

Textbook of Operative Dentistry

Including **Conservative and Restorative Dentistry**

presents the updated version of the current concepts of operative dentistry, including **conservative and restorative dentistry**. The text is based on the valuable suggestions given by the contemporary teachers and students all over the world, coupled with newer developments in the field of restorative dentistry.

The text, discussed in 34 chapters, covers the syllabi of all the Indian universities. The recent concepts have been highlighted in all the chapters, especially the chapters on dentin hybridization (bonding), composites, lasers, diagnosis and diagnostic aids, and minimal invasive dentistry, keeping in mind their clinical significance in day-to-day practice.

Written in a lucid language, the text is replete with self-explanatory photographs and diagrams, well reinforced with clinical photographs for easy understanding of the subject. The keynotes are presented in box format for quick access and easy understanding. The *Textbook* is a 'must-read' for all the undergraduate and postgraduate dental students, teachers, as well as the practitioners pursuing career in operative dentistry | **conservative and restorative dentistry**.

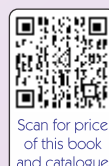
Vimal K Sikri MDS, DOOP(PU), DEME(AIU), FICD is former Professor and Head, Department of Conservative Dentistry and Endodontics, and Principal/Dean, Punjab Government Dental College and Hospital, Amritsar. A well-known personality in the Indian dental fraternity, he is former Director, Punjab Institute of Medical Sciences, Jalandhar.

Blessed with an aptitude for teaching and learning, he has authored seven books, viz. *Fundamentals of Dental Radiology 4/e*, *Community Dentistry*, *Essentials of Endodontics 2/e*, *Textbook of Conservative and Restorative Dentistry*, *Pre-clinical Conservative Dentistry 2/e*, *Indirect Restorations in Dental Practice 2/e*. He is the only dental teacher in India who has successfully completed Diploma in Evaluation, Methodology and Examination from Association of Indian Universities and that too with distinction. He also stood first in Diploma in Office Management from Punjab University. He has to his credit more than 100 scientific publications in reputed journals. He is an examiner for BDS, MDS, DNB and PhD at various Indian Universities. He was the founder editor of the *Journal of Conservative Dentistry* published by Indian Association of Conservative Dentistry and Endodontics. He was also Editor of *i dentistry*, the journal published on behalf of the Indian Dental Association, Punjab. He has been invited as keynote speaker at various national/international conferences.

Apart from his academic acumen, he has always been very active in social and extra-curricular activities. He has always been at the forefront regarding issues pertaining to dentistry.



CBS Publishers & Distributors Pvt Ltd
4819/XI, Prahlad Street, 24 Ansari Road, Daryaganj, New Delhi 110 002, India
E-mail: delhi@cbspd.com, customercare@cbspd.com; Website: www.cbspd.com
New Delhi | Bengaluru | Chennai | Kochi | Kolkata | Lucknow | Mumbai
Hyderabad | Jharkhand | Nagpur | Patna | Pune | Uttarakhand



Scan for price
of this book
and catalogue

ISBN: 978-93-5466-630-8



Fifth
Edition

Textbook of Operative Dentistry
Including Conservative and
Restorative Dentistry

Sikri



Fifth
Edition

Textbook of Operative Dentistry

Including **Conservative and Restorative Dentistry**

Vimal K Sikri



CBS Publishers & Distributors Pvt Ltd
Dedicated to Education



Fifth
Edition

Textbook of

Operative Dentistry

Including **Conservative** and
Restorative Dentistry

Other CBS Books by the Same Author

- ❖ **Pre-Clinical Conservative Dentistry**, Second edition
- ❖ **Fundamentals of Dental Radiology**, Fourth edition
- ❖ **Community Dentistry**
- ❖ **Dental Caries**
- ❖ **Essentials of Endodontics**, Second edition
- ❖ **Textbook of Conservative and Restorative Dentistry**
- ❖ **Indirect Restorations in Dental Practice**, Second edition

**Fifth
Edition**

Textbook of **Operative Dentistry**

Including **Conservative and
Restorative Dentistry**

Vimal K Sikri

MDS, DOOP (PU), DEME (AIU), FICD

Ex-Professor and Head
Department of Conservative Dentistry and Endodontics and
Principal, Punjab Government Dental College and Hospital
Amritsar, Punjab
India

