ORTHODONTIC PEARLS

SECOND EDITION

ORTHODONTIC PEARLS

A Selection of Practical Tips and Clinical Expertise

Edited by

Eliakim Mizrahi, **BDS, DOrth RCS, FDS RCS, MSc, PhD**
Private practice, London, UK

CRC Press
Taylor & Francis Group
Boca Raton London New York

CRC Press is an imprint of the
Taylor & Francis Group, an **informa** business

CRC Press
Taylor & Francis Group
6000 Broken Sound Parkway NW, Suite 300
Boca Raton, FL 33487-2742

Version Date: 20141223

International Standard Book Number-13: 978-1-4822-4195-2 (eBook - PDF)

CONTENTS

ACKNOWLEDGEMENTS

I acknowledge and I am extremely grateful to all original and new co-authors for the tremendous effort they have put in to produce the material for the second edition. It is a testament to the quality and standing of our profession that clinicians, busy in their own practices, continue to give of their time to ongoing education whether it is in the formal academic environment or in the contribution of material provided for this publication. They understand that education continues to be the backbone and foundation on which the future of our profession depends.

I must also acknowledge with many thanks the tolerance and understanding of my wife in accepting the disruption of our home lifestyle over the last number of months.

Eliakim Mizrahi

INTRODUCTION TO FIRST EDITION

I acknowledge that the formal education provided by most dental schools as well as existing textbooks and journals equip the contemporary orthodontist with an excellent foundation in the science and art of orthodontics. However, I believe there is a pool of knowledge and information that is not provided by formal education and only becomes available and acquired with time and experience in clinical practice.

The administration and running of an orthodontic practice is not an aspect of orthodontics that is taught extensively or formally in most schools; it is information that students, as well as young and old orthodontists glean with experience, from interchange with professional colleagues and from general reading. In time it comes to reflect the individual nature of a practice and becomes a component of the practice driven and moulded by the personality of the individual orthodontist.

In this book I hope to present the reader with information on administrative and clinical aspects of practice sourced from experienced orthodontists worldwide; to show how they manage their patients and their practices. What patterns do their conversations follow, what do they say to their patients at different appointments and what do they say to parents? It is important to know just how much clinical information to give to patients and what information should be provided in correspondence to both the patient and the referring dentists. I hope the sample letters used by orthodontists in different parts of the world will be of assistance and will reflect the varying nature of practices.

With regard to the clinical aspect, current teaching on the theory and technique of orthodontics continues to evolve and expand and cannot be faulted. However, with the development of prescription-type brackets and the concepts of straight wire and pre-formed arches, students over the last few years may not have been exposed to some of the intricacies and complexities of wire bending. While it is commendable that clinical procedures should continue to be simplified and streamlined, there are a number of occasions in practice when the orthodontist is presented with different malocclusions and individual situations where additional wire bending or the use of an additional auxiliary will facilitate and improve the treatment and final result. This concept is well described in an editorial by Robert Rubin 'Why we still have to bend wires'.[1] He concludes in his last sentence 'In fact, in some areas of the arch, the risk benefit ratios suggest that wire bending will always be a wise choice'.

With time and experience orthodontists learn many technique adjuncts that work for them and which facilitate the clinical treatment of their patients. A number of these adjuncts are published in different journals. In this book I tried to collate some of these clinical tips and to present information from an international selection of orthodontists using varying techniques. I hope that this component of the book will be of value to the graduate student, the neophyte orthodontist as well as the established orthodontist wherever he or she may be practicing.

This book is not intended to compete with the major texts on the theory and techniques that form the basis of contemporary orthodontic teaching and practice. I hope that in an informal style, more akin to a seminar or tutorial, this book will provide the reader with information which will be helpful in both the administrative and clinical components of orthodontic practice.

I concede that it has not been possible to cover the complete orthodontic scenario; there

are omissions particularly in the areas of non-compliance and functional appliances. I have no doubt there are many clinicians who have ideas, tips and techniques that have not been included, perhaps these gaps could be filled in future editions.

Much of the information submitted by different clinicians has been gleaned from experience, lectures, courses and journals; where possible references are listed at the end of each chapter. Unfortunately, in certain cases the exact reference or source of an idea or a technique cannot be recalled, in such cases, none of the contributing authors knowingly claim originality for any idea or technique described.

The literary style varies with each contribution and I have tried not to alter this variation but rather to retain the individuality of each author. In certain sections the reader may encounter some repetition, once again this has been retained with the intent of maintaining the integrity of each individual contributor.

A hallmark of our profession is the diversity of individual opinion on both clinical and administrative issues, this diversity on the management of certain aspects of practice may be apparent to the reader. I have made no attempt to try to achieve consensus but have chosen, once again, to retain the individuality of the contributor. I hope the reader will benefit by being exposed to the different views and will take from the text what suits his or her own circumstances, personality and practice environment.

COMMENT

I believe that orthodontics is one of the finest professions; it combines the best of both the science and art of dentistry. We are privileged to treat a group of patients who actively seek our services, and the general level of work satisfaction and patient appreciation is high, I have yet to meet an unhappy orthodontist. Whether you run an individual single practice or a multiple surgery/operatory type of practice is an individual choice and I believe is more related to personality and character type rather than to financial consideration. Which of these makes for a happy orthodontist? I don't know. In our professional context, what is happiness, how do you define it? A simple definition given to me by a friend states: 'Happiness is when your earning power equals your yearning power'. By all means be ambitious but above all be honest with yourself and with your patients. Be happy and content with what you do.

I would like to acknowledge and thank every contributor for his or her effort and input. No matter how small or large their contribution, it takes time and effort to put pen to paper, and for this I and I am sure our readers are grateful. I must also thank my colleagues and postgraduate students at the Department of Orthodontics, Whipps Cross Hospital, London, for their stimulus in the initiation of this work, I hope the end result is worthy of their confidence.

Finally, let me say to every reader, the greatest appreciation you can demonstrate to your profession is to impart and pass on your knowledge and expertise to your students and fellow colleagues. To those of you already involved with teaching we acknowledge your services. To the others, I encourage you to get involved with teaching to a level and extent that suits you. I hope that, via this book, our colleagues who have put pen to paper are in their way giving something back to the profession they so enjoy. I leave you with what has probably been the best pearl in my career.

Pearl: For me the most satisfying professional experience has been the mix of clinical orthodontic practice combined with part time teaching.

INVITATION

I would like to take this opportunity to invite any reader who believes that they have one or more pearls of information that could be included in any possible future edition of this book, to feel free to contact me. (My address is included in the List of Contributors.)

Eliakim Mizrahi

A LITTLE PHILOSOPHY

The following are a few experiences and lessons gleaned as I travelled as a practice manager for thirty-six years through the life of an orthodontic office. I learnt that:

- Orthodontists hold in their hands a capacity to generate financial benefits allowing them to lead a comfortable and generous lifestyle.
- That all of this is irrelevant if they do not acknowledge that their opportunity of altering the position of the teeth should be joined with a positive experience in the lives of their patients.
- That it is important to remember that as each potential patient walks through the door they do not only bring misaligned teeth with them. They are part of a social structure interwoven with expectations and dreams of their own. They belong to a family, whether it is a nuclear or single parent family. They belong to an educational facility or the workforce. They each have a life outside of their teeth. Consideration of their individual circumstances helps to form a bond between clinician and patient early on in treatment. This individual consideration will also assist greatly in their cooperation during treatment. It is as well to remember that this 'customer' or 'consumer' is going to share at least eighteen months of their life's experience with you.

Pearl: Cultivate, as much as you can, to share this experience on an individual basis with your patient and if possible without another family member being present.

Effie Patrikios

REFERENCE

1. Rubin RM. Why we still have to bend wire. The Editors Corner. *J Clin Orthod* (1996) 30:541–542.

INTRODUCTION TO SECOND EDITION

The basic premise and rationale on which the first edition of *Orthodontic Pearls* was originally based remains the same. For this reason, the original introduction has been retained allowing both new and old readers to acquaint themselves with the original objectives of *Orthodontic Pearls*. I do hope that readers will take the opportunity to read the original introduction.

When it comes to writing the second edition of a textbook, clearly, the editor is faced with the dilemma of how to manage the balance between the inclusion of new material and the exclusion of old material. I hope that this introduction will help the reader understand how I, as the editor, tried to manage this dilemma.

