

European Journal of Dentistry

Editor-in-Chief

Dr. Necdet Adanir

Associate Professor and Coordinator of Restorative Dentistry, Department of Restorative Dentistry, College of Dentistry, King Faisal University, Al Ahsa, Saudi Arabia

Section Editors

Dr. Takashi Komabayashi

Department of Endodontics, College of Dental Medicine, University of New England, Portland, Maine, USA

Dr. Ulvi Kahraman Gursoy

Department of Periodontology, Institute of Dentistry, University of Turku, Turku, Finland

Dr. Wan Zaripah Wan Bakar

Prosthodontic Unit, School of Dental Science, Universiti Sains Malaysia, Health Campus, Kubang Kerian, Kelantan, Malaysia

Dr. Marco Cicciù

Department of Biomedical and Dental Sciences, Morphological and Functional Images, School of Dentistry, University of Messina, Messina, Italy

Dr. Cemil Yesilsoy

Department of Endodontics, Kornberg School of Dentistry, Temple University, Philadelphia, Pennsylvania, USA

Dr. Lucas da Fonseca Roberti Garcia

Department of Dentistry-Endodontics Division, Health Sciences Center, Federal University of Santa Catarina, Florianópolis, Santa Catarina, Brazil

Dr. Muhammad Sohail Zafar

Department of Restorative Dentistry, College of Dentistry, Taibah University, Madinah Munawarah, Saudi Arabia

Dr. Tiago Novaes Pinheiro

Department of Oral Pathology and Oral Medicine, School of Dentistry, School of Health Sciences, University of the State of Amazonas, Manaus, Amazonas, Brazil

Dr. Zohaib Khurshid

Department of Prosthodontics and Implantology, College of Dentistry, King Faisal University, Al Ahsa, Saudi Arabia

Dr. Andrea Enrico Borgonovo

Department of Oral Rehabilitation, Istituto Stomatologico Italiano, University of Milan, Milan, Italy

Dr. Fares Zeidán Chuliá

Department of Periodontology, Institute of Dentistry, University of Turku, Turku, Finland

Dr. Ali Murat Aktan

Department of Dentomaxillofacial Radiology, Faculty of Dentistry, Gaziantep University, Sehitkamil/Gaziantep, Turkey

Dr. Frederico Canato Martinho

Advanced Oral Sciences and Therapeutics-Endodontic Division, School of Dentistry, University of Maryland, Baltimore, Maryland, USA

Dr. Rodrigo Giacaman

Cariology Unit, Department of Oral Rehabilitation, Faculty of Dentistry, University of Talca, Ruta, Talca, Maule, Chile

Dr. Liviu Steier

Division of Restorative Dentistry, School of Dental Medicine, University of Pennsylvania, Philadelphia, USA

Dr. Kausar Sadia Fakhruddin

Department of Preventive and Restorative Dentistry, School of Dentistry, University of Sharjah, Sharjah, UAE

Dr. Yasser Khaled

Oral Pathology, Oral Medicine and TMD/Orofacial Pain, School of Dentistry, Marquette University, Milwaukee, Wisconsin, USA

Dr. Melinda Madléna

Department of Orthodontics and Pediatric Dentistry, Faculty of Dentistry, Semmelweis University, Budapest, Hungary

Dr. José João Mendes

Clinical Research Unit, Centro de Investigação Interdisciplinar Egas Moniz, Instituto Universitário Egas Moniz, Campus Universitário, Quinta da Granja, Monte de Caparica, Almada, Portugal

Dr. Pavel Cherkas

Department of Oral Physiology and Endodontics, Faculty of Dentistry, University of Toronto, Toronto, Ontario, Canada

Dr. Adepitan A. Owosho

Department of Oral and Maxillofacial Pathology, College of Dental Medicine, University of New England, Portland, Maine, USA

Dr. Konstantina Delli

Department of Oral and Maxillofacial Surgery, University Medical Center Groningen, Groningen, Netherlands

Dr. Arvind Babu Santosh

Faculty of Medical Sciences, School of Dentistry, University of the West Indies, Mona, Kingston, Jamaica

Dr. Hatem M. El-Damanhoury

Department of Preventive and Restorative Dentistry, School of Dentistry, University of Sharjah, Sharjah, UAE

