

Sandro Siervo

SUTURING TECHNIQUES IN ORAL SURGERY

illustrations by Luisa Lorenzini



Quintessenza Edizioni S.r.l.

Milano, Berlino, Chicago, Tokyo, Barcellona, Istanbul, Londra, Mosca,
Nuova Delhi, Parigi, Pechino, Praga,
San Paolo, Seul, Varsavia

Contents

Surgical wounds	2
• Introduction	3
• Tissue healing: general considerations and clinical aspects	4
• Tissue healing: cellular and molecular mechanisms	11
<i>The physiology of wound healing: an overview</i>	11
<i>Inflammatory phase (days 0–3)</i>	12
<i>Proliferation or fibroblast phase (days 3–12)</i>	14
<i>The remodeling phase (days 6–14)</i>	15
<i>Wound healing: peculiarities of the gastroenteric tract</i>	16
<i>The role of growth factors in tissue healing</i>	17
<i>Sepsis and scar formation</i>	18
<i>Treatment of infected surgical wounds</i>	20
<i>Use of growth factors in clinical practice</i>	20
<i>The role of integrins in re-epithelialization</i>	23
• Classification of wounds	25
• Tissue reactions to sutures	27

Technological aspects **34**

• <i>Suture needles</i>	35
<i>Technological and commercial characteristics of suture needles</i>	35
<i>Suture needle anatomy</i>	39
<i>Optical microscopic analysis of suture needles on the market</i>	50
• <i>Sutures: general characteristics and terminology</i>	53
<i>Monofilaments</i>	58
<i>Multifilaments</i>	59
<i>Resorbable sutures</i>	60
<i>Non-resorbable sutures</i>	63
<i>Suture removal</i>	64
<i>Packaging</i>	65
<i>Optical microscopic analysis of the junction between needle and suture thread</i>	67

Auxiliary materials **72**

• <i>Instruments for use in oral-surgery procedures</i>	73
<i>Needle holders</i>	73
<i>Forceps</i>	75
<i>Scissors</i>	77
• <i>Gripping needle holders and scissors</i>	80

Contents

Clinical applications	82
• <i>Interrupted sutures</i>	83
CASE 1	85
<i>The interrupted suture</i>	88
<i>The full surgeon's knot</i>	90
<i>The full lock knot or Toupet's knot</i>	93
CASE 2	95
• <i>The single stitch continuous suture</i>	97
<i>The simple or spiral continuous suture</i>	99
<i>The locked continuous suture</i>	104
<i>The locked and secured continuous suture</i>	109
• <i>The mattress suture</i>	113
CASE 3	116
CASE 4	118
CASE 5	119
<i>The external horizontal mattress suture</i>	122
<i>The external vertical mattress suture</i>	124
<i>The buried horizontal mattress suture</i>	126
<i>The buried vertical mattress suture</i>	132
CASE 6	142
• <i>Suturing on more than one plane</i>	145
<i>Coronal seal of the mattress suture</i>	145
CASE 7	145
CASE 8	150
<i>Single stitch associated with the external horizontal mattress suture</i>	153

<i>Single stitch associated with the external vertical mattress suture</i>	155
<i>The Gottlow suture</i>	157
<i>The horizontal Gottlow suture</i>	158
<i>The vertical Gottlow suture</i>	159
<i>The figure-of-eight suture</i>	161
<i>The figure-of-eight suture: step by step technique</i>	162
• The anchored suture	165
CASE 9	166
CASE 10	168
<i>The simple anchored (sling) suture</i>	170
<i>The sliding anchored (sling) suture</i>	174
CASE 11	177
CASE 12	179
<i>The criss-cross anchored suture</i>	182
<i>The "H", "U" and "X" anchored sutures</i>	186
<i>The continuous sling suture</i>	193
• Protective sutures	199
CASE 13	199
CASE 14	200
<i>Cornick's suture</i>	203
• A word about nerve suturing	206
Quick Reference Guide	210
Bibliography	224
Index	233

Preface

The great surgeon has just successfully completed a delicate operation; he removes his gloves and gives a few suggestions to his collaborators as they begin closing the access route. Having sutured the deeper planes in their turn they leave the skin suturing to the youngest member, who is still specializing. Thus a phase of surgery that, in some branches, is a fundamental one is left in the least expert hands. Suturing the access route has always been neglected, put in place quickly and no more than adequately, while in oral surgery, and obviously in facial surgery, it is of fundamental importance. Whereas in the latter field the esthetic consequences of a badly executed suture can readily be understood, for many operations in oral surgery proper suturing determines success. How many bone grafts have become infected because the suture did not provide a proper seal? How many exposed membranes or gingival recessions are linked to a technical defect in suturing? For these reasons I particularly appreciate the work of Siervo and collaborators, who have tackled the subject, and given the suture the role it deserves.