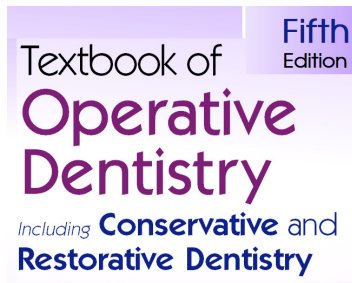


CBS Publishers & Distributors Pvt Ltd

New Delhi • Bengaluru • Chennai • Kochi • Kolkata • Lucknow • Mumbai
Hyderabad • Jharkhand • Nagpur • Patna • Pune • Uttarakhand

Disclaimer

Science and technology are constantly changing fields. New research and experience broaden the scope of information and knowledge. The author has tried his best in giving information available to him while preparing the material for this book. Although, all efforts have been made to ensure optimum accuracy of the material, yet it is quite possible some errors might have been left uncorrected. The publisher, the printer and the author will not be held responsible for any inadvertent errors, omissions or inaccuracies.



ISBN: 978-93-5466-630-8

Copyright © Author and Publisher

Fifth Edition: 2024

First Edition: 2002

Reprint: 2003, 2004, 2005, 2006

Second Edition: 2008

Reprint: 2009, 2010, 2012

Third Edition: 2014

Fourth Edition: 2016

Reprint: 2017

All rights reserved. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system without permission, in writing, from the author and the publishers.

Published by **Satish Kumar Jain** and produced by **Varun Jain** for

CBS Publishers & Distributors Pvt Ltd

4819/XI Prahlad Street, 24 Ansari Road, Daryaganj, New Delhi 110 002, India

Ph: 011-23289259, 23266861

Website: www.cbspd.com

e-mail: delhi@cbspd.com

Corporate Office: 204 FIE, Industrial Area, Patparganj, Delhi 110 092, India

Ph: 011-4934 4934

Fax: 011-4934 4935

e-mail: publishing@cbspd.com;

publicity@cbspd.com

Branches

- **Bengaluru:** Seema House 2975, 17th Cross, KR Road, Banasankari 2nd Stage, Bengaluru 560 070, Karnataka, India
Ph: +91-80-26771678/79 Fax: +91-80-26771680 e-mail: bangalore@cbspd.com
- **Chennai:** 7, Subbaraya Street, Shenoy Nagar, Chennai 600 030, Tamil Nadu, India
Ph: +91-44-26680620, 26681266 Fax: +91-44-42032115 e-mail: chennai@cbspd.com
- **Kochi:** 42/1325, 1326, Power House Road, Opp KSEB, Power House, Ernakulum Kochi 682 018, Kerala, India
Ph: +91-484-4059061-65,67 Fax: +91-484-4059065 e-mail: kochi@cbspd.com
- **Kolkata:** 147, Hind Ceramics Compound, 1st Floor, Nilgunj Road, Belghoria, Kolkata-700056, West Bengal India
Ph: +033-25633055, 033-25633056 e-mail: kolkata@cbspd.com
- **Lucknow:** Basement, Khushnuma Complex, 7 Meerabai Marg (Behind Jawahar Bhawan), Lucknow-226001, UP, India
Ph: +91-522-4000032 e-mail: tiwari.lucknow@cbspd.com
- **Mumbai:** PWD Shed, Gala no 25/26, Ramchandra Bhatt Marg, Next to JJ Hospital Gate no. 2, Opp. Union Bank of India Noorbaug, Mumbai-400009, Maharashtra, India
Ph: 022-66661880/89 e-mail: mumbai@cbspd.com

Representatives

- Hyderabad 0-9885175004
- Jharkhand 0-9811541605
- Nagpur 0-8692091830
- Patna 0-9334159340
- Pune 0-9664372571
- Uttarakhand 0-9716462459

Printed at Sri Print, Jhilmil Colony, Delhi, India

Foreword

We are in the midst of rapidly advancing technical developments in all areas of our profession. The vast experience of Dr Sikri, coupled with his aptitude for writing, conceived a nice way of presenting his vision in the form of a book.


Textbook of Operative Dentistry including Conservative and Restorative Dentistry comprehensively deals with clinical and theoretical needs of all types of restorations. The book shows the inherent vision of the author. Author's emphasis on originality and the language of the subject matter is clearly evident in the book.

The current concepts of occlusion, composites and minimal invasive dentistry are excellently presented; the subject matter in other chapters also emphasizes

clinical aspects in day-to-day practice. It is hoped that students, teachers and the practitioners will find an accurate presentation of the subject and get benefited from the same.