Any clinician who has been in practice for some years comes to realise that firstly, there is a life outside the office (see "A little Philosophy" at the end of this introduction *Harold M Shavell*) and secondly, in order to keep up to date with our professional life, education is an essential continuing process. This theme has been expressed in Chapter 1 where the importance of continuing education is well described and written by two orthodontic educators of international standing: *Nada M Souccar* and *Lionel P Sadowsky*.

Bearing in mind the original concept that this book is not an in-depth text on any one particular subject, I have sourced the experience of new authors on a variety of subjects which I believe widens the scope of the book and will be of interest to readers. To the credit of the first edition co-authors, some of their original contributions have been expanded and updated. The advances in digital technology have already influenced clinical dentistry and orthodontics. Clearly the digital age is upon us and we need to examine how this impacts our clinical practice. Its effect on radiology (see Chapter 5, *Iain Macleod*), photography (see Chapter 6; *Jonathan Sandler* and *Alison M Murray*), and digital intraoral scanning (see Chapter 16; *Rohit CL Sachdeva* and *Nikita Sachdeva*) is presented by a variety of experienced co-authors.

The impact of risk management in clinical practice continues to grow in importance and is well covered in Chapter 8 by *Laurance Jerrold*, a co-author well qualified and experienced in this field. The related Appendix B has been completely rewritten.

The expanding use of auxiliary personnel in clinical practice is changing the way many orthodontists run and manage their practice. A perspective on this subject is also comprehensively described in Chapter 9 by *Liz Hopkins*, an orthodontist closely involved in this aspect of education and practice.

Clinical practice continues to flourish in a competitive market. Marketing and attracting patients to our practice continue to be an important consideration. The co-authors of Chapter 10 provide the reader with basic marketing principles (*Winston B Senior* and *Renton Tindall*) and *Asif Hassan Chatoo* introduces the concept of marketing through the currently popular and influential social media.

Chapters 12, 14, 15 covering practical clinical pearls have also been expanded with contributions of varying lengths submitted by a number of original and new co-authors. Self-ligating brackets continue to be used extensively and their benefits are well described in Chapter 13 by *Nigel WT Harradine*, an orthodontist highly experienced in this subject.

Chapter 16 written by *Rohit CL Sachdeva* and *Nikita Sachdeva* introduces the reader to the developments in digital technology that are currently being incorporated into clinical orthodontics. Clearly, clinical practice in the 21st century will proceed along this pathway.

The growing influence of temporary anchorage devices as an alternative source of

intraoral anchorage is presented by co-authors familiar with these devices (see Chapter 17; Miniscrews by *Eliakim Mizrahi* and Zygomatic Anchor Plates by *Antony GH McCollum*).

The growing importance of interdisciplinary treatment has been recognized and presented in Chapter 18 covering, the orthodontic interface with restorative dentistry (*Eliakim Mizrahi*); periodontial therapy (*W Aubrey Soskolne, Ayala Stabholz*) and orthognathic surgery (*Antony GH McCollum*).

Impacted canines continue to be a feature of clinical practice that taxes the diagnostic and technical skills of clinicians. This subject is comprehensively covered by *Adrian Becker* and *Stella Chaushu*, co-authors considered to be authorities in this field (see Chapter 19).

With an increasing number of patients requesting lingual orthodontic treatment, more orthodontists are taking up the challenge and the use of the technique is growing internationally. As with conventional labial techniques there are a variety of lingual techniques currently available. In Chapter 20 readers are introduced to some of these techniques by *Alan Rumbak*, an orthodontist with experience in the use of lingual techniques.

Temporomandibular joint disturbances have been studied and reported on extensively over the years, yet the diagnosis and management of this clinical entity continue to be of concern to orthodontists. *Brian Nebbe*, a co-author familiar with this topic, has in a limited space attempted to clarify the subject in Chapter 21.

The question then arises what do I leave out? After due consideration, the answer is, very little.

Most of the material presented in the first edition is still very relevant.

I accept that cephalometric films have been largely replaced by digital images which can be digitized and analysed by many software programs, however, the technique of tracing and understanding the information derived from this task is still something many clinicians consider important. This section has been reduced but still retained (Section 4.6).

I understand that due to considerations of compliance and risk management, the use of headgear is tending to decline; however, for some clinicians' headgear is still an important form of therapy for maxillary related malocclusions, so I decided to retain the following sections: 14.1.3 to 14.1.7.

The chapters on fixed appliances, auxiliaries and removable appliances (Chapters 12, 14, 15, 22 and 23) did give me a dilemma. The fact that orthodontic techniques continue to develop and progress does not mean that many of the older techniques and concepts should be discarded. In the past they have contributed to excellent treatment results achieved by orthodontists worldwide. Furthermore, if we accept that orthodontists internationally do not all use the same techniques and they do not all move in the same direction at the same pace, then it makes sense to retain in this new edition many of the older concepts and techniques published in the first edition.

Retention still continues to be a very controversial issue. Well trained and experienced clinicians still have widely differing views on this subject particularly on issues such as the retention protocol, the duration of retention and duration of clinical responsibility. To this end, I have included expanded contributions from original co-authors as well as new contributions from new co-authors (see Chapter 24).

A LITTLE PHILOSOPHY

"… And Then It Is Winter"

Harold M Shavell

You know … time has a way of moving quickly and catching you unaware of the passing years. It seems just yesterday that I was young, just married and embarking on my new life with my Donna. Yet in a way, it seems like eons ago, and I wonder where all the years went. I know that I lived through them all, through thick and thin … through all the blood, sweat and tears. Over the years I learned that good judgment comes from experience and that often experience comes from bad judgment; that learning without thought is labour lost, and thought without learning is perilous. I learned that when you choose an action, you choose the consequences of that action. The corollary of this axiom is even more compelling: when you

desire a consequence you had darn well better take the action that would create it!

But, here it is … the winter of my life and it sort of catches me by surprise … how did I get here so fast? Where did the years go and where did my youth go? I remember well seeing older people through the years and thinking that those older people were years and years away from me and that my winter was so far off that I could not fathom it; I was young and hadn't really pondered mortality and the inexorable coming of winter. And now I'm retired, and yes, I do have the luxury of being owner of my own time … yet, truth be told, it took me some time to get used to that 'ineffable luxury'.

But, now it's clear my winter has drifted in almost without notice … and also for many of my friends who have retired and are getting grey, they too move slower. Some are in better and some in worse shape than me. I see great changes that have taken place; they're not like the people I remember who were young and vibrant … our age is beginning to show, and we are now those 'older folks'. We've finally gotten our heads together, but our bodies start falling apart!

And so now I enter into this new season of my life, I'm not sure how long it will last, and I was unprepared for all the aches and pains and the inevitable loss of strength, agility and ability (as well as volition!) to go and do things that I wish I had done but never somehow found the time to do. Yes, I do have regrets. There are things I wish I hadn't done … things I should have done … but still, there are many things I'm happy and proud to actually *have* done. You can't control the wind, but you can adjust your sails; some men can live up to their loftiest ideals without ever going higher than a basement. It's all in a full lifetime. The trick, I found, is to combine your waking rational abilities with the infinite possibilities of your dreams. Unfortunately, many of us lead lives of quiet desperation and then we go to the grave with the dream still in us. So never give in – never, never, never, in nothing great or small, large or petty – never give in except to convictions of integrity, honour, morality, just causes, and good sense. Keep to this premise, and you just can't go wrong.

Well then, if you're not in *your* winter yet … let me remind you that it will be here faster than you think. The more sand that has escaped from the hour-glass of our life, the clearer we should see through it. So, whatever you would like to accomplish in your life I suggest you do it quickly! You are today where your thoughts have brought you; you will be tomorrow where your thoughts will take you. Don't put things off too long. Life goes by more rapidly now; remember, winters have shorter days. So, do what you can now, *today*, as you can never be sure whether or when *your* winter is approaching, or how dark and cold it will be. You have no promise that you will continually see all the comings and goings of all the seasons of your life … so live, and do things for today and say all the things that you want your friends and loved ones to hear and remember and hope that they understand, appreciate, and love you for all the good and decent things that you have tried to accomplish in your life.