The argument is treated with a clear and rational approach, including the indispensable biological aspects required to understand the various problems, and with illustrations that make even the less understandable details clear. So it is with great pleasure that I present this book, the latest undertaking of Sandro Siervo, whose serious and committed approach to all the problems he has dealt with I have come to appreciate greatly since I first met him.

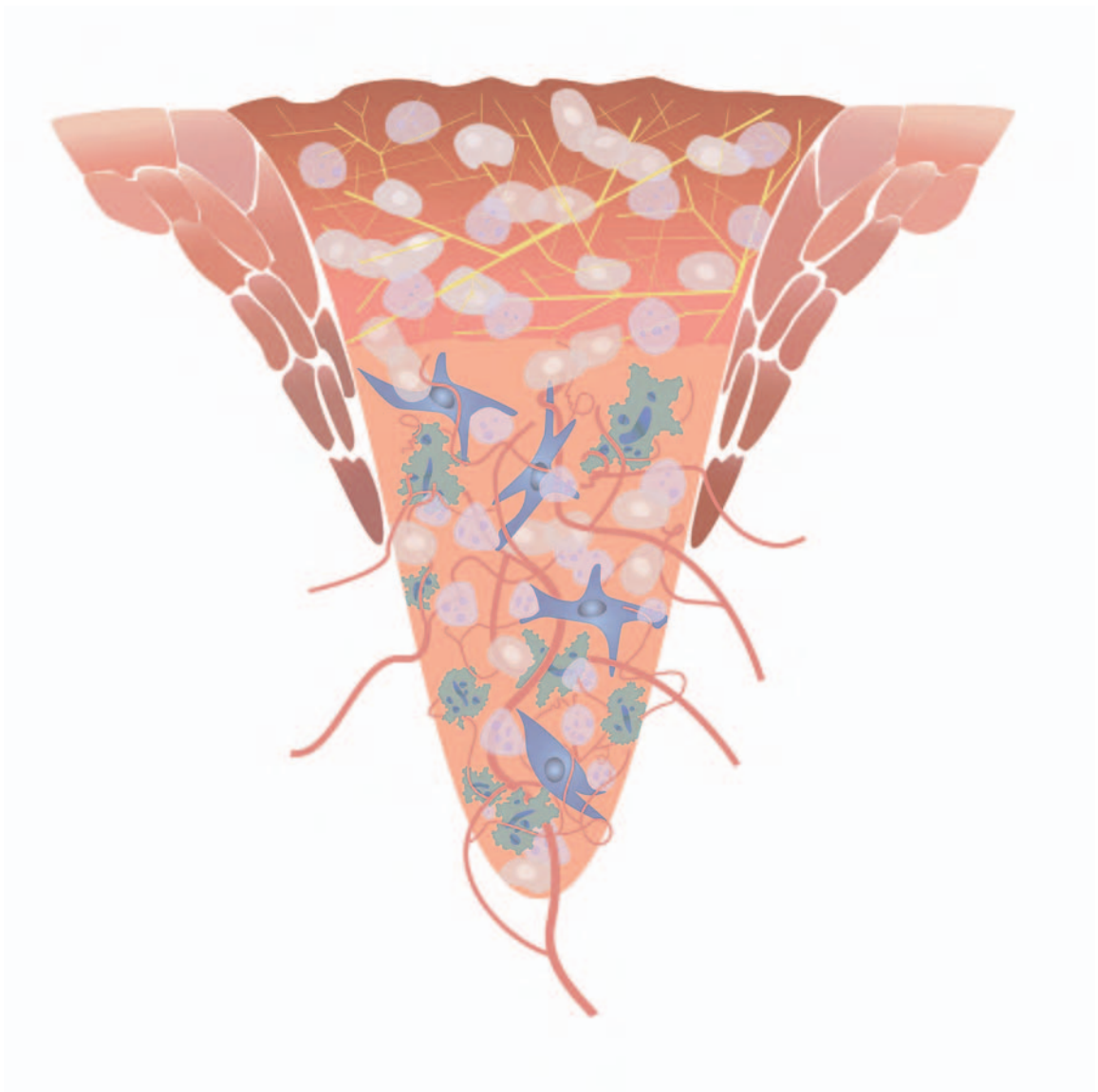
I am sure that this book will have great success, that its readers will appreciate its message, and that it will have a positive influence on day-to-day surgical practice.