It is advisable to consider Dr Sikri's book for application in our daily teaching and clinical practice. I hope this book will enlighten and encourage exploring new horizons in the field of restorative dentistry.

With my profound faith and professional respect for Dr Sikri, who is a popular teacher having vast experience in the subject, I wish him excel in every field, especially academics and research. I hope this book would become treasure of knowledge amongst students and teachers as well.



Dr. Zora Singh
Chancellor
Desh Bhagat University

Preface to the Fifth Edition

T*extbook of Operative Dentistry 5/e* is an updated version of the present concepts of conservative and restorative dentistry. This book was conceived based on valuable suggestions of my fellow teachers and students all over the world, coupled with newer developments in the field of restorative dentistry. The book is expanded in 34 chapters covering syllabi of all the universities. The recent concepts have been highlighted in all the chapters, especially chapters on dentin hybridization (bonding), composites, lasers, diagnosis and diagnostic aids and minimal invasive dentistry, keeping in mind their clinical significance in day-to-day practice. The language is kept lucid along with self-explanatory photographs and diagrams. The text is reinforced with clinical photographs for easy understanding of the subject. The keynotes are presented in box format for easy access and understanding. I hope *Textbook of Operative Dentistry including Conservative and Restorative Dentistry* is in a 'must-read' category for the students, teachers and the practitioners as well, pursuing restorative dentistry as a career.

Completing book of this magnitude would not have been possible without contributions from

eminent academicians, multitude of teachers, students and friend as well. I recognize their 'contribution' with sincere thanks. I am indebted to my elder brother, Mr RK Sikri, former Director, NTPC, for re-writing text on 'Forces Exerted on Teeth', along with modifying the line diagrams.

I am thankful to Dr Mohan Kumar (Chennai) and Dr Vivek (Pune) for sharing their expertise in the field of conservative dentistry. I am grateful to my colleagues, Dr Renu Sroa, Principal, Dr Baljit Sidhu, Associate Professor, Dr Jagan and Dr Sangeeta, Medical officers for their constant help and motivation. I am also thankful to my students, Dr Akanksha, Dr Vikram, Dr Rajinder and Dr Swapnil for checking and rechecking the manuscript.

I acknowledge the understanding and patience of my gracious wife, Dr Poonam; my dear sons, Dr Ankit, Dr Arpit, and my sweet daughters, Dr Anupriya and Dr Jyotsana.

I request all the students and teachers to go through the present edition and suggest areas of improvement. Your comments and criticism will be incorporated in future editions.

Vimal K Sikri

Contents

<i>Foreword</i>	<i>vii</i>		
<i>Preface</i>	<i>ix</i>		
<i>Contributors</i>	<i>xi</i>		
1. Introduction to Restorative Dentistry 1–9			
Evolution of operative dentistry	1		
Beginning of dental science	2		
Dentistry in 20th century	4		
Chronology of major events in operative dentistry	4		
Aims and objectives	6		
Indications	6		
Future of operative dentistry	8		
2. Nomenclature 10–28			
Systems having similar notation in each segment	10		
System with different notation in each segment	11		
FDI system	13		
Terminology related to caries	14		
Defects in tooth structure	16		
Nomenclature related to tooth surfaces	18		
Anatomical clinical crown	19		
Nomenclature related to cavity preparation	19		
Walls in a cavity preparation	20		
Angles in a cavity preparation	23		
Bevel	25		
Classification of cavities	25		
Dr GV Black classification	25		
Modification of Black's classification	25		
Dr GJ Mount classification	26		
Dr Vimal Sikri classification	28		
3. Dental Caries 29–60			
Classification of caries	29		
Etiology of dental caries	32		
Worm theory	33		
Humoral theory	33		
Chemical theory	33		
Parasite theory	33		
Acidogenic theory	33		
Proteolytic theory	33		
Proteolysis chelation theory	34		
Bioelectric phenomena	34		
Levine's theory	34		
Bandlish's theory	37		
		Systemic theory	38
		Caries balance concept	39
		Genetic theory	39
		Autoimmune theory	40
		Contributory factors in dental caries	40
		Histopathology of dental caries	47
		Caries of enamel	49
		Caries of dentin	52
		Root caries	54
		Arrested caries	55
		Secondary caries	56
4. Functional Occlusion 61–80			
		Terminology	62
		Centric relation	64
		Centric occlusion and maximal intercuspal position	65
		Occlusal designs	66
		Occlusion and restorative dentistry	67
		Interocclusal records	70
		Principles of EDEC	71
		Restoring individual tooth	72
		Role of contact areas	75
		Role of contours	76
		Role of marginal ridges	76
		Recording occlusal relations for indirect restorations	76
		Transferable records	77
		Non-transferable records	78
		Checking casting for occlusion	78
5. Contacts, Contours and Periodontium 81–93			
		Dentogingival unit	81
		Preservation of periodontium	82
		Contour	82
		Height of epithelial attachment	83
		Proximal contact areas	83
		Embrasures	85
		Occlusal surface	85
		Margins	86
		Surface finish and texture	86
		Trauma from occlusion	86
		Occlusal equilibration	90
		Sequence of occlusal adjustments	92
6. Case Selection: Treatment Planning 94–106			
		Case selection (history)	94
		Formulating treatment plan	94