Dr. Javier Mareque Bueno

Department of Oral Surgery, Facultat d'Odontologia, UIC Barcelona-Universitat Internacional de Catalunya, Barcelona, Spain

Dr. Domenico Dalessandri

Department of Orthodontics, School of Dentistry, University of Brescia, Brescia, Italy

Dr. Sonam Khurana

Department of Comprehensive Dentistry, Division of Oral and Maxillofacial Radiology, The University of Texas Health Science Center San Antonio, Texas, USA

Dr. Ikenna Isiekwe

Department of Child Dental Health, College of Medicine, University of Lagos, Ikeja, Lagos, Nigeria

Dr. Selma Jakupovic

Department of Restorative Dentistry with Endodontics, School of Dentistry, University of Sarajevo, Sarajevo, Bosnia and Herzegovina

Dr. Majid Ebrahimi

Department of Endodontics, Umeå University, Vårdvetarhuset, Umeå, Sweden

Dr. Arlette Suzy Setiawan

Department of Paediatric Dentistry, Faculty of Dentistry, Universitas Padjadjaran, Jawa Barat, Indonesia

Dr. Mustafa Alkhader

Department of Oral Medicine and Oral Surgery, Faculty of Dentistry, Jordan University of Science and Technology, Ar-Ramtha, Irbid, Jordan

Dr. Ana Pejčić

Department of Periodontology and Oral Medicine, Medical Faculty, University of Nis, Nis, Serbia

Dr. Fernanda de Carvalho Panzeri

Pires-de-Souza Department of Dental Materials and Prosthodontics, Ribeirão Preto School of Dentistry, University of São Paulo, São Paulo, Brazil

Dr. Alida Mahyuddin

Department of Family Dentistry, Faculty of Dentistry, The National University of Malaysia, Kuala Lumpur, Malaysia

Dr. Lucio Souza Goncalves

Department of Periodontology, Faculty of Dentistry, Estácio de Sá University, Rio de Janeiro, Brazil

Board of Reviewers

Dr. James Tsoi

Dental Materials Science, Applied Oral Sciences, Faculty of Dentistry, The University of Hong Kong, Sai Wan, Hong Kong, China

Dr. Umer Daood

Clinical Dentistry, Faculty of Dentistry, International Medical University, Bukit Jalil, Kuala Lumpur, Malaysia

Dr. Nathan S. Birnbaum

Department of Prosthodontics and Operative Dentistry, Tufts University School of Dental Medicine, Boston, Massachusetts, USA

Dr. Philippe Sleiman

Department of Endodontics, Adams School of Dentistry, The University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA

Dr. Gal Hiltch

Post-Graduate Program in Dentistry, Federal University of Rio Grande do Sul-UFRGS, Porto Alegre, Rio Grande do Sul, Brazil

Dr. Edward Lynch

Principal Director of Biomedical and Clinical Research, School of Dental Medicine, State University of Nevada, Las Vegas, Nevada, USA

Dr. Renato de Toledo Leonardo

Department of Restorative Dentistry, Araraquara Dental School, UNESP - Universidade Estadual Paulista, Araraquara, Sao Paulo, Brazil

Dr. Vinicius Rosa

Discipline of Oral Sciences, Faculty of Dentistry, National University of Singapore, Singapore

Dr. Herve Tassery

Laboratory of Bioengineering and Nano-science, Montpellier University, Montpellier, France

Dr. Jose Antonio Poli de Figueiredo

Department of Morphological Sciences, Federal University of Rio Grande do Sul-UFRGS, Porto Alegre, Rio Grande do Sul, Brazil

Dr. Nachum Samet

Department of Restorative Dentistry and Biomaterials Science, Harvard School of Dental Medicine, Boston, Massachusetts, USA

Dr. Ronald Ordinola-Zapata

Division of Endodontics, University of Minnesota School of Dentistry, Minneapolis, Minnesota, USA

Dr. Dinesh Rokaya

Biomaterial and Material for Dental Treatment, Faculty of Dentistry, Chulalongkorn University, Bangkok, Thailand

Dr. Ramanarayana Boyapati

Department of Periodontics, Sibar Institute of Dental Sciences, Takkellapadu, Guntur, Andhra Pradesh, India

Dr. Yeon Jung Kim

Department of Implantology, Department of Implantology, University of Santo Amaro-UNISA, São Paulo, Brazil