Roberto Brusati

with collaboration from:

- Samuele Burastero Doctor of Medicine and Surgery, Specialist in Pneumology, Specialist in Immunology, Researcher at the San Raffaele Hospital, Milan
- Cristian Coraini Doctor of Dentistry and Dental Prosthetics, Private Practitioner in Milan
- Enrico Cerri Doctor of Medicine and Surgery, Specialist in Dentistry, Private Practitioner in Milan
- Carlo Marchetti Doctor of Medicine and Surgery, Specialist in Dentistry, Private Practitioner in Morbegno and Milan
- Luigi Paglia Doctor of Medicine and Surgery, Specialist in Dentistry, Head of the Children's Dentistry Department, Istituto Stomatologico Italiano.
- Massimo Radici Doctor of Dentistry and Dental Prosthetics, Private Practitioner in Morbegno
- Paolo Siervo Doctor of Medicine and Surgery, Specialist in Maxillo-Facial Surgery, Private Practitioner in Milan
- Raffaele Siervo Doctor of Medicine and Surgery, Specialist in Dentistry, Private Practitioner in Milan

SURGICAL WOUNDS



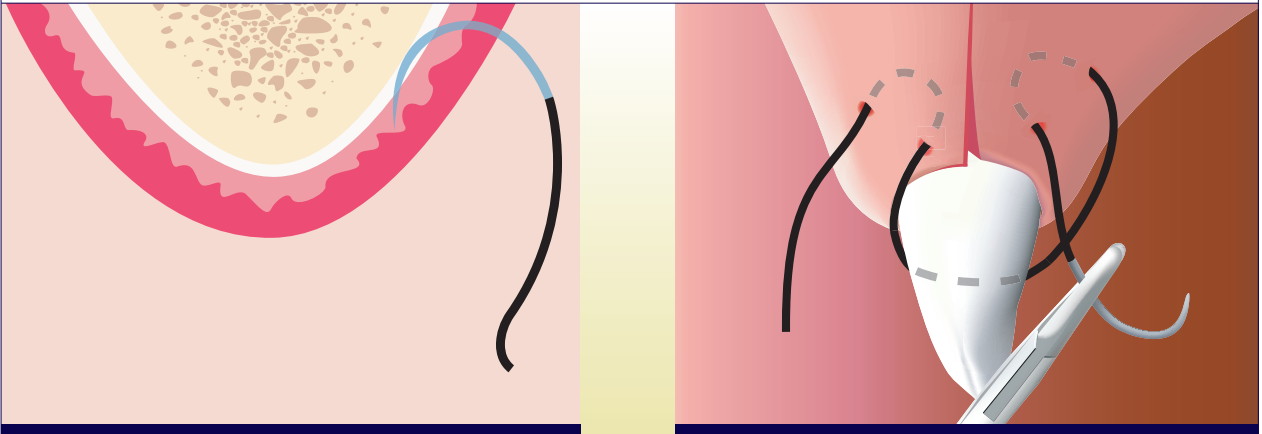
Introduction

The importance of soft-tissue management is today an absolute priority in any intra- and extra-oral surgical procedure if a correct esthetic and functional result is to be achieved. There are at least two aspects that are of equal importance in reaching this goal: on one hand the design and consequent management of the flap, and on the other hand the suturing technique.

The development of infections along the line of the incision is potentially a dangerous post-operative event. Some infections that affect the wound margins in certain areas of the body may put the prognosis, in terms of the patient's life, at serious risk. In less dramatic situations they in any case delay healing of the tissues involved in the surgery. The suturing materials and techniques used to reconstruct the planes can thus have a direct and determinate influence on the phases of healing, making an in-depth and detailed knowledge of the physical, chemical and technological properties of suturing materials an absolute necessity. The clinical choice that, on each individual occasion, leads us to prefer a

