Risk Factors in Implant Dentistry:
Simplified Clinical Analysis for Predictable Treatment, Second Edition

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Foreword

The number of books written about oral implantology has increased considerably in recent years. This fact demonstrates the importance of implantology within the field of dentistry. Today, implant dentistry is the fastest developing discipline in this field. It certainly takes great effort to keep abreast of all new developments and maintain an adequate overview of all the innovations, particularly for those who wish to gain adequate knowledge of any innovations in the context of their education or continued training as well as for the professionals in charge of organizing this education and training.

Books that are published for dentists usually fall into one of the following categories: those with a scientific bias; those intended for the practical clinician; and textbooks intended for university education and training. Some books provide a general overview on the overall spectrum of dentistry, while others cover only specialized fields or details or are simply intended as illustrated textbooks. The target group of readers for all these types of books includes either those interested in scientific developments or university colleagues, clinicians, and students. Generally, the information provided to those who are not part of this select target group is rather scarce.

It is very rare that authors succeed in devising a book that is actually rewarding to read and recommendable to anyone interested in implant dentistry. As readers will discover, this can happen when an implantologist with a wealth of experience joins forces with a scientifically renowned colleague to publish a book in a cooperative effort. Obviously, this concept has been successful for the book you are about to read; the results certainly are impressive, not only for students or clinicians but also for readers with a more research-related bias.

As in the first edition, the authors have relied on their well-proven checklist system to ensure that any essential aspect of modern, recognized implant dentistry is covered. Innovations are discussed in the same manner as traditional and well-proven concepts. The result is a comprehensive and clear-cut clinical guide for anyone interested in implants.

The book is easy to read for specialists, but it is also very accessible to anyone who is not an expert in one of the special fields discussed. Even those without any clinical experience in implants will be provided with a guide on how to succeed in this highly developed field at the beginning of their clinical practice. It provides clear-cut, step-by-step descriptions of clinical procedures—ranging from simple implantation to difficult and complex cases—so that these techniques are easy to understand and to implement. As passionate hobby pilots, the authors have applied their experience with checklists to implant dentistry in this book.

I would like to cordially congratulate the authors on their general and in-depth knowledge and experience as well as on this well-conceived and perfectly implemented treatise on the phenomenon of oral implants. I recommend that all those interested in dental implants read this book. All readers can be assured to profit from the contents, regardless of their personal level of knowledge.

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Introduction

The Human Factor

All medical decisions are made according to a treatment plan that is designed to improve or restore function and/or esthetics.

Treatment must be the result of a diagnosis. From an etymologic perspective, diagnosis means identifying a disease according to its symptoms; therapeutic treatment can be proposed only after a diagnosis is established. Treatment comprises a consistent group of actions and practices aimed at curing the disease. In implant dentistry, treatment is aimed not at curing a disease per se, but rather at restoring masticatory function and/or esthetics. The concept of diagnosis has been extended to encompass this type of treatment.

Treatment planning in dentistry is a daily task: the clinician defines a goal as well as the means to be used to achieve it. All treatment planning is based on a diagnosis that is derived from clinical examination. This examination is not administered at random; it follows a logical sequence. After listening to the patient’s requests and discussing the treatment objectives, the clinician:

1. Performs a clinical examination.
2. Defines the objective.
3. Identifies risk factors.
4. Assesses treatment difficulty.
5. Establishes a treatment plan.
6. Determines the means of accomplishing the objective.

The clinical examination must be adapted to the complexity of the initial medical situation. It is therefore necessary to organize the time spent in the initial examination as well as to determine the number of additional tests to be ordered.

Diagnosis that is not followed by appropriate treatment is useless.

Completion of myriad clinical, biologic, and radiographic examinations is simply a waste of time and energy if they do not significantly improve the quality of treatment. Retrospective examination of a large number of clinical cases has shown that most complications or failures are the result of an accumulation of diagnostic errors that eventually lead to one or more technical errors. For example, focusing on the suspicion of an apical lesion in a tooth adjacent to an edentulous gap rather than detecting a pronounced lingual concavity to the alveolar ridge may have serious consequences.

A reliable clinical examination depends on the systematic assessment of a number of parameters that are simple to evaluate.

The best illustration of this statement can be found in aeronautics. Before the pilot of a small private plane or commercial aircraft can take off, he or she must go through a checklist that is used at all times during the flight. This checklist must:

1. Take into account all vital parameters. Only one parameter marked “yellow” (proceed with caution) or “red” (danger) will delay, cancel, or divert the flight.
2. Be exhaustive to minimize any risk of breakdown.
3. Be concise enough to be followed systematically.

Aeronautic experts have spent a lot of time developing checklists that fulfill these criteria. Airline pilots are judged on their capacity to understand the difference between “nice to know” and “need to know” parameters. Therefore,
it is more important to verify that there is fuel in the tank than to check the compression ratio of the engine cylinders. (In 1999, 16 people died during a tourist flight in France because the airplane lacked sufficient fuel, according to statistics from the Bureau d’Enquêtes et d’Analyses [2001].)