Editor's comment: Eliakim Mizrahi
Following on Dr Shavell's sobering, and beautifully expressed thoughts, may I suggest that those of you still enjoying the warmth in the summer of your life, do not forget to buy an overcoat (financial planning) because winter without an overcoat can be very cold and miserable. Just a thought.

MANUFACTURERS

AJ Wilcock
Scientific and Engineering Equipment
45 Yea Road
Whittlesea, Victoria 3757
Australia

Align Technology
2560 Orchard Parkway
San Jose, CA 95131
USA

American Orthodontics
3524 Washington Avenue
PO Box 1048
Sheboygan, WI 53081–1048
USA

Canon (UK), Ltd.
Woodhatch
Reigate Surrey, RH2 8BF
UK

DB Orthodontics
Unit 6
Ryefield Way
Silsden, West Yorkshire BD20 0EF
UK

Dental Health Products, Inc.
4011 Creek Rd
Youngstown, NY 14174-9609
USA

Dentronix, Inc.
235 Ascot Parkway
Cuyahoga Falls, OH 44223
USA

Dentsply GAC International, Inc.
One CA Plaza
Suite 100
Islandia, NY 11749
USA

Dolphin Imaging & Management Solutions
9200 Eaton Avenue
Chatsworth, CA 91311
USA

DW Lingual Systems GmbH
Lindenstrasse 44
49152 Bad Essen, Germany

EM Natt, Ltd.
Marchpen House
45–47 Friern Barnet Road
London N11 3EG, UK

Erkodent Erich Kopp GmbH
Siemensstraße 3
72285 Pfalzgrafenweiler, Germany

ESM Digital Solutions
17 Main St
Swords Co.
Dublin, Ireland

Forestadent, Ltd.
Unit 4
Pineham Farm
Haversham, Milton Keynes MK19 7DP
UK

and

Bernhard Förster GmbH
Westliche Karl-Friedrich-Str. 151
75172 Pforzheim, Germany

G&H Orthodontics
2165 Earlywood Dr.
Franklin, IN 46131
USA

Great Lakes Orthodontics, Ltd.
200 Cooper Avenue
Tonawanda, NY 14150
USA

Guangzhou Riton Biomaterial Co., Ltd.
Unit 101-103, Floor 1
Research District A and B
Luo Xuan Road 3
Guangzhou International Bioisland
Guangdong, China
510005

Heraeus Kulzer
Heraeus House
Northbrook St.
Newbury RG14 1DL, UK

Kerr Dental Products
1717 West Collins
Orange, CA 92867
USA

Kerr UK
3 Flag Business Exchange
Vicarage Farm Road
Peterborough PE1 5TX, UK

Komet/Brasseler
2014 West One Dental
Sydenham Road
Croydon, Surrey CRO 2EB
UK

Masel Orthodontic Products
1822 Aston Avenue
Carlsbad, CA 92008
USA

Mölnlycke Health Care AB
Global headquarters:
Box 130 80
SE-402 52 Gothenburg, Sweden

Ormco Orthodontic Corporation
1717 West Collins
Orange, CA 92867
USA

Ortho2
1107 Buckeye Avenue
Ames, Iowa 50010
USA

OrthoCad Cadent, Inc.
8 Industrial Avenue
Fairview, NJ 07022
USA

Ortho-Care (UK), Ltd.
1 Riverside Estate
Shipley, West Yorkshire BD17 7DR
UK

Oscar, Inc.
11793 Technology Lane
Fishers, IN 46240
USA

Peltz and Companion GmbH
Laurenbuelstrasse 59
D-88161
Lindenberg, Germany

Plydentco, Inc.
325 Philmont Avenue
Unit "A"
Feasterville, PA 19053
USA

Precision Orthodontics
93 Cathedral Road
Cardiff CF11 9PG, UK

Reliance Orthodontic Products
1540 West Thorndale Ave
Itasca, IL 60143
USA

Rocky Mountain Orthodontics
650 W Colfax Avenue
Denver, CO 80204
USA

Surebonder FPC Corporation
355 Hollow Hill Drive
Wauconda, IL 60084
USA

SureSmile. OraMetrix, Inc.
2350 Campbell Creek Blvd.Suite
400 Richardson, TX 75082
USA

3M Unitek
Dental Products Division
2724 South Peck Road
Monrovia, CA 91016
USA

TP Orthodontics, Inc.
100 Center Plaza
LaPorte, IN 46350-9672
USA

Tru-Tain Orthodontic and Dental Supply
2625 Hwy 14 West
Rochester, MN 55901
USA

Zhermack
Via Bovazecchino
100
Badia Polesine Rovigo, Italy

CONTRIBUTING AUTHORS

Simon Ash BDS, MSc, MOrth, FDS RCS
27 Harley Street
London W1G 9QP
UK

Adrian Becker BDS, LDS RCS, DDO RCPS
Clinical Associate Professor Emeritus
Department of Orthodontics
Hebrew University–Hadassah School of Dental Medicine
Jerusalem, Israel

JW (Hans) Booij BDS
Professor Emeritus
Rijksuniversiteit Groningen
Schelluinsevliet 5
4203 NB
Groningen, the Netherlands

Kees Booij (Deceased)
Department of Orthodontics
Groningen, the Netherlands

Richard N Carter DMD, MS
124 Principe De Paz
Santa Fe, NM 87508
USA

Asif Hassan Chatoo BSc, BDS, FDS RCS, MSc, MOrth RCS
Lingual Orthodontic Clinic
57a Wimpole Street
London W1G 8YP
UK

Stella Chaushu DMD, PhD
Associate Professor and Chair
Department of Orthodontics
Hebrew University–Hadassah School of Dental Medicine
PO Box 12272
Jerusalem 91120
Israel

Glenn William Cooper BDS, MSc, MOrth RCS
Southover Orthodontics Limited
80 Southover, Woodside Park
London N12 7HB
UK

Luc Dermaut DMD, PhD
Professor Emeritus
University Ghent
Bergbosstraat 212 9820
Merelbeke, Belgium

Gerald Gavron BDS, HdipDent, MDent (Orth) (Deceased)
Past Head
Department of Orthodontics
University of the Witwatersrand
Johannesburg, South Africa

Lee W Graber DDS, MS, PhD
830 West End Ct. Site 175
Vernon Hills, IL 60061
USA

Matie Grobler MChD DDO, RFPS
PO Box 1266
Pretoria, 0001
South Africa

Nigel WT Harradine BDS, LDS, MB BS, LRCP MRCS, FDS, FDS, MSc ORTH, M ORTH
Consultant Orthodontist
Bristol Dental Hospital and School
Bristol Dental Hospital, Lower Maudlin Street
Bristol BS1 2LY
UK

John Hickham DDS, MSD (Deceased)
Hilton Head Island, SC
USA

Liz Hopkins BDS, FDS RCS, DDO RCPS FHEA
Director of Orthodontic Therapy
The University of Warwick
Devon Square Orthodontics
29 Devon Square, Newton Abbot
Devon TQ12 2HH
UK

André O Hugo BDS, MDent
PO Box 5532
Weltevreden Park
Roodepoort 1715, Gauteng
South Africa

Alexander Jacobson DMD, Ms, MDS, PhD
1406 St James Court
Birmingham, Alabama 35243
USA

Laurance Jerrold DDS, JD. ABO
Chair, Division of Orthodontics
Lutheran Medical Centre New York
180 Riverside Blvd
Apartment 25 B
New York, NY 10069
USA

Robert A Katz BDS, MSc Dent, MS Orth
165 Hale Lane
Edgware Middlesex
HA8 9QN
UK

Brett Kerr BDS, LDS RCS, MDSc
Ashgrove Specialist Medical Centre
21 Harry St
Ashgrove
Queensland 4060
Australia

Victor Lalieu BDS, MDent MRACDS
Exact Orthodontics
4 Westminster Road
Indooroopilly, Brisbane
Queensland 4068
Australia

Anthony Lam BDS, MSc, MOrth RCS
Clinical teacher in Orthodontics
Department of Orthodontics
Guys Hospital, London
11, Devonshire Place
London W1G 6HT
UK

Iain Macleod BDS, PhD, FDS RCS, FRCR, DDRRCR, FSA
Hon Clinical Senior Lecturer
School of Dental Sciences
Newcastle University
Newcastle upon Tyne
UK