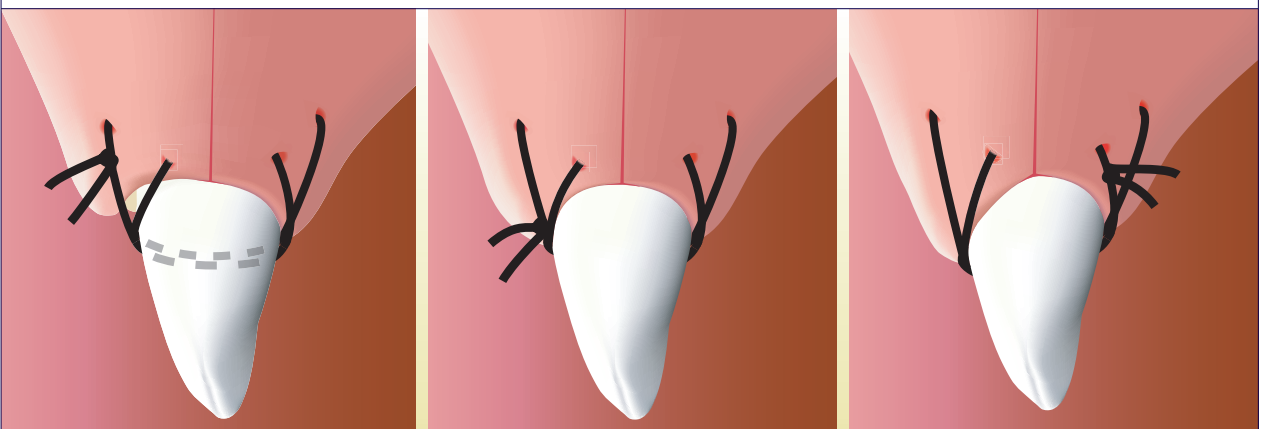
synthetic or a natural thread, a single or a multiple filament, a resorbable or a non-resorbable suture, must be reasoned and never left to chance. The thread is always used with a needle, the characteristics of which also contribute to differentiating its use in order to achieve the required results. A precise knowledge of these variables is part of the body of technical and theoretical expertise of every oral surgeon; the goal of this book is to provide useful indications for the most appropriate choice in different clinical situations.

The primary function of sutures is to help to stabilize the flap during the healing phases without imposing needless traction on the soft tissue. The suturing technique is thus chosen according to its characteristics. These characteristics, in the individual circumstances, enable the flaps in question to be everted or to be introflected, or make it possible to exercise compression on the surrounding tissues in order to ensure hemostasis, or again to create a seal on the different planes to guarantee their hermetic closure. The aim is always to optimize the functional



By passing beneath the periosteum, the suture can be anchored and thus attached.

The thread passes completely outside the flap to reach the palatal side. Here it pierces the flap from the outside inwards, again engaging the periosteum. The flap may be pierced more coronally and the needle can leave more apically, or the entrance hole can be more apical and the exit hole more coronal. Both methods are correct, although the second is easier to perform. Anchorage to the palatal periosteum is the second anchorage point to attach this suture.



If the full surgeon's knot is placed more apically on the vestibular side, the vestibular flap will be displaced apically. This suturing technique is indicated in resective periodontal therapy, where the suture helps to reposition the flap apically.

If the knot is positioned at the level of the cemento-enamel junction, the flap will be passive with no tendency to displacement.

If the knot is positioned palatally, the suture will displace the vestibular flap coronally. This type of flap displacement is preferable when the tooth in question has undergone regenerative surgery.

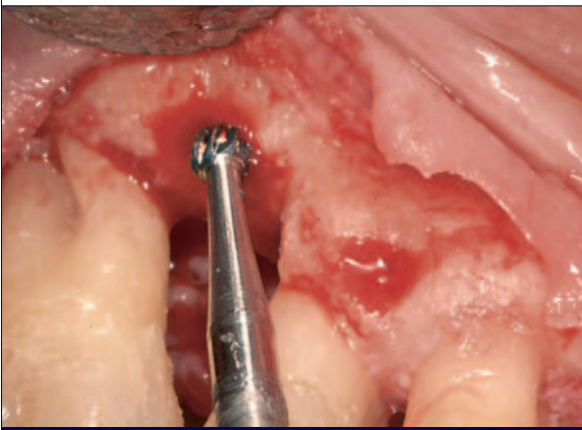
Case 11



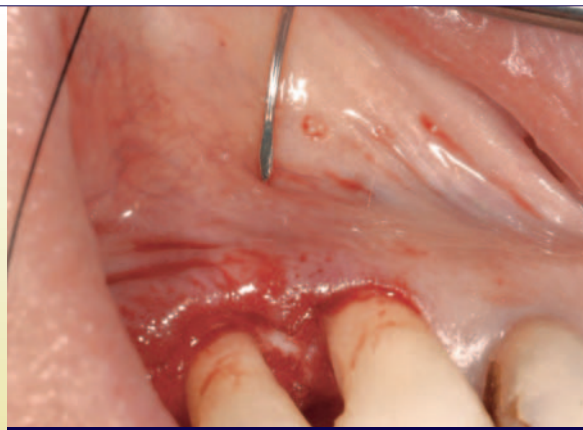
Clinical documentation illustrates the great utility of this type of suture. The treatment plan in this case entailed resective periodontal therapy in order to decrease the depth at probing.



After having resected a mixed-thickness flap (full thickness at the more coronal part and half thickness at the more apical part) the root surfaces and the bone defects are surgically cleansed.



Using rotating instruments, the bone surround is modified, taking particular care to reconstruct a correct bone anatomy.



Suturing begins high up in the vestibule, well above the muco-gingival line, with the needle entering perpendicular to the underlying bone and piercing the periosteum, where it finds a point of anchorage.