Clinical examination	96
Caries risk assessment	99
Caries activity tests	101
Systemic diseases influencing treatment planning	104
Maintenance phase	106

7. Diagnosis and Diagnostic Aids 107–136

Caries diagnosis	107
Diagnostic tools	108
Visual examination	108
Tactile examination	108
Radiographic methods	115
Electrical resistance	121
Optical detection methods	123
Endoscopic/videoscopic methods	132
Dye penetration method	132
Miscellaneous	132

8. Instruments, Instrumentation and Operating Positions 137–162

Hand cutting instruments	137
Metallurgy	137
Classification	137
Designing characters	138
Instrument nomenclature	139
Instrument formula	139
Cutting planes (instrument beveling)	139
Non-cutting instruments	144
Instrument grasps	146
Sharpening of hand instruments	148
Rotary-driven instruments	149
Dental handpieces	149
Dental burs	151
Abrasive instruments	156
Mechanism of cutting	158
Patient and operator positions	159

9. Sterilization and Infection Control 163–182

Terminology	163
Categorization of instruments	163
Presterilization	163
Methods of sterilization	165
Physical method	165
Chemical method	169
Radiation method	173
Causes of sterilization failures	174
Control of sterilization	175
Sterilization of handpieces	175
Sterilization of burs	176
Infection control	176
Methods for infection control	177

10. Matrices, Retainers and Wedges 183–195

Tooth separation	183
Matrices	184
Matrices for Class II, MOD and complex restorations	185
Matrices for Class III restorations	188
Matrices for Class IV restorations	188
Matrices for Class V restorations	189
Matrix retainers	190
Wedges	191
Wedging system	193

11. Isolation of the Operating Field 196–213

Isolation from moisture (direct methods)	196
Rubber dam	196
Cotton rolls and cotton roll holders	204
Gauge pieces	205
Absorbent pads	205
Evacuation systems	205
Gingival retraction cord	206
Indirect methods	208
Isolation from the soft tissue	208
Management of cheeks, lips and tongue	208
Management of gingival tissues	208

12. Principles of Cavity Preparation 214–234

Outline form	214
Modification of outline form	216
Enameloplasty	217
Resistance and retention forms	218
Convenience form	223
Removal of remaining carious dentin	224
Pulp protection	224
Finishing the enamel walls and margins	225
Toilet of the cavity	225
Present concept of principles	226
Conservative cavity preparation	228
Forces exerted during functional occlusion	229
Marginal ridge and occlusal forces	231
Stresses distribution in individual restorations	233

13. Interim Restorations 235–244

Interim restorative materials (rationale)	235
For intracoronal preparation	236
Gutta-percha	236
Dental cements	236
For extracoronal preparation	241
Prefabricated crowns	241
Indirect acrylic restorations	243

14. Silver Amalgam 245–266

Composition of silver alloy	245
Effect of constituent metals	246
Alloy mercury reaction	246
Cavity preparation	247
Manipulation of silver amalgam	256
Failures of dental amalgam	259
Gallium alloys	261
Modified silver restorations	262
Bonded amalgam restorations	262
Fluoridated amalgam	263
Amalgam restorations and oral environment	263
Mercury and its management	264

15. Direct Filling Gold 267–280

Properties of pure gold	267
Types of direct filling gold	267
Annealing/degassing	270
Condensation/compaction	270
Biologic effects of pure gold restoration	273
Indications	274
Contraindications	274
Cavity preparation and restoration	275

