

Zoran Stajčić

Atlas of Implant Dentistry and Tooth- Preserving Surgery



Prevention and
Management
of Complications

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To my loving wife and companion, Ljiljana, for sustained support and encouragement and my daughters, Nevena, Mina and Vladica, for their devotion and understanding.

Foreword I

This is a publication that aims to expand a dental clinician's view beyond simply a further contribution to the knowledge and understanding on the replacement of teeth using implant dentistry. A comprehensive text, it provides a significant contribution in detail and topic coverage extending well beyond what the title would lead the reader to expect.

Professor Stajcic has collected a vast and detailed volume of clinical and scientific material in text, complimented with an equally vast collection of clinical images and illustrations. This is further enhanced by electronic links to a range of video recordings of actual clinical procedures, to present an atlas reflecting his extensive surgical expertise. This level of expertise has been acquired after formal training and several decades of clinical patient management. This offers the reader a unique combination of information on both implant dentistry (ID) and tooth-preserving surgery (TPS).

The author's philosophical approach to patient care reflects his stated belief that knowledge gained through appropriate formal training and the development of expertise through experience with careful and critically evaluated documentation and review of outcomes are required to reach the most appropriate treatment plan. Next is to have the skill to execute the required clinical (surgical) procedures in a manner to create the desired outcome whilst limiting morbidity and unwanted post-operative sequelae. This is eloquently stated in the first chapter, in the discussion of complications related to the surgeon: "Performing new procedures on humans without previous experience or knowledge can be regarded as an 'experimental', unethical action, which can be very costly because if anything goes wrong there are no legal or professional means to defend oneself".

For the less experienced surgically trained reader, or general dentist with some knowledge and understanding of dental surgical procedures, the entire second chapter extensively discusses surgical procedures related to both ID and TPS. This extends to a comprehensive discussion of the "Common Obstacles" that may be encountered. It is this extension of the text, enhanced by the clinical images, that brings the extent of the experience and acquired expertise of the author to the reader. This truly defines the value of the contribution of this work to the provision of dental care in this field.

The complications and failures related to implant dentistry are well categorized (biological, mechanical, prosthetic and non-implant related) and discussed. Not only does Professor Stajcic provide sufficient information for the pre-operative evaluation of the patient to assist in the avoidance of a complication, but in addition often provides detailed and systematic operative steps to manage the complication. It is well recognized in the literature that often a surgically derived complication can precipitate a considerably less than ideal ultimate restorative outcome. As I am a prosthodontist with some knowledge and understanding, but devoid of expertise of the surgical elements, the information is born of wisdom and insight that only an experienced surgeon can offer.

Of equal merit is the comprehensive discussion around the re-visitation of TPS. Such an analysis of multiple clinical presentations is often reserved for publications limited to this topic alone. There are detailed technical descriptions of surgical technique, clearly from an extremely experienced surgeon who has developed expertise from years of careful and critical evaluation of the documented outcomes of his own procedures and techniques.

A concise yet practical summary of the decision between TPS and extraction and ID is found within the statement: “If the natural tooth has a favourable prognosis for more than 10 years, it should be included in the treatment plan. A less than 5-year prognosis despite restorative or periodontal therapy justifies extraction of the tooth and implant placement”.

Emphasis on the SAC classification – stressing the importance of a recognition of the required level of competence and the clear educational directive to utilize the assistance of colleagues, where the clinical or procedural challenge is likely to exceed the primary operator’s competence, is found throughout this text. I support the author’s assertion that many professional colleagues, even with considerable experience, would be well advised to heed this advice.

And in the most outstanding summary of a text I have had read, encompassing both the author’s ethical and professional positions on knowledge, communication and professionalism in appropriate patient management, Professor Stajcic challenges the reader: “The best management of a complication is to avoid it. You cannot avoid something you do not know it exists. What would get you into difficulty is that what you don’t know”.

I commend this practical atlas – a record of a significant body of clinical work, carefully documented, analytically evaluated and scientifically supported.

Glen Iris, Australia

Dr. Anthony J. Dickinson, OAM, BDS, MSD, FRACDS

Foreword II

I read with pleasure this work by Professor Stajčić because every sentence reveals the great experience of the author, who, during his career, has been confronted with all kinds of surgical problems, complications and failures. This degree of experience makes this atlas so trustworthy and the knowledge disclosed so authentic.