Antony GH McCollum BDS, HDD, MDent
Adjunct Professor
Department of Orthodontics
Faculty of Health Sciences
University of the Witwatersrand
South Africa

and

Kilcullen House
54 Old Kilcullen Road
Hurlingham Manor, Sandton
South Africa

Ronald G Melville BDS, D. Orth, RCS, FDS, RCS
31 Alphenvale
Private Bag X17
Constantia 7848, Cape Town
South Africa

Eliakim Mizrahi BDS, DOrth RCS, FDS RCS, MSc, PhD
9 Aspen Court
86 Holders Hill Road
London NW4 1LW
UK

Alison M Murray BDS, MSc, DOrth RCS, MOrth RCS, FDS PCPS, FDS RCS
Consultant Orthodontist
Royal Derby Hospital
Uttoxeter Road
Derby, DE22 3NE
UK

Brian Nebbe BDS, MDent, PhD, FRCD (C)
Suite 26, 171 Broadway Boulevard
Sherwood Park
Alberta T8H 2A8
Canada

Effie Patrikios BA
18 Cawarra Street
Carseldine, Brisbane
Queensland 4034
Australia

Demetri Patrikios BDS, HdipDent, Mdent
18 Cawarra Street
Carseldine
Brisbane
Queensland 4034
Australia

Farah R Padhani LDS, BDS, DOrth, MOrth RCS
Clinical Teacher in Orthodontic
Department of Orthodontics
King's College Hospital NHS Foundation
Bessemer Road
London SE5 9RS
UK

Alan Rumbak BSc, BDS, MSc, MDent
1 Oakridge Avenue
Radlett
Herts HP232 4BB
UK

Adam A Ryan BDSc, FDS RCS, MSc, MOrth RCS
Pond Cottage
Rocky Lane, Rotherfield Greys
Henley-on-Thames
Oxon RG9 4RD
UK

Nikita Sachdeva
Dartmouth College
Hanover, NH

and

Research Intern, OraMetrix, Inc.
2350, Campbell Creek Boulevard
Suite 400
Richardson, TX 75082
USA

Rohit CL Sachdeva BDS, MDSc
Co-Founder and Chief Clinical Officer
OraMetrix, Inc.
and
Clinical Professor
Department of Orthodontics
University of Connecticut
Farmington, Connecticut
USA

Lionel P Sadowsky DMD, BDS, DipOrth, MDent
Chair and Professor Emeritus
Department of Orthodontics
University of Alabama at Birmingham
Birmingham, AL

and

1057 W Century Drive # 119
Louisville, CO 80027
USA

Jonathan Sandler BDS, MSc, PhD, DOrthRCS, MOrthRCS, FDSPCPS, FDSRCS
Consultant Orthodontist
Chesterfield Royal Hospital NHS
Foundation Trust
Calow
Chesterfield Derbyshire S44 5BL
UK

Winston B Senior LLDS RCS, DDO RCPS
Northenden House
Sale Road
Northenden
Manchester M23 0DF
UK

Harold M Shavell DDS, FADI, FICD, FACD, FAAED
1341 Wessling Drive
Northbrook, Illinois 60062
USA

John J Sheridan DDs, MSD
Assistant Professor of Orthodontics
Jacksonville University
School of Orthodontics
2800 University Blvd.
N. Jacksonville, FL 32211
USA

Desmond Solomon LOTA
15 Bentley Way
Woodford Green
Essex, IG8 0SE
UK

W Aubrey Soskolne BDS, PhD
Professor Emeritus
Department of Periodontology
Hebrew University–Hadassah Faculty of Dental Medicine
PO Box 12272
Jerusalem 91120
Isreal

Nada M Souccar DDS, MS
Assistant Professor
Department of Orthodontics
University of Alabama at Birmingham
Birmingham, AL
USA

Ayala Stabholz DMD
Professor
Department of Periodontology
Hebrew University–Hadassah Faculty of Dental Medicine
PO Box 12272
Jerusalem 91120
Israel

Renton Tindall BDS MDent
3 Berkely Crescent
Durban North, 4051
South Africa

Pieter van Heerden BChD M DENT MChD
60-62 High Street
Harpenden
Herts AL5 2SP
UK

Colin Wallis BDS, LDS, DOrth MOrth RCS, BA, MSc
Meadowside
Ravensmere
Epping
Essex CM16 4PS
UK

Tom Weinberger BDS, FDS, DOrth RCS
Misgav Ladach Hospital
27, Hezkiyahu Hamelech Street
Jerusalem
Israel

1 THE RELEVANCE OF CONTINUING EDUCATION TO ORTHODONTIC PRACTICE

Nada M Souccar and Lionel P Sadowsky

CONTENTS

Orthodontics, as well as general dentistry and other clinical dental specialties, is undergoing significant change in research, information, technology and delivery systems.

Pearl: More specifically, in contemporary orthodontics with the rapid evolution of products and technologies, practitioners are required to make every effort to keep their knowledge and skills current and evidence based.

Continuing education (CE) is defined by the American Dental Association[1] as 'educational activities designed to review existing concepts and techniques, to convey information beyond the basic dental education and to update knowledge on advances in scientific, clinical, and non-clinical practice-related subject matter, including evidence-based dentistry'.

Pearl: The American Dental Association and other equivalent international bodies recognize continuing education to be a lifelong process that aims at providing the highest quality of service to patients, the public, and the profession by preserving, enhancing and refining the practice of dentistry.

Interestingly, this definition combines the practical and business side of dentistry, but also introduces the newer concept of evidence-based dentistry that will be further discussed later in this chapter.

The orthodontic specialty has been rapidly evolving and integrating new diagnostic tools as well as various advances in appliance design, treatment approaches, and multidisciplinary techniques, including soft tissue lasers, temporary anchorage devices, three-dimensional treatment planning, to name but a few. In today's fast-paced world, it becomes increasingly challenging for orthodontists to acquire and refine knowledge, particularly when scientific data is published at a rapid rate.[2,3]

1.1 VEHICLES OF CONTINUING EDUCATION

Traditionally, clinicians seek CE for two particular reasons. The first reason is to maintain active practice licences, memberships and certifications. The list of requirements varies from state to state in the United States and is available on the American Dental Association website. Similar requirements exist for different

countries and their own governing bodies. While most useful, this requirement does not usually lead to the most dynamic learning outcome. The second reason is when clinicians are faced with a difficult treatment decision or desire to learn more about a particular treatment or technology. In the latter situation, practitioners seek information using different formats, didactic courses, live activities, electronically mediated learning, and self-instructional activities that collectively fall under the umbrella of CE.[1]

The medical literature has reported investigations as to the best way to design and deliver CE seminars. The aim was to insure that the latest scientific findings are relayed to clinicians, thus improving their daily clinical practice. In an effort to evaluate the effectiveness of continuing medical education, a series of articles specifically looking into the impact of CE on knowledge, attitudes, skills practice behaviour and clinical practice outcomes was issued.[4–8] By comprehensively reviewing the available literature at the time of publication, the authors recommended using continuing medical education to improve physician's knowledge, favouring multimedia interventions and multiple instructional techniques instead of single-medium intervention and single techniques, as well as repeating the intervention rather than limiting it to a one-time experience. A recent publication by The National Dental Practice-Based Research Network indicates that a medium-range concordance exists between the clinical practice of dentistry and available research data.[9] Interestingly, this study showed that dentists who most commonly integrated research findings into clinical practice were females, those practicing within group dental offices, and those who received their degree prior to 1990. However, the authors were not able to provide definite explanations for their findings, and advocated more research to clarify them. These conclusions can be easily extrapolated to orthodontics. In choosing their CE courses, orthodontists can select their preferred media method, technique, and frequency of such courses. Media methods include live media, such as meetings and lectures; internet media such as webinars, online courses, and online communities; and print media, such as journals and textbooks.[7] Combinations of those vehicles are possible and make CE courses more appealing to clinicians.