16. Cast Metal Restorations 281–306

Noble vs base metals	281
Indications	282
Contraindications	283
Advantages and disadvantages	283
Cavity design for cast restorations	283
Types of margins in cast restoration	286
Bevels	287
Flares in cast restorations	288
Cusp capping/onlay	289
Tucker's technique	289
Fabrication of cast restorations	290
Casting the pattern	298
Procedure of casting	299
Thermal expansion casting technique	299
Hygroscopic expansion technique	300
Finishing and polishing	300
Casting defects	303

17. Complex Restorations 307–317

Extra retentive devices	307
Pin-retained restorations	309
Indications	309
Advantage/disadvantage	309
Classification	309
Principles of pin placement	311

Pinhole preparation	313
Pin, stresses and tooth	313
Factors affecting retention of pins	314
Complication during pin placement	315
Effects of pins on pulp	316
Amalgapins	316

18. Dentin Hybridization: Bonding Agents 318–349

Common terms: Definitions	318
Factors affecting Adhesion	319
Tooth as a substrate for bonding	320
Bonding to enamel	320
Bonding to dentin	323
Dentin bonding agents	326
Classification (evolution) of dentin bonding agents	328
Alternative classification (evolution) of bonding agents	333
Categorization of adhesives based on their action on smear layer	335
Resin–dentin bond: Degradation and management	337
Bonding in other clinical situations	339
Additives for bonding agents	342
Role of water in the bonding process	343
Water treeing phenomenon	343
Nanoleakage and water treeing	345
Success/failure of adhesives	345

19. Composite Restorations 350–386

Composition	350
Evolution of composites	352
Properties of composites	352
Advances in composites	352
Curing of composites	356
Light-curing units	357
Cavity preparation	360
General consideration	360
Placement of composites	364
Establishing proximal contacts	369
Failures in composite restorations	369
Composite laminates and veneers	372
Componomers	373
Composite inlays	376
Classification of composite inlay	376
Evolution of composite inlay material	377
Cavity preparation	377
Repair of composite restorations	382

20. Glass-Ionomer Cement 387–405

Composition	387
Classification	388
Uses of glass-ionomer cement	388
Setting reaction	389
Physical and mechanical properties	390
Modified glass-ionomer cements	392
Metal modified glass-ionomers	392
Resin modified glass-ionomer cements	393
Compomer	393
Giomers	394
Antibacterial glass-ionomer	394
Glass carbomer	395
Zirconomer	396
Low pH smart materials	396
Placement of glass-ionomer cement	396
Clinical applications	400
Failure of glass-ionomer restoration	403

21. Ceramic Restorations 406–434

Terminology: Definitions	406
Composition	407
Classification	409
Properties of porcelain	409
Strengthening of ceramic	410
Condensation of porcelain	411
Firing procedure	412
All ceramic systems	413
Ceramic restorations	418
Ceramic inlays/onlays	418
Cavity preparation	418
Fabrication of a porcelain inlay	421
Cavity considerations for	426
CAD-CAM inlays	426
Ceramic laminates/veneers	428
Repair of ceramic restorations	430

22. Microleakage 435–450

Clinical implication of microleakage	435
Restorative material and microleakage	436
Role of smear layer	437
Factors controlling bacterial	438
penetration at tooth–restoration gap	438
Microleakage and restorative materials	438
Microleakage around	438
amalgam restorations	438
Microleakage around	439
glass-ionomer restorations	439
Microleakage around composite	440
restorations	440
Microleakage around direct	443
gold restorations	443

Microleakage around cast restorations	443
Microleakage around	444
porcelain restorations	444
Methods to detect microleakage	444
Nanoleakage	448

23. Finishing and Polishing 451–468

Definitions	451
Objectives of finishing and polishing	452
Finishing and polishing instruments	452
Abrasive materials	453
Adjunct finishing modalities	454
Microabrasion	454
Burnishing	454
Finishing and polishing of individual	455
restorations	455
Amalgam restorations	455
Composite restorations	456
Glass-ionomer restorations	458
Direct gold restorations	461
Cast gold restorations	461
Non-precious alloy restorations	462
Porcelain restorations	463
Concept of finishing polish	465
Hazards of finishing and polishing	465

24. Color Perception 469–483

Source of light	469
Optical characteristics	469
Color	471
Structure and function of eye	472
Perception of color	472
Additional features in color perception	473
Metamerism	473
Fluorescence	473
Opalescence	473
Basic color schemes	474
Color harmonies	474
Additive color theories	474
Subtractive color theories	474
Color systems	474
Munsell color system	475
CIE system	476
CIE (modified) L*a*b* color space	476
CIE (modified) L*C*h° color difference	477
Optics of natural teeth	477
Dental shade guides	478
Shade-taking devices	479
Guidelines for clinical shade selection	479
Procedure for shade matching in	481
porcelain restorations	481