This atlas depicts every detail in the field of ambulatory implant dentistry and oral surgery; one example, among many others, is the description of no fewer than 18 different flaps and their indications. No subject is overlooked; for instance, the delicate handling of the maxillary sinus subjected to the Caldwell-Luc procedure and lined by scarring tissue is one of several subjects which are neglected in other works of this kind.

Not only established treatment methods but also novel techniques developed by the author are presented in a systematic and understandable way. Another attractive feature of this book is the very instructive video presentations of special interventions available in the YouTube and/or specially designed website, which facilitates the learning process because surgery is also a visual art.

I personally know how much work is required to create a surgical book such as this: when, together with Dr. Gian Pajarola, I wrote the *Atlas of Oral Surgery* (Thieme 1996), it took 4 years. In the meantime, 20 years have elapsed, and in implant surgery, for example, significantly wider experiences have been gained. Professor Stajčić has integrated from our atlas the SAC Classification, which obviously is still a helpful instrument to evaluate a surgical situation and avoid complications.

This book on implant dentistry and oral surgery is a delight to read, and I can wholeheartedly recommend it to all professionals, including experienced oral surgeons.

Zurich, Switzerland

Professor Hermann Sailer

Preface

This atlas is written for dentists involved in outpatient implant dentistry and oral surgery, particularly to implant surgeons originating from general dentistry or non-surgical specialities who are confronted with basic surgical manoeuvres such as designing and raising the mucoperiosteal flap or suturing techniques. However, even oral and maxillofacial surgeons may find the description of innovative techniques or manoeuvres of interest, especially those related to marsupialisation technique, the selection of incision and flap design, sinus floor elevation technique with the existence of maxillary sinus mucosa lesions, as well as the comprehensive approach to the removal of failing implants and the management of peri-implantitis.

This text compares the two disciplines of dental implant surgery and tooth-preserving surgery with respect to procedures, problems, and failures and provides guidance on the prevention and management of complications. While the predictability, functionality and durability of dental implants make them an attractive option, complications can arise at any stage of treatment. In this atlas, the aetiology of a wide variety of complications and failures in surgical implant dentistry is described. Both implant-related and non-implant-related complications are considered, with advice on avoidance and management. Since many complications have their roots in oral and periodontal surgical manoeuvres, also relevant to tooth-preserving surgery, these manoeuvres are themselves discussed and extensively illustrated. To make the entire project livelier, a substantial number of references are listed, quoting video material presented in the form of video clips on the YouTube, similar to reading abstracts in the PubMed. Entire videos can be found in the specially created website for that purpose.

Tooth-preserving surgery, which should be considered prior to the placement of an implant, entails the use of surgical procedures for the treatment of diseased teeth that cannot be treated by routine conservative measures. The most frequently used tooth preservation procedures are fully described, with emphasis on correct surgical technique as a means to avoid complications and failures both in the intraoperative period and in the postoperative period. The use of these procedures is constantly weighed against the effects of tooth removal and insertion of dental implants.

This text is divided into four chapters. The first two chapters are devoted to common topics amenable to both disciplines: implant dentistry and tooth-preserving surgery. The aetiology of complications and failures is described as dental surgeon related, patient related and instrument/equipment related. The second chapter talks about common measures and common obstacles in implant dentistry and tooth-preserving surgery as parameters of significant importance to be respected when planning such surgical procedures with emphasis on the preventive measures taken to counteract possible complications. Common measures are related to surgical access, selection of incisions and flap design, selection of needles and suturing materials, medicinal treatment as well as supportive steps. Anatomical structures, such as the maxillary sinus, the nose, the peripheral nerves, the neighbouring teeth as well as the soft and hard tissue conditions that may interfere with the execution of surgical procedures are described in the subchapter Common Obstacles. *Clinical observations, recommendations, or comments referring to preventive measures are given in italics throughout the entire text, to be distinctive and easily found by the reader.*

Complications and failures related to implant dentistry are described in the third chapter. The management of implant-related complications is described in detail, and protocols are given for the successful treatment of peri-implant infections and the removal of failing implants. Chapter 4: “Tooth-Preserving Surgery Revisited” throws more light onto the procedures that are still successful in the treatment of diseased teeth. This is particularly important for implant surgeons who tend to disregard this fact and are more prone to place an implant instead of treating the tooth with long-term results that can match those achieved with dental implants.

I sincerely hope this atlas will offer readers the professional achievement and pleasure that I have been experiencing by performing surgery and collecting the material for this text. Since I have been privileged to be taught by many masters willing to devote their time and competence, my mission of the educator is fulfilled if I am able to reciprocate this valuable gift together with my own expertise.