The most traditional vehicle for CE is live media. The American Association of Orthodontists and various orthodontic organizations hold frequent national and local meetings to disseminate clinical knowledge among their communities, but also to inform their members about any guidelines, changes in legislation, advances in technology and practice management. The materials are usually available to orthodontists in hard copy at the end of the meeting. By combining two or more methods of data delivery, for example attending the meeting and then acquiring an audio-visual recording or a printed summary of the session, clinicians probably retain more information and increase the repeatability of their exposure. More importantly, by having frequent access to the lectures, orthodontists get an opportunity to compare this recent set of data to their acquired knowledge, and can make the decisions on whether to integrate the new information in their daily decision-making process. While it is easy to get influenced by charismatic speakers, the fact remains that each orthodontist has supposedly received a sound education during their residency programmes, and should be able to discern the commercial propaganda from sound scientific findings. In this context, it is interesting to note that many companies nowadays tend to bypass the orthodontist and advertise directly to the consumer, that is, the patient. Patients seem to be an easy target, because they generally lack the background needed to evaluate the validity of commercial claims. In this regard, it still is the orthodontist's responsibility to ensure that CE opportunities fulfil their stated purpose: an education that shapes their minds to make better chairside decisions for the best benefits of their patients, instead of being a mere technical repetition of procedures or training.

Internet media include webinars, online workshops, and virtual communities. The most important resource the Internet offers is perhaps the ability to access different portals of peer-reviewed publications. This wide topic will be discussed in the following section, and aims at integrating evidence in clinical practice. An investigation of the behaviour of physicians in seeking information to better

treat their patients highlighted the growing trend of searching the Internet for answers.[10] This tendency is exacerbated in the fresh graduates group who grew up using digital technology. Those young orthodontists feel comfortable accessing various websites and answering their queries in a timely manner. More senior clinicians might be intimidated by the tremendous volume of information available at their fingertips, and therefore may prefer the use of traditional learning resources versus online communities of practice for work and training.[11]

Webinars combine the advantages of live media and the convenience of learning from a remote location. They have steadily increased in popularity, as have online workshops which offer the possibility to interact with the speakers through teleconferencing and/or live chatting. Online communities are web-based groups that focus on orthodontics. They aim at disseminating orthodontic knowledge through continuing education, printed magazines and live events. Members of those communities can create their own profile, organize their activities and prioritize their interests. Online communities offer the ease of learning at one's own pace. They also constitute a good support system, mirroring the more customary study groups. These appear to be extremely appealing, particularly to young graduates, because they provide access to multiple media supports and offer various levels of evidence ranging from expert opinion (the 'how to' level, particularly suited for basic technical skills) to higher levels of evidence. The Internet is, however, just a tool to access various resources. Again, all online resources are not of equal validity, and a rigorous search of publications through various scientific portals varies tremendously from answers found in a discussion forum.

An interesting concept of web-based orthodontic education was recently tested in the United Kingdom.[12] A virtual learning environment was coupled to a regular academic setting. The advantages were time flexibility as well as a higher quality of presented data, and the opportunity to attend a lecture multiple times using the available library of presentations and topics. The low points of this investigation show that residents still like the interaction with instructors and peers. Those results can easily be extended to practicing orthodontists, and may represent the tipping point between exclusive web-based learning activities and in-person access to education.

1.2 INTEGRATING EVIDENCE BASED ORTHODONTICS IN CONTINUING EDUCATION

All methods of CE rely, among other important factors, on the quality of the promoted data. Aside from purely commercial communications, it is important for every orthodontist to be able to recognize the different levels of available evidence. The single most important advantage the Internet offers is the ability to access the most current literature and be aware of the scientific advances in our specialty. The American Association of Orthodontists[13] recently launched an application for electronic tablets that can be used to search its website and journal, recognizing by this move that many orthodontists nowadays are familiar and comfortable with technology.

Evidence-based medicine is defined by Sackett[14] as the 'conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research'. The American Dental Association[1] further emphases the importance of the three pillars of evidence-based dentistry, namely, published evidence, clinical experience and patient's desires in its adopted definition:

> **Pearl:** 'Evidence-based dentistry is an approach to oral health care that requires the judicious integration of systematic assessments of clinically relevant scientific evidence, relating to the patient's oral and medical condition and history, with the dentist's clinical expertise and the patient's treatment needs and preferences'.

It seems then that the best way to provide the highest standard of treatment is to be aware of the published literature and couple it with one's

own clinical judgment. However, all publications do not carry the same weight. In the accepted hierarchy of evidence for scientific articles, the scale going from weakest to strongest levels of evidence is as follows: editorials, expert opinions, case reports and case series, cross-sectional studies, case-control studies, cohort studies, randomized controlled trials, systematic reviews and meta-analyses.[15]

The volume of yearly publications requires clinicians to devote considerable amounts of time and effort to absorb and categorize the literature, and reach an informed approach to care. In this quest, it is very easy to ignore parts of the published materials, and limit one's knowledge to the most quoted articles or the most popular sayings. Moreover, the highest levels of evidence are only as good as the clinical trials they rely on, making them sometimes weak in nature. In addition to printed publications and continuing education programmes supported by dental schools and other official organizations, there are some web-portals that are excellent sources of information. The two most used platforms using the English language are the Cochrane Collaboration and Medline.[16]

The Cochrane Collaboration is a nonprofit organization whose aim is to collect independent research findings into evidence-based data about healthcare. It is regarded as one of the best resources for systematic reviews, mainly because of the rigorous methodology methods used to assess the available literature. The reviews are published in the Cochrane Library and organized by topic. They are updated periodically to reflect the latest advances in various medical fields. Dentistry and oral health topics are extensively reviewed, and orthodontic analyses are grouped under the craniofacial anomalies subheader.

Medline is the United States National Library of Medicine database for abstracts and citations related to biomedical information and clinical sciences. It is freely accessible on the Internet through the PubMed website which uses Medical Subject Heading (MeSH) terms to index citations. MeSH terms represent a controlled vocabulary that categorizes information for future retrieval. Medline can also be accessed through other interfaces such as Ovid and Ebsco, but these providers are restricted by license. The European equivalent of Medline is Embase, and is available via subscription though various gateways. Using the different databases, it becomes possible to critically review the literature and seek the best available evidence.

The concept of evidence-based orthodontics has generated heated debates in the orthodontic community, probably because of the versatility of orthodontic mechanics.[17] Two conflicting lines of thought clearly appeared: on the one hand clinicians who only trust their experience, and on the other researchers and academics who present the evidence-based approach as the only future of the specialty. The whole debate stems from the apparent contradictions between published research results and daily practitioner's observations. Significant topics such as intercanine distance, maxillary expansion, functional appliances, cephalometrics, and aesthetics highlight the divergence between the two camps.[18] It seems obvious at the present time that the specialty of orthodontics cannot survive without a commitment to excellence. Excellence comes from reflecting on past experiences and/or experiments and moving forward in a predictable, reproducible and innovative but safe way. There currently are increasing efforts to bridge the gap between academics, research and private practice through regional and national networks that investigate common clinical behaviour in relation to published evidence.

Pearl: It is essential to build partnerships between educators and clinicians and to recognize the importance of each of the party's contribution in order to achieve the best benefit for the patient.

REFERENCES

1. American Dental Association. Recognition Standards and Procedures Chicago, IL December 2013 [December 14, 2013]. Available from: http://www.ada.org/sections/educationAndCareers/pdfs/cerp_standards.pdf.

2. Van Harrison R. Systems-based framework for continuing medical education and improvements in translating new knowledge into physicians' practices. *J Contin Educ Health Prof.* 2004;24(Suppl 1):S50–62.

3. Andrews JE, Pearce KA, Ireson C, Love MM. Information-seeking behaviors of practitioners in a primary care practice-based research network (PBRN). *J Med Libr Assoc.* 2005;93(2):206–12.

4. Marinopoulos SS, Dorman T, Ratanawongsa N, Wilson LM, Ashar BH, Magaziner JL et al. Effectiveness of continuing medical education. *Evid Rep Technol Assess (Full Rep) No. 149*. 2007:1–69

5. Ratanawongsa N, Thomas PA, Marinopoulos SS, Dorman T, Wilson LM, Ashar BH et al. The reported validity and reliability of methods for evaluating continuing medical education: A systematic review. *Acad Med.* 2008;83(3):274–83.

6. Bordage G, Carlin B, Mazmanian PE, Committee ACoCPHaSP. Continuing medical education effect on physician knowledge: Effectiveness of continuing medical education: American College of Chest Physicians Evidence-Based Educational Guidelines. *Chest.* 2009;135(3 Suppl):29S–36S.