25. Esthetics and Smile Designing	484–496	28. Minimal Intervention Dentistry	534–552
Principles of esthetics	484	Core principles	534
Esthetic smile designing	486	Components of minimal invasive approach	535
Facial analysis	486	Early diagnosis of caries	535
Lip analysis	487	Caries risk assessment	535
Incisal display	487	Strategies to arrest existing cariou lesions	536
Gingival tissue analysis	488	Remineralization of existing lesions	537
Treatment planning	490	Restoring cavitated lesions	539
Cosmetic contouring	491	Caries inhibition by resin infiltration	549
Diastema closure	492	Repair rather than replacement of defective restorations	550
Adhesive restoration	493		
Lasers	495		
Ethics in esthetic dentistry	495		
26. Tooth Substance Loss	497–519	29. Dentinal Hypersensitivity	553–564
Attrition	497	Incidence and prevalence	553
Biocorrosion	499	Etiopathogenesis	553
Bruxism	499	Factors affecting hypersensitivity	555
Cervical lesion	499	Measuring tooth hypersensitivity	555
Cariou cervical lesions	500	Diagnosis	556
Non-cariou cervical lesions	500	Management of hypersensitivity	557
Abrasion	501	Treatment modalities	557
Erosion	502	Newer materials	560
Abfraction	507	Prevention	561
Biomechanics of a Class V cavity	510		
Measuring tooth substance loss	511		
Treatment of tooth substance loss	512		
Treatment of cariou cervical lesions	512		
Treatment of non-cariou cervical lesions	512		
Treatment of attrition	515		
Dahl concept	517		
27. Geriatric Restorations	520–533	30. Management of Deep Cariou Lesions	565–575
Age changes in dental tissues	520	Arrested caries	565
Mechanism of aging	521	Repair of pulp–dentin complex	566
Aging and dental tissues	521	Treatment modalities of deep caries lesions	567
Age changes in enamel	521	Indirect pulp capping	567
Age changes in dentin	521	Direct pulp capping	568
Age changes in pulp	522	Pulp curettage	573
Age changes in cementum	523	Partial pulpotomy	573
Age changes in bone	523	Pulpotomy	574
Age changes in periodontium	524		
Age changes in salivary glands	524		
Clinical implications	524		
Treatment planning for elderly	525		
Management of common oral diseases in elderly	529		
Considerations for prescribing medications to the elderly	532		
		31. Pulpal Reactions	576–588
		Terminology	576
		Pulp–dentin organ	576
		Pulpal response to restorative materials	578
		Intensity of pulpal response	578
		Stages of pulpal inflammation	579
		Evaluation of biocompatibility	581
		Pulpal reaction to commonly used restorative materials	581
		Pulpal reaction to tooth preparation	584
		Pulpal reaction to caries	585
		Pulpal reaction to trauma	586
		Orthodontic movement and pulpal reaction	586
		Pulpal reaction to vital bleaching	588

32. Tooth Discoloration and Bleaching 589–608

Tooth discoloration and staining	589
Bleaching of teeth	590
Bleaching agents	591
Bleaching modalities	592
Vital tooth bleaching	593
Non-vital bleaching	598
Laser-assisted tooth whitening	600
Bleaching with non-thermal atmospheric plasma	603
Over the counter products	603
Advanced techniques	604
Adverse effects of bleaching	604

33. Laser in Restorative Dentistry 609–622

Principle of laser	609
Laser device	609
Laser delivery system	610
Laser emission modes	610
Mechanism of action	611
Laser–tissue interaction	611
Classification	611

Conventional categorization of lasers	612
Routinely used lasers	613
CO ₂ laser	613
Argon laser	613
Nd:YAG laser	614
Er:YAG laser	614
Excimer laser	614
Uses of lasers in operative (conservative) dentistry	615
Laser hazards	619
Laser safety	620

34. Magnification in Restorative Dentistry 623–633

Magnifying tools	623
Ergonomics	625
Components of microscope	626
Use of operating microscope in restorative dentistry	630
Advancements in magnification	632

<i>Appendix</i>	635
-----------------	-----

<i>Index</i>	637
--------------	-----