

Clinical Dental Pharmacology

Edited by
Kamran Ali



WILEY Blackwell

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Qatar University

QU Health

College of Dental Medicine

Doha

Qatar

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This edition first published 2024
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Library of Congress Cataloging-in-Publication Data

Names: Ali, Kamran, editor.

Title: Clinical dental pharmacology / edited by Kamran Ali.

Description: Hoboken, NJ : Wiley-Blackwell, 2024. | Includes index.

Identifiers: LCCN 2024009202 (print) | LCCN 2024009203 (ebook) | ISBN

9781119984931 (paperback) | ISBN 9781119984948 (Adobe PDF) | ISBN

9781119984955 (epub)

Subjects: MESH: Pharmaceutical Preparations, Dental-pharmacology | Tooth

Diseases-drug therapy | Pharmacology, Clinical

Classification: LCC RK305 (print) | LCC RK305 (ebook) | NLM QV 50 | DDC

617.6/3061-dc23/eng/20240314

LC record available at <https://lccn.loc.gov/2024009202>

LC ebook record available at <https://lccn.loc.gov/2024009203>

Cover Design: Wiley

Cover Images: Courtesy of Kamran Ali

Set in 9.5/12pt STIXTwoText by Straive, Chennai, India

*My late parents for their relentless sacrifices and dedication;
their loving memories continue to inspire me.*

My dear wife, Mahwish, for her unwavering support, patience, and understanding.

My beloved sons, Asad and Turab, the greatest blessings in my life.

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List of Contributors

Kamran Ali

Qatar University
QU Health
College of Dental Medicine
Doha
Qatar

Sadeq Ali Al-Maweri

Qatar University
QU Health
College of Dental Medicine
Doha
Qatar

Gail V.A. Douglas

School of Dentistry
University of Leeds
Leeds
UK

Manal Matoug-Elwerfelli

Qatar University
QU Health
College of Dental Medicine
Doha
Qatar

Ewen McColl

Plymouth University
Faculty of Health
(Medicine, Dentistry, and Human Sciences)
Department of Clinical Dentistry
Plymouth
UK

Mahwish Raja

Qatar University
QU Health
College of Dental Medicine
Doha
Qatar

Susu M. Zughaier

Qatar University
QU Health
College of Dental Medicine
Doha
Qatar

Preface

It is a pleasure to share this book entitled *Clinical Dental Pharmacology*. Although there a large number of resources on pharmacology, there has been a long-standing need for a comprehensive text to support decision-making regarding drug prescriptions in clinical dental practice. I am positive that the book will address this gap and serve as an authentic resource for dental professionals and students alike.

The book covers common drugs prescribed by dental practitioners as well as systemic medications which may impact on provision of clinical dental care. A separate section on recognition and management common medical emergencies in dental practice is also included. Pharmacology is a complex subject and a plethora of new information on drugs emerges regularly. Dental professionals may find it difficult to keep pace with latest research and how different drugs may impact on their dental practice. The readers are signposted to professional guidelines from a variety of online sources to facilitate access to evidence-based and reliable information on each topic covered in the book. The readers are advised to consult the guidelines directly from the relevant websites to read the most updated version of the guidelines. Each chapter also includes online resources which can be used for patient education.

The book is aimed at a global audience and covers a wide range of topics. Dental professionals are reminded to consider their scope of practice in the light of national legislation and professional regulations and guidelines applicable to their geographic location. All health professionals must always act in the best interests of the patients and if management of a patient is beyond the expertise of a dental professional, it is best to seek advice from an appropriate colleague or specialist.

I am grateful to all authors for their excellent contributions.

Qatar University
QU Health College of Dental Medicine
Doha, Qatar
08 December 2023

KAMRAN ALI

Abbreviations

A&E	accident and emergency	LA	local anaesthesia
ACE	angiotensin-converting enzyme	LN	lingual nerve
AHA	American Heart Association	LOC	loss of consciousness
b.i.d.	bis in die – twice daily	Mane	in the morning
b.i.d.	quarter in die – four times daily	MAO	mono amino oxidase
BLS	basic life support	mg	milli gram
BNF	British National Formulary	MI	myocardial infarction
BP	blood pressure	mL	milli litre
BT	bleeding time	Nocte	at night
COPD	chronic obstructive pulmonary disease	°C	degree Celsius
		OD	once daily
CPR	cardiopulmonary resuscitation	°F	degree Fahrenheit
CVA	cerebrovascular accident	OSA	obstructive sleep apnoea
DM	diabetes mellitus	OTC	over the counter
DNF	dental national formulary	PO	per oral (by mouth)
EU	European Union	ppm	parts per million
-F	fluoride ion	PT	prothrombin time
HHV	human herpes virus	q.i.d.	quater in die – four times daily
HR	heart rate	s.c.	subcutaneous
IAN	inferior alveolar nerve	Stat	statim – immediately
IDN	inferior dental nerve	t.i.d.	ter in die – three times daily
IHD	ischaemic heart disease	TCA	tricyclic antidepressant
IM	intramuscular	tsp	teaspoon
INR	international normalised ratio	U.S.P.	United States pharmacopeia
ION	infra orbital nerve	w	with
IV	intravenous	w/o	without