7. Mazmanian PE, Davis DA, Galbraith R, Committee ACoCPHaSP. Continuing medical education effect on clinical outcomes: Effectiveness of continuing medical education: American College of Chest Physicians Evidence-Based Educational Guidelines. *Chest.* 2009;135(3 Suppl): 49S–55S.

8. McGaghie WC, Siddall VJ, Mazmanian PE, Myers J, Committee ACoCPHaSP. Lessons for continuing medical education from simulation research in undergraduate and graduate medical education: Effectiveness of continuing medical education: American College of Chest Physicians Evidence-Based Educational Guidelines. *Chest.* 2009;135(3 Suppl):62S–8S.

9. Norton WE, Funkhouser E, Makhija SK, Gordan VV, Bader JD, Rindal DB et al. Concordance between clinical practice and published evidence: Findings from The National Dental Practice-Based Research Network. *J Am Dent Assoc.* 2014;145(1):22–31.

10. Bennett NL, Casebeer LL, Zheng S, Kristofco R. Information-seeking behaviors and reflective practice. *J Contin Educ Health Prof.* 2006;26(2):120–7.

11. Barnett S, Jones SC, Bennett S, Iverson D, Bonney A. Perceptions of family physician trainees and trainers regarding the usefulness of a virtual community of practice. *J Med Internet Res.* 2013;15(5):e92.

12. Mulgrew B, Drage K, Gardiner P, Ireland T, Sandy JR. An evaluation of the effects of a web-based modular teaching programme, housed within a virtual learning environment on orthodontic training for specialist registrars. *J Orthod.* 2009;36(3):167–76.

13. American Association of Orthodontists. AJO-DO Tablet App Now Available 2014 [cited Jan 2, 2014]. Available from: http://aao.informz.net/AAO/archives/archive_2909373.html.

14. Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: What it is and what it isn't. *BMJ.* 1996;312(7023):71–2.

15. Weyant R. Clinical research designs. In: Huang G, Richmond S, Vig K, Eds. *Evidence-Based Orthodontics*. UK: Wiley-Blackwell, 2011. pp. 15–29.

16. American Association of Orthodontists. Clinical Practice Guidelines for Orthodontics and Dentofacial Orthopedics 2008 [cited December 17, 2013]. Available from: http://www.mnortho.org/doc/Clinical-Practice-Guidelines-2008-2.pdf.

17. Johnston L. Playing doctor: Evidence-based orthodontics. In: Huang G, Richmond S, Vig K, Eds. *Evidence-Based Orthodontics*. UK: Wiley-Blackwell, 2011. pp. 293–9.

18. Gianelly A. Evidence-based therapy: An orthodontic dilemma. *Am J Orthod Dentofacial Orthop.* 2006;129(5):596–8; discussion 8.

2 ADMINISTRATION: THE PRACTICE

Eliakim Mizrahi, Victor Lalieu and Effie Patrikios

CONTENTS

2.1 PHYSICAL APPEARANCE AND LAYOUT

It is important to appreciate and understand that for a new patient, or for that matter any visitor, the external approach, the entrance, the appearance and atmosphere of the reception and waiting area, all contribute to create the first and lasting impression of your practice. The whole environment should appeal to the eye and give the impression of being bright, clean and airy. Whether you prefer modern contemporary or older period style as your personal taste, but the overriding principle still holds: keep it bright and light.

Lighting should be bright but not necessarily harsh. Bright areas help to elevate the mood of both the staff and the patients. This theme of brightness and light should be carried throughout the entire practice. The choice of colours and decor once again is a matter of personal taste and choice; try to select light as opposed to dark and oppressive colours and furniture.

Pearl: Keep it bright, light and clean.

Cleanliness should be a given and not need to be mentioned but this issue is so important I feel it needs to be stressed. Both clinical and nonclinical areas need to be kept spotless. Whether in-house staff members are responsible for cleaning or you employ a cleaning service, it is not always easy to get staff to clean to the standard that we would like. Unfortunately, it is an area of administration that needs constant monitoring.

Pearl: To make cleaning easier, try to keep the area uncluttered, use simple lightweight furniture, easy to move and easy to clean under.

2.1.1 Physical Layout

Remember, buildings and alterations are long-term investments and physical structures that cannot easily be changed; you need to do some careful research and plan well. Consideration of the physical design and layout are important at the new surgery/office planning stage, during the lifespan of the surgery/office, and as the working life of the clinician starts tailing off. The latter scenario is seldom given adequate consideration, Hamula points out that when the time comes to either sell your practice or take in an associate, a refurbished, modernized surgery/office is more marketable and will attract a higher price.[1] He believes that money spent in refurbishing an old, tired-looking practice will be more than recovered in the final sale.

At an early stage in your planning, I would strongly recommend a visit to the American Association of Orthodontists website, go to

'practice management' and click on the 'office design manual' (https://www.aaoinfo.org/practice/office-design-manual).

Two major issues will govern the physical layout. First, are you designing the practice from scratch with an open area available to you, or are you limited by an existing physical structure? Second, and probably more important, what is your available budget? Within the constraints of these limitations, there are some overriding principles that should be borne in mind.

2.1.1.1 Patient Flow

A patient entering the reception room will generally be seen first at the reception counter/desk and depending on the nature of the visit, the new patient will either be guided to a seat in the waiting area, or directed through to a consulting office or for patients under treatment, directed through to the surgery/operatory.

Pearl: Access to these two areas should be as direct as possible without the patient having to pass through any other rooms.

From these two areas, there should be access to the radiology room or other such designated area reserved for radiology. If possible access to the radiology room should be direct so that patients attending specifically for radiographs would not need to pass through other areas, such as the surgery/operatory or consulting office, where other patients may be under treatment. It is not necessary for patients to have access or sight of the accounts office, the laboratory, or the sterilizing area. On the other hand, staff should be able to move easily to all areas without too much interference with patient flow. If possible, it is an advantage to have a second private entrance to the premises, this allows the orthodontist and staff to arrive and leave whenever necessary without having to pass through the main entrance where there may be patients sitting in the waiting area.

2.1.1.2 Budget

Once again this is a very personal consideration specific to each individual and his or her particular circumstances; however, there are certain principles and generalizations that can be discussed. With regard to the cost of the physical structure, there is not much that can be said except that it is important to get more than one quote for the job; building costs do vary with different contractors. Try to get references on the contractor and speak to people for whom they may have worked for in the past. If possible, do not use a contractor who is a personal friend or a relative. Very often disputes arise regarding failure to meet certain specifications or time-related deadlines. It is far easier to be objective, demanding, and firm when dealing with a stranger on a purely business basis than when dealing with a personal friend or family member.

As opposed to the physical structures, the furniture and fittings can be more easily adapted to suit various budgets.

Pearl: For clinicians with a limited budget such as the newly qualified practitioner starting a new practice, keep the costs as low as possible particularly if the alternative will mean going into debt.

Shop around for furniture and equipment. There is available, low budget equipment and furniture, which looks good, and functions well. It may not last forever, but that is not so serious; once the practice is well established and there is a good income, you can afford to change or upgrade equipment and as a bonus there may be possible tax advantages. Very expensive equipment, which will probably last for many years, is a disadvantage, in some cases. Often, when you have been functioning for some years, you may find that the practice needs a refurbishment or you may feel that you would like to change the image of the practice. If the fittings and equipment were originally very expensive then you may be reluctant to change; however, if they were low budget items, you may well be happy to change or upgrade.

2.1.2 Reception Area

Pearl: Remember, this room creates the first impression and sets the tone for the entire practice.

Keep it bright, airy and clean. If your budget will allow, seek the advice of a professional interior decorator.

The front desk, depending on the size of the practice, can vary from a single desk to a large counter; either way, keep the counter level low, a high counter makes the room feel smaller, and sets up a physical and psychological barrier between the patient and the practice. Even with a low counter, it is still possible, with tops of varying widths, to keep any private documents and appointment books out of direct sight of the patient. As a rule, try to keep the counter surface free of clutter, keep patient cards or files and any other papers on counter levels below the main top. Make adequate provision for computer terminals and keyboards.