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Sincere gratitude to my teachers and senior colleagues who taught me well how to observe and act in an emergency or difficult situation, and to my students and followers who inspired me to make a step forward at each complex case. Acknowledgements to my colleagues, referring dentists and doctors who trusted in my judgement and expertise as well as to our patients with complications whose confidence in our teamwork approach has been overwhelming. Special thanks to the members of my team, particularly to Dr. Marko Rodić who all endured the pressure I generated during the creation of this atlas.

Abbreviations

ABP	Autogenous bone particles
CBCT	Cone beam computerised tomography
CM	Collagen membrane
CT	Computerised tomography
CTG	Connective tissue graft
CFM	Ceramic fused to metal
CFZ	Ceramic fused to zirconia
DBBM	Deproteinised bovine bone mineral
ePTFE	Expanded polytetrafluoroethylene
ENT	Ear, nose and throat
FCC	Full ceramic crown
FDP	Fixed dental prosthesis
GBR	Guided bone regeneration
HBSS	Hank's balanced salt solution
ID	Implant dentistry
MTA	Mineral trioxide aggregate
MPF	Mucoperiosteal flap
OCG	Oxidised cellulose gauze
OPG	Orthopantomography
PTFE	Non-expanded polytetrafluoroethylene
SAC	Classification of the complexity of surgical procedures
<S>	Simple
<A>	Advanced
<C>	Complex
SFE	Sinus floor elevation
TPS	Tooth-preserving surgery
3HP	3% Hydrogen peroxidase

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A complication in its broadest sense can be defined as an infrequent and unfavourable evolution of a medical/dental treatment or as a circumstance/difficulty that complicates the outcome in implant dentistry (ID)/tooth-preserving surgery (TPS).

1.1 Dental Surgeon-Related Complications

With regard to ID/TPS, the dental surgeon as well as his/her assistant or personnel can be associated with complications of variable severity that reflect insufficient knowledge, inexperience, lack of surgical skills, disregard of established protocols as well as surgeon's mistakes.

1.1.1 Insufficient Knowledge

Knowledge in general can be described as a familiarity with someone or something, which can include facts, information, description or skills acquired through experience or education. It can refer to theoretical or practical understanding of a subject.

As far as ID/TPS are concerned, it is unlikely that a dental surgeon would consider these surgical procedures without overall knowledge about them. Insufficient knowledge as causative factor of complications and failures, however, mostly refers to the lack of information on the behaviour of certain materials applied and the reaction of host tissues to them or to specific manoeuvres within the surgical procedure. This factor can play a role both in novice and very experienced surgeons.

The former can fall into the trap after the completion of, for example, a successful 3-day practical dental implant course acquiring sound information on many aspects of ID that, unfortunately, implies knowledge of basic surgical techniques normally acquired either by specialist training in oral and maxillofacial surgery or periodontology or on other courses designed for that purpose. Dental surgeons without such knowledge may find it extremely difficult to apply a tension-free

closure of operative site that has been augmented which ultimately leads to wound dehiscence and subsequent complications. The latter, with all their surgical experience, skill and expertise, such as maxillofacial surgeons, may disregard the fact that, for example, if the sinus floor was augmented using deproteinised bovine bone mineral (DBBM) only, dental implants inserted after 6 instead of 8 months might well fail.

The remedy for insufficient knowledge as an etiological factor of complications has always been continued education despite the wisdom and surgical skill of experienced surgeons and eagerness and the drive of novice ones.

1.1.2 Inexperience

Should a dental surgeon decide to commence a procedure without being exposed to it either as an observer in clinical setting or surgical assistant, or without having done something similar, it can be regarded as irrational bravery since there is little room left for pioneers in ID and TPS nowadays.

It is well known that there is no substitute for experience. Neither knowledge nor skill can counteract inexperience. This implies that novice dental surgeons involved in ID and/or TPS are very unlikely to introduce new surgical procedures in their armamentarium performing them safely simply by watching YouTube or reading a book. Even with experience in certain procedures, such as single-tooth implant replacement or apicoectomy on single-rooted upper anterior teeth, *one needs, in order to perform procedures such as full dental arch implant reconstruction or apicoectomy on molars with retrograde root filling, to be exposed to them "live" either by observing, assisting or performing it under the guidance of a senior, more experienced colleague.*

1.1.3 Lack of Surgical Skill

Those who complete well-structured university training programmes in surgical dental disciplines are rewarded with