Medications for Pain Control

SECTION I

Kamran Ali

Qatar University, QU Health, College of Dental Medicine, Doha, Qatar

1.1 INTRODUCTION

One of the commonest presenting complaint of patients in dentistry is pain, and dentists routinely advise/prescribe analgesics. However, the main purpose of analgesics is to provide symptomatic relief before definitive treatment and minimise pain following operative interventions. Pain control during operative dental procedures is usually accomplished with administration of local anaesthesia (Chapter 3). Appropriate management of dental and orofacial pain should address the cause of pain using a comprehensive clinical assessment and relevant investigations such as radiographs. For example, patients presenting with features of pulpitis may benefit from analgesics to achieve pain relief, and definitive pain relief is best obtained through operative management of the inflamed pulp. Similarly, the use of analgesics to manage pain related to a peri-radicular abscess can only provide a partial and temporary relief, at best. Definitive management of the abscess would require drainage of the abscess through root canal access opening or tooth extraction, as appropriate.

Some of the key principles which need to be observed when prescribing analgesics in dentistry are summarised as follows:

- *Undertake a comprehensive clinical assessment*
Before advising or prescribing an analgesic, it is important to assess the source of pain along with its character, severity, site, frequency, aggravating and relieving factors to aid an accurate diagnosis.
- *Choose an appropriate analgesic*
The choice of analgesic will depend on the cause and severity of pain as well as the patient's medical history and any contraindications. All medications have potential risks and benefits, and the choice of an analgesic should take into account the patient's systemic health, and any potential drug interactions of the proposed analgesics with any medications the patient may be taking.
- *Determine route of administration*
In most cases, analgesics used for the management of pain in dental patients are administered orally. However, for pain associated with certain chronic conditions, such as myofascial pain and internal derangement of temporomandibular joint, topical application may be appropriate to minimise the systemic side effects associated with long-term use of oral analgesics. Parenteral administration of analgesics for acute dental pain is usually not undertaken in general dental practice settings. Nevertheless, local anaesthetic administration can be used for immediate management of severe acute pain.
- *Determine the dose and duration of analgesics cover*
Analgesics should be used at the lowest effective dose for the shortest duration necessary. This can help reduce the risk of side effects and addiction and minimise the cost. In most

cases analgesics used for the management of acute dental pain are administered orally for few days until definitive management of the underlying problem. Similarly post-operative pain following invasive dental procedures requires analgesics for up to a week. However, pain associated with certain chronic conditions such as temporomandibular joint disorders (e.g., myofascial pain and internal derangement) and trigeminal neuralgia may require long-term analgesics. As mentioned before, topical application of analgesics may be considered if appropriate to minimise the systemic side effects associated with long-term use of analgesics.

- *Consider the cost of analgesics*

Many analgesics used in dentistry are available over the counter, and it may be much cheaper for the patients to purchase these themselves on a dentist's advice. Dispensing analgesics on a prescription may be more expensive for patients in many countries.

- *Patient education and follow-up*

Patients should be advised to read the patient information leaflet (PIL), accompanying the medication. The patients should be advised on how to take the medication safely and effectively. Also, precautions, side effects or adverse reactions to the medication and appropriate actions which may be required should be discussed. Patients should be followed up to ensure that the medication is effective and welltolerated and to make any necessary adjustments to the treatment plan.

1.2 NON-NARCOTIC ANALGESICS

Non-narcotic analgesics, also known as non-steroidal anti-inflammatory drugs (NSAIDs), are the most frequently used analgesics across the board in clinical medicine as well as dentistry. In addition to their analgesic effects, these drugs also have anti-inflammatory, antipyretic and antiplatelet activity. These drugs are widely used for short-term management of mild to moderate pain from various causes including dental pain. More severe pain, particularly of visceral origin, may require management with opioid analgesics either alone or in combination with NSAIDs.

1.2.1 MECHANISM OF ACTION

Tissue injury leads to breakdown of membrane phospholipids by the enzyme phospholipase A₂ (PLA₂). This results in the release of arachidonic acid (AA) from the membrane phospholipids. AA is metabolised via the cyclooxygenase (COX) and lipoxygenase (LOX) pathways as depicted in Figure 1.1.

Most NSAIDs are non-selective inhibitors of COX and target the two main isoforms of COX, i.e., COX-1 and COX-2. COX catalyses the formation of prostaglandins and thromboxane from AA. Aspirin inhibits COX irreversibly, while the other NSAIDs (e.g., indomethacin and diclofenac) cause reversible inhibition of COX. Steroids inhibit PLA₂ and block both the COX and LOX pathways.

The analgesic effect results from inhibition of prostaglandin synthesis (especially inhibition of PGE₂) as well as inhibition of bradykinin release from high-molecular-weight (HMW) kininogens in the blood plasma and tissues.