Pay careful attention to the selection of floor surfaces, furnishings, lighting, and seating. Remember that hard floors and surfaces contribute to higher noise levels. Try to keep the room warm, bright, and easy to clean.

In a practice with a large, young patient caseload, parents, siblings and friends often accompany these patients; these extra people take up space and adequate seating needs to be provided. Unfortunately, some parents do not exercise adequate control over accompanying smaller children who can create considerable turmoil and mess, so consider providing toys and books for young children. The furnishings should allow for a quick clean and tidy up.

Many practices now provide facilities for patient self-check-in (see Chapter 9). If you do intend to provide such a facility, make sure that is correctly situated with regard to visibility and accessibility.

2.1.3 Surgery/Operatory

2.1.3.1 Chair Layout

Whether you opt for single chair surgeries or open-plan multiple chair surgeries is your personal choice. Orthodontics is the one branch of dentistry that lends itself to open plan surgeries. The concept has been used for many years; it makes efficient use of space and equipment, it contributes to informality, which in turn makes for a pleasant and relaxed working atmosphere. The layout of chairs and cabinets are dependent on the shape of the area available. Square areas allow for a circular wheel-and-spoke, staggered, four chair corner, or straight-line chair layout, whereas, rectangular areas usually limit you to a staggered or straight-line option.

2.1.3.2 Cabinets

Generally, surgery cabinets are custom-made and fitted for each surgery/operatory. These are not cheap items. However, as an alternative, consider visiting office furniture showrooms. Office furniture and accessories, such as desk extensions, can easily be adapted as surgery items. Colours can be changed; legs can be chrome-plated or powder-coated and most important they can be made mobile by fitting castors. While custom-built cabinetry is usually fitted to the walls and floors, there are advantages to making them mobile. If you need to move premises, expand or change the practice layout, moving fixed cabinets is a problem. In spite of manufacturers' claims that the cabinets are demountable, invariably this process results in damage to the cabinets and walls.

Pearl: Mobile cabinets are easy to move, and facilitate layout changes.

This mobility also helps in cleaning and maintaining the floor areas and surrounding walls.

Every building authority has its specific health and safety codes and specifications with which the contractor should be familiar; these are usually fixed and inflexible.

Two aspects specific to dental/orthodontic surgeries with which contractors are not always that *au fait* with are the positioning of electrical outlets/points and plumbing requirements.

2.1.3.3 Electrical Outlets

Plan to have more than the minimum number of electrical outlets/points: do not skimp. Once the practice is up and running, invariably you will over the years keep purchasing appliances and gadgets which require power supply and with time you often find yourself

running out of electrical outlets. Site them correctly in relation to the working areas and at the correct heights. Depending on your cabinets, the electrical outlets should be at counter height for appliances that will rest on the counter tops and at skirting board heights for the rest. Try to avoid having a lot of loose wires hanging around particularly in the surgery/operatory. Included in the electrical planning, make adequate provision for telephone and computer terminals and links. It is advisable to have the power for computers on a different circuit to the general equipment circuits.

Many of our IT components, such as tablets mobile/cell phones, computers, modems, and printers, are capable of wireless communication. Bearing this in mind, take advice from the right consultants and check that the internal walls and partitions are not shielded with some form of metal lining that could interfere with wireless transmissions.

2.1.3.4 Plumbing Items

Plumbing items are fixed and need careful planning, if budgets and space allow, try to provide for extra key sites and junction boxes which may not be required at present, but will be valuable for future expansion. Plastic pipes incorporated in dental equipment may, with wear and tear, burst or become disconnected. Invariably, this will happen at night when mains water pressure increases.

Pearl: To prevent such accidents, it is advisable to provide for one valve or key (solenoid switch) strategically situated near the suite exit, which allows the last member of staff leaving the rooms at night to switch off both water and electrical supply to the entire suite (but not the power for computers).

2.1.3.5 Floor Covering

Whereas some areas of the practice offer you the choice of soft carpeted or hard flooring, the floors of the surgery must be of the hard type, either plastic, rubber, or ceramic. Each surface type has advantages and disadvantages. The surface must be easy to wash and clean, and in some countries it is a requirement for all joints in the floor surface to be sealed including the skirting board area. Ceramic surfaces may be attractive, but remember that if you drop orthodontic pliers on the floor, and at some stage you will, ceramic tiles will eventually start to show evidence of small chips. The surface should allow free movement of the operator's stool. Floor colouring is part of the overall decor; however, when choosing a colour, remember plain colours readily show shoe prints while mottled colours make it difficult to find any small item, such as a bracket or even a band that may fall on the floor. Floor colours or patterns can be used in an attractive manner to demarcate different areas in a multi-chair surgery.

2.1.3.6 Ambient Lighting

The modern operating light as a component of the dental chair unit provides more than adequate light. However, the ambient light in the surgery is an important feature that is often neglected. Dentistry/orthodontics is an activity that requires precise visual and digital activity. The eye performs increasingly better as illumination is increased but levels off as the light intensity reaches above 20,000 lux. Operating lights generally exceed 22,000 lux, consequently, if there is a large difference between the light intensity in the mouth and outside the mouth, the eye is forced to adapt to a continual change in light intensity as you focus in and out of the mouth. This continual adaptation induces excess eyestrain and fatigue. Not only is the intensity of light important, but also of equal importance is the quality and colour temperature of the light. It is believed that working under the correct kind of light is physiologically beneficial to the operator's health; we need to work under lighting with a colour temperature of 5000 kelvin or above. There are European and International Standards for dental surgery illumination levels. Din standard 67505 and ISO 9680: *The Right Light for Dental Surgeries*. The standards lay down the amount of light, its distribution, and its quality.[2] All these factors need to be taken into consideration when planning and designing your surgery/operatory, particularly

as we often spend more time at work than we do at home.

Contemporary low voltage halogen and LED lights have just about replaced the standard fluorescent light tubes. These small ceiling mounted lights lend themselves to variations in light intensity and also allow variations in design that make them useful as decorative features. There are special lighting consultants who could contribute significantly to your surgery/office lighting design.

Furthermore, the incorporation of hand-held IPad technology for the remote wireless control of lighting, sound, and audiovisual equipment adds a new and exciting dimension to the contemporary surgery/office of the twenty-first century.

2.1.4 Consulting Office

Ideally, this is a room apart from the surgery. If space and budget allow, try to include an examination chair in this room. It is very useful to have the facility to examine a new patient in a nonsurgical environment. It is a less threatening environment for the child patient and a more private environment for an adult patient. It also allows clinical work to carry on uninterrupted in the main surgery. The examination chair located in the consulting office need not be a large or fancy expensive dental chair, as an alternative, look for semireclining office chairs, or look through catalogues of hairdresser chairs. There are neat, modern, attractive low voltage lights on flexible arms, which can be used for the clinical examination. With the current mandatory use of gloves, it is preferable but not essential to include a washbasin in such a consulting office; if you do go out the room to wash your hands, it is advisable to let the patient see you fit on a new pair of gloves before carrying out any examination.

The design, shape, and placement of the desk should also lend itself to being informal. If your practice is still using conventional radiographic films, then a viewing box may either be cut into the desk top or placed as a standalone box at the side of the table. However, if you have converted to digital technology, then flat-screen monitors must be available either on the desk or on the wall. Whether you have multiple small screens or one large screen, make sure you have the facility to display, radiographs, photographs and scanned virtual study models either individually or simultaneously.

Pearl: Keep the desk surface uncluttered; clutter on a desk distracts the patient's attention and does not contribute to a professional atmosphere.

2.1.5 Radiology/Photography Room

While this facility could be incorporated into the clinical area of a large surgery/operatory, it is preferable to have a separate room for radiology and photography. The design and size of the area will depend on the equipment available. The essential components are

- Intraoral x-ray unit
- Panoramic x-ray unit
- Cephalometer
- Photographic set up for extra- and intra-oral photographs
- Conventional radiograph tracing table, or a digitizer
- Provision for any of the above to be digital either from the outset, or for future conversion with the possible incorporation of scanners, computers and all the other necessary supporting hardware
- Provision for a facility to darken the room to assist in tracing or digitizing radiographs

Pearl: The physical structure of the room and walls will need to comply with ionizing radiation regulations specific to the local or national building and planning authorities.