Dr. Francisco Vera-Sempere

Department of Pathology, Faculty of Medicine and Dentistry, La Fe University Hospital, University of Valencia, Valencia, Spain

Dr. Javed A. Qazi

Department of Periodontology and Oral Medicine, Peshawar Dental College, Peshawar, Pakistan

Dr. Meircurius Dwi Condro Surboyo

Oral Medicine Department, Faculty of Dental Medicine, Airlangga University, Surabaya, East Java, Indonesia

Dr. Prashant Bhasin

Department of Conservative Dentistry and Endodontics, Shree Bankey Bihari Dental College and Research Centre, Ghaziabad, Uttar Pradesh, India

Dr. Gaetano Isola

Department of General Surgery and Surgical-Medical Specialties, School of Dentistry, University of Catania, Catania, Italy

Scientific Advisory Board

Dr. Paul Vincent Abbott

UWA Dental School, The University of Western Australia, Nedlands, Western Australia, Australia

Dr. Tayfun Alacam

Department of Endodontics, Faculty of Dentistry, Gazi University, Emek, Ankara, Turkey

Dr. Khalid Almas

Department of Preventive Dental Sciences, College of Dentistry, Imam Abdulrahman Bin Faisal University, Dammam, KSA

Dr. Athanasios E. Athanasiou

Department of Dentistry, School of Medicine, European University Cyprus, Nicosia, Cyprus

Dr. Daniel W. Boston

Department of Restorative Dentistry, Kornberg School of Dentistry, Temple University, Philadelphia, Pennsylvania, USA

Dr. Serge Bouillaguet

Endodontics Unit, Section of Dental Medicine, Faculty of Medicine, University of Geneva, Geneva, Switzerland

Dr. William W. Brackett

Department of Restorative Sciences, Dental College of Georgia at Augusta University, Augusta, USA

Dr. Lorenzo Breschi

Department of Biomedical and Neuromotor Sciences, DIBINEM, University of Bologna, Bologna, Italy

Dr. Mijin Choi

Advanced Education Program in Prosthodontics, Department of Prosthodontics, College of Dentistry, New York University, New York, USA

Dr. David L. Cochran

Department of Periodontics, University of Texas Health Science Center at San Antonio, San Antonio, Texas, USA

Dr. M. Ali Darendeliler

Faculty of Medicine and Health, Discipline of Orthodontics and Paediatric Dentistry, School of Dentistry, University of Sydney, Sydney Dental Hospital, Sydney, Australia

Dr. Douglas S. Darling

Department of Oral Immunology and Infectious Diseases, and Center for Genetics and Molecular Medicine, University of Louisville, Louisville, Kentucky, USA

Dr. Mark Devlin

Department for Cleft Lip and Palate Surgery, Royal Hospital for Children, Glasgow, UK

Dr. Marianne Federlin

Department of Conservative Dentistry and Periodontology, University Medical Center Regensburg, Regensburg, Germany

Dr. Lorenzo Franchi

Department of Experimental and Clinical Medicine, School of Dentistry, Università degli Studi di Firenze, Firenze, Italy

Dr. Mark G. Hans

Department of Orthodontics, School of Dental Medicine, Case Western Reserve University, Cleveland, Ohio, USA

Dr. Varun Jindal

Department of Conservative Dentistry and Endodontics, Bhojia Dental College and Hospital, Baddi, Solan, Himachal Pradesh, India

Dr. Martin Jung

Policlinic for Operative and Preventive Dentistry, Faculty of Dentistry, Justus-Liebig-University, Giessen, Germany

Dr. Nicholas Kalavrezos

Department of Head & Neck Surgery, University College London Hospital, Bloomsbury, London, UK

Dr. Sharukh S. Khajotia

Division of Dental Biomaterials, College of Dentistry, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma, USA

Dr. Stavros Kiliaridis

Department of Orthodontics, University Clinics of Dental Medicine, Faculty of Medicine, University of Geneva, Geneva, Switzerland

Dr. Fatma Yesim Kirzioglu

Department of Periodontology, Faculty of Dentistry, Suleyman Demirel University, Dogu Kampusu, Isparta, Turkey

Dr. Enver Sedat Kucukay

Department of Endodontics, Faculty of Dentistry, Okan University, Gulbahar, Istanbul, Turkey

Dr. Anne Marie Kuijpers-Jagtman

Department of Orthodontics,
University of Groningen and University
Medical Center Groningen, Groningen,
Netherlands