A good pilot is one who has performed as many landings as takeoffs. Error-free procedures do not exist, in aviation or implant dentistry. Just as the checklist examination before flight departure allows the pilot to diagnose the reliability of the aircraft, the presurgical assessment evaluates the treatment prognosis with minimum risk. The first objective of clinical examination is to prevent unqualified candidates from receiving implant treatment.

The therapeutic procedure in implant dentistry must have the same goal, corresponding to the following principles:

1. Assessment involves systematic evaluation of specific predetermined parameters.
2. If all predetermined parameters are marked “green” (acceptable), the case is feasible, even if the margin of error cannot be completely eliminated.
3. If a parameter is marked “yellow” or “red,” treatment is postponed and the examination continues to the next level of complexity.

The simpler the assessment parameters are, the smaller the risk of misinterpreting them.

It is not feasible to systematically make casts of every patient’s dentition to check occlusion in an articulator. It is a waste of time, money, and energy. While focusing on the occlusion of an articulated cast, the specialist is likely to overlook a problem in another area of diagnosis (eg, periodontics, technical and esthetic feasibility). However, the detection of significant abrasion associated with a history of dental and/or prosthetic fracture may alert the specialist to continue occlusion examination to the next level of complexity.

Today, the greatest cause of mortality around the world is diagnostic error rather than disease such as cancer or diabetes.

A checklist approach may seem reductive since it leaves little room for clinical experience; however, specialists are their own worst enemies, and most failures are related to human error. The less human intervention in the decision-making process, the more reliable this process will be.

In general aviation, 80% of air crashes are caused by human error, not by technical problems. Analysis of large transport aircraft accidents has sometimes revealed gross stupidity as the primary accident cause. A pilot with an overweening self-confidence who refuses to admit an error (even when faced with the obvious), or problems of communication between the pilot and the copilot are among the many elements that contribute to the risk of air crashes.

Stress is obviously a powerful catalyst for failure. For example, the pilot of a private plane gets lost. After the gas gauge’s red light comes on indicating low fuel, the pilot eventually finds the airport and lands . . . without having activated the landing gear. The more stress a person is under, the less possibility there is for reflection. This is why, over time, special procedures have been developed to take these human factors into account. Checklists continue to be one of the essential tools to prevent human error, whether the error is of knowledge by the novice practitioner or of execution by the experienced practitioner.

A patient treated by a practitioner who is too optimistic is a patient at risk!

The objective of the checklist is not to establish a diagnosis but to help make the clinical examination as complete as possible and to identify all risk factors. The objective of this book is to provide a series of checklists that will make the practice of implant dentistry more predictable.
CHAPTER 2

Esthetic Risk Factors

Gingival Risk Factors
- Smile line
- Gingiva quality
- Papilla of adjacent teeth
- Dental risk factors
- Type of interdental contact
- Position of interdental contact point

Osseous and Implant Risk Factors
- Buccal concavity
- Adjacent implants
- Vertical bone resorption
- Proximal bony peaks

Patient-Dependent Factors
- Esthetic demands
- Hygiene quality
- Provisional restoration

Practioner-Dependent Factors
- Checklist for Edentulism in the Maxillary Anterior Quadrant
- Test Your Knowledge
SURGICAL CONCEPT

The use of a precise surgical guide is recommended (Fig 4-6).

Fig 4-6 Same patient as Figs 4-1a to 4-1d. A precise surgical guide is valuable to the surgeon during implant placement. The maxillary left central incisor is fabricated from resin mixed with amalgam powder, which makes it possible to visualize the tooth profile in the radiographs.

CLINICAL CONCEPT

The implant should be placed in an ideal position in all three dimensions. (Figs 4-2 to 4-5).

Figs 4-2 to 4-5

Fig 4-2 The implant head must be placed 2 to 3 mm below the cementoenamel junction.

Fig 4-3 The implant must be placed in the crown envelope.

Fig 4-4 If the implant axis is palatal to the incisal edge, a screw-retained prosthesis is viable.

Fig 4-5 If the axis is labial, a restoration on a customized abutment should be considered.
**TECHNICAL CONCEPT**

Procera abutments may be indicated to improve the quality and stability of the esthetic result by providing optimal prosthetic contours at the gingival level (Figs 4-7 to 4-9).

![Figures 4-7 to 4-9](image)

*The Procera system is a process of computer-aided design that makes it possible to optimize the esthetic result of the prosthetic restorations.*

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**CLINICAL CONCEPT**

The morphology of the crown and the abutment must support the soft tissues. Tulip-shaped contours should be avoided (Figs 4-10a and 4-10b).

![Figures 4-10a and 4-10b](image)

*Fig. 4-10a* Provisional crown. The emergence profile makes it possible to support soft tissues and, therefore, to guide the gingival healing.

*Fig. 4-10b* The crown has a tulip-shaped profile. This morphology generally results in collapse of soft tissues and recession of the gingiva around the implants.

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**Alternative implant solution**

A narrow-platform implant may be used if the mesiodistal width of the incisor is less than 7 mm.