2.1.6 Laboratory

The size and sophistication of the laboratory will depend on how much in-house laboratory work you intend to do. Make provision for adequate sinks and hot and cold water taps.

Possible components for a small in-house laboratory are

- A model trimmer, which will need to be placed on a firm base and have a connection to both the cold water supply and to the drain.
- A plaster trap is essential to prevent blockage of the main drain.
- A laboratory handpiece.
- A polishing lathe with a pumice trough.
- Vibrator for casting models.
- A pressure or vacuum-forming machine for retainer and appliance fabrication.
- Depending on the amount of trimming that will take place; a dust evacuation system is desirable.
- A Bunsen burner and a soldering flame connected to either the gas mains or an independent gas tank. There are some very neat, small, stand-alone soldering gas torches available either from orthodontic supply houses or general hardware shops.
- Good lighting and ventilation. If the laboratory is to double up as a model storage area, then make provisions for the maximum amount of shelving the room will allow. Model storage is a problem that compounds itself with the ageing of the practice.
- A number of in-house laboratories are now incorporating model scanners.

Pearl: Make sure that the noise and smells from the laboratory do not permeate the rest of the suite: fit a good quality door.

2.1.7 Accounts Office

This office can be out of sight of the patients. The requirements of an accounts office will vary with the size of the practice. Some of the basic requirements are

- Adequate desk space
- Provision for telephone and computer terminals
- Filing cabinets
- Adequate storage space for stationery and any other office requirements; remember many practice are going paperless

If this office doubles up as the office for the practice manager, and if the sighting in the overall plan will allow, place a one-way mirror overlooking the reception area. This allows the practice manager to view and control this very important area.

Pearl: The more you can keep in this office the less clutter you will have at the front reception desk.

2.1.8 Cloakroom

The cloakroom and toilets must conform to planning authority requirements. This facility may be part of the main building or it may be an integral part of your suite. If it is your responsibility, then provide mirrors and counter space for ladies' toiletries and make-up requirements. Keep the area fresh and clean, and continually replenish all toiletry requisites.

2.2 STAFF

You will probably find over the years that managing staff and their related issues and problems will tax and stress you more than any malocclusion. We are trained to treat patients with malocclusions; we are not trained in the philosophy and psychology of human nature nor are we trained in employment laws and their practise.

Second only to patients, the staff comprise the most important component of your practice; they can almost make or break your practice. It is necessary for you to devote a major percentage of your energy and time to the management of your staff. The following suggestions may help you manage this difficult and sensitive component of clinical practice.

- Whenever possible attend courses on staff management, you will invariably learn something helpful.
- When selecting new staff, have a structured interview protocol.

- Understand that selection criteria for a front office/receptionist will be different to the criteria for a chairside assistant.
- For a young practice, where running costs are a significant factor, keep staff numbers to a minimum. As the practice grows, so you will increase the number of staff. When you can afford the salary, aim to employ more than the minimum number, an extra member of staff acting as a back-up helps to reduce the stress generated by absenteeism. If possible consider appointing one member of staff as the practice manager.
- Study the labour rules and regulations as they apply to your area and your practice. These laws are important and at all costs try to avoid and prevent any confrontation with staff that may result in legal proceedings. It is often more expedient to swallow one's pride, settle, and avoid litigation.
- If you are unhappy with a staff member early on in their employment, replace the individual. Experience has shown that individuals do not easily change their character; the problems you experience with an employee in the early days, do not disappear, in fact they get worse. Unfortunately, the more time and effort you expend on training, the more hesitant and reluctant you become to change staff and as time passes you may tend to settle for second best.

Pearl: Once you have good staff, make every effort to keep them.

Discharging a member of staff is probably one of the most unpleasant tasks we occasionally need to perform. Before confronting a member of staff, make sure that you conform with the current labour laws as they apply to you. In an editorial, White gives some thoughts on firing staff, but unfortunately there is no easy way to fire an individual.[3] Whatever the reasons that led to the need to fire a member of staff, it is essential that you remember to conduct yourself in a professional manner, protect the dignity of the employee, be courteous, be understanding, and never embarrass the individual.

Depending on the stage of your career, you may consider moving over to the concept of the 'extended duty orthodontic team' (see Chapter 9).

Health and safety legislation will vary with every country so make sure you are familiar with the requirements as they apply to a clinical environment. In the UK, the recent establishment of the Care Quality Commission (CQC) has added further requirements with regard to staff and patient protection.

Clearly, we expect our employees to have many virtuous qualities; one of these qualities is honesty. Invariably one or more of our staff handle money in one form or another. Over the years we have heard of cases, sometimes from colleagues who we know personally, where money of varying quantities, has been embezzled by a member of staff. How can we reduce this risk?

In a short article, Greco[4] explains a theory put forward by sociologist Donald K. Cressey (1919–1987) who points out that there are three essential conditions to induce dishonesty – Cressey's 'fraud triangle'. Firstly, pressure: the individual is under financial pressure. It is possible that the employer may have heard either from the individual concerned or other members of staff that there is a financial problem. Be sensitive to this type of information. Secondly, rationalization: the individual believes his/her action is justifiable. Perhaps they have asked for a salary increase that has been denied on more than one occasion. Be aware that this may induce a sense of dissatisfaction and possibly encourage rationalization of dishonest behaviour. The third leg of this triangle is opportunity. If the individual concerned has access to unsupervised or uncontrolled cash and the above two legs of the triangle are in place, then there is a fair chance that some dishonesty may manifest itself.

Pearl: An employer who is aware of the fraud triangle–pressure, rationalization and opportunity–has a chance to minimize the effect of each leg and so reduce the overall risk of dishonesty.

2.3 FORMS AND STATIONERY

All forms required for the administration and running of the practice can be purchased or custom-designed to suit your requirements. Before settling on a final design, why not first design the form on your own computer, print out a few, use them, and alter them until you are happy with the final design. The forms can then be produced commercially or printed in-house. Desktop publishing can add a new dimension to the administration of your practice. The content and design of the forms will be dictated by your personal preferences. Essentially, you will need standard information for administrative purposes, forms for medical and dental history, and for clinical examination, and a record card for noting all treatment procedures. Many contemporary practices have dispensed with paper forms and all data and clinical procedures are computerized. Before deciding on your own preference it is essential to research the subject extensively,[5] and consider some of the following issues:

- Your own level of computer literacy and technical know-how; your dependence on the computer and the effect any computer breakdown will have on your practice.
- The availability and the quality of support for both hardware and software.
- The reliability of back-up systems and the quality, reliability and discipline of your staff to maintain the back-up procedures.
- The admissibility of electronic data as evidence in the medicolegal context. Digital data, such as record cards, photographs, and radiographs, can all be altered and their reliability questioned.

Pearl: Both the paper and paperless systems have their advantages and disadvantages. There is no 'all or nothing' rule, each clinician should take from each system what he or she feels comfortable with.

For a detailed discussion of inter-, intra- and extraoffice communication as an orthodontic risk management tool, see Chapter 8.

2.4 STAFF MOTIVATION

Victor Lalieu

We have a 'Staff Social Club' – all members of staff contribute a small weekly amount to this fund and this is used to help fund various staff social functions with accompanying partners, for example, canoeing, weekends away to Sea World or to the wine-making district, 'skirmish' encounters, various dinners, go-cart racing, etc. I find that if the staff members have at least contributed some money (I make up the difference), they are more appreciative and involved in the outing (they want to get the most out of their contributions!). At our monthly staff meetings, each staff member must provide one point of interest or a new idea to improve the practice.

2.4.1 Staff Relationships

Effie Patrikios

I believe that it is imperative to understand that running a successful practice depends on several people and circumstances. I believe certain standards need to be maintained within the office procedures. A major part is the understanding of the needs of staff and your expectations of the delivery of their duties. You need a team that can be relied upon to work together for the ultimate benefit of all in the field. Just as a driver in a racing car on the race track needs to have so many different items serviced as he pulls into the pit so too does the orthodontic practice need to function. Each member of the team has a function to fulfil, together with the absolute consideration of all concerned in the team. Staff meetings provide a necessary and functional forum to assist in the process. Just as each patient brings their social structure to the practice so too does each member of staff (including the orthodontist). Consideration and intuitive recognition of these individual circumstances are vital.

Pearl: Each day, each patient and each member of staff will bring something different with them through the door.