Dr. Robert M. Love

School of Dentistry and Oral
Health, Griffith University, Griffith
Health Centre, Gold Coast Campus,
Southport, Australia

Dr. Martha E. Nunn

Department of Periodontics, School
of Dentistry, Creighton University,
Omaha, Nebraska, USA

Dr. Pertti Pirttiniemi

Department of Oral Development
and Orthodontics, Unit of Oral Health
Sciences, University of Oulu, Oulu
University Hospital, Medical Research
Center, Oulu, Finland

Dr. Raustia Aune

Research Unit of Oral Health
Sciences, Prosthetic Dentistry and
Stomatognathic Physiology, Faculty
of Medicine, University of Oulu, Oulu,
Finland

Dr. Paul A. Rosenberg

Department of Endodontics, New York
University College of Dentistry,
New York, USA

Dr. Stephen F. Rosenstiel

Division of Restorative and Prosthetic
Dentistry, College of Dentistry, The
Ohio State University, Columbus, Ohio,
USA

Dr. Axel Ruprecht

Department of Oral and Maxillofacial
Diagnostic Sciences, University of
Florida College of Dentistry, Florida, USA

Dr. Camila Sabatini

Department of Restorative Dentistry,
School of Dental Medicine, University
at Buffalo, New York, USA

Dr. Tuula Salo

Institute of Oral and Maxillofacial
Disease, University of Helsinki, and
HUSLAB, Department of Pathology,
Helsinki University Hospital, Helsinki,
Finland

Dr. Paul F. van der Stelt

Department of Oral and Maxillofacial
Radiology, Academic Centre
for Dentistry Amsterdam, Vrije
Universiteit and University of
Amsterdam, Gustav Mahlerlaan,
Amsterdam, Netherlands

Dr. Kathy K. H. Svoboda

Department of Biomedical Sciences,
Texas A&M University College of
Dentistry, Dallas, Texas, USA

Dr. Thomas E. Van Dyke

Department of Oral Medicine,
Infection and Immunity, School of
Dental Medicine, Harvard University,
Boston, Massachusetts, USA

Dr. Bart Van Meerbeek

KU Leuven BIOMAT, Department
of Oral Health Sciences, University
of Leuven & Dentistry University
Hospitals Leuven, Leuven, Belgium

Dr. Luca Testarelli

Department of Dental and
Maxillofacial Sciences, Sapienza
Università di Roma, Rome, Italy

Dr. Hakan Turkkahraman

Department of Orthodontics and Oral
Facial Genetics, School of Dentistry,
Indiana University,
Indianapolis, Indiana, USA

Dr. Serdar Usumez

Department of Orthodontics, Faculty
of Dentistry, University of Bezmi Alem,
Istanbul, Turkey

Dr. Michael H. Walter

Department of Prosthetic Dentistry,
Faculty of Medicine Carl Gustav Carus,
Technische Universität Dresden,
Dresden, Germany

Dr. Hom-Lay Wang

Department of Periodontics and
Oral Medicine, School of Dentistry,
University of Michigan, Ann Arbor,
Michigan, USA

Dr. Derrick Willmot

The School of Clinical Dentistry,
University of Sheffield, Sheffield, UK

© 2022. The Author(s). All rights, including the rights of publication, distribution, and sales, as well as the right to translation, are reserved. No part of this work covered by the copyrights hereon may be reproduced or copied in any form or by any means – graphic, electronic, or mechanical, including photocopying, recording, taping, or information and retrieval systems – without written permission of the publisher.

European Journal of Dentistry is published 4 times a year in February, May, July, and October by Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India. Tel: +91-120-4556600, Fax: +91-120-455-6649.

Subscription: Open access journals available online for free at <http://open.thieme.com>.

Advertisers contact: Marketing, Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India, marketing@thieme.in.

European Journal of Dentistry is indexed in PubMed, PubMed Central, Scopus, Index Copernicus, DOAJ. Thieme Medical Publishers is a member of the CrossRef initiative.

Editorial comments should be sent to journals@thieme.com. The content of this journal is available online at www.thieme-connect.com/products. Visit our Web site at www.thieme.com and the direct link to this journal at www.thieme.com/ejd.

Typesetting: Thomson Digital, Noida, India

Printing and Binding: Replika Press Pvt. Ltd.

Printed in India