheating or charring. This may increase implant morbidity and possibly lead to premature loss of the implant due to bone disintegration.

Surgical Management of Peri-Implantitis

Though nonsurgical treatment of peri-implantitis may be effective in some cases, the majority of cases require a more invasive approach to ensure an effective treatment outcome. There are various surgical techniques to treat peri-implantitis, depending on the final objective (Fig. 18.37)[144]:

- Access flap: for cleaning and decontamination of implants with pus, heavy bleeding, or with evidence of probing or craterlike radiographic bone loss.
- Regenerative procedures: provides access for cleaning, plus regeneration procedures for deep crater defects past the first thread of nonmobile implants.
- Apically positioned flap: provides access for cleaning and decontamination, and is used for implants showing generalized horizontal bone loss past first thread.

Access Flap. This surgical technique is used to maintain the soft tissues around the implant with the goal of decontamination (Fig. 18.38). A sulcular incision is made around the implant and extends at least one tooth mesial and one tooth distal on both the buccal and palatal/lingual side. This allows the clinician to have proper visualization and access for the next step. A full-thickness flap reflection is performed to gain access to the implant and bone surface. Although it is desirable to minimize the incision on healthy tissue, if access is inadequate, a vertical incision may be included to gain further access. Degranulation can be completed with curettes, specialized titanium brushes with an implant handpiece, and/or a glycine polishing handpiece. Along with mechanical decontamination, a chemical decontamination process should be followed, using compounds such as doxycycline or citric acid. The flaps are then reapproximated in their original position using a horizontal mattress suture,