



高雄醫學大學 | 口腔醫學院

## 第18屆研究日國際學術研討會

International Conference of the 18<sup>th</sup> Research Day  
College of Dental Medicine, Kaohsiung Medical University



**新視野：**  
顱顏診斷、影像技術、  
外科手術介入與跨領域合作

*New Horizons: Craniofacial diagnosis, imaging technologies,  
surgical interventions, and interdisciplinary collaboration*

# PROGRAM BOOK

2026 / **3 / 13** FRI  
五

**Venue** | 6F Auditorium II,  
Chi-Chuan Building, KMHU

**地點** | 高雄醫學大學附設醫院  
啟川大樓 6F 第二講堂

# International Conference of the 18<sup>th</sup> Research Day



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**新視野：**  
**顱顏診斷、影像技術、**  
**外科手術介入與跨領域合作**  
 New Horizons: Craniofacial diagnosis, imaging technologies,  
 surgical interventions, and interdisciplinary collaboration

**International Conference 國際學術研討會**

2026 / **3 / 13** FRI  
 Venue | 6F Auditorium II, Chi-Chuan Building, KMHU  
 地點 | 高雄醫學大學附設醫院 啟川大樓 6F第二講堂

Time 時間	Program/Topic 內容	Speaker 主講人	Moderator 主持人
08:50~09:10	Registration 報到		
09:10~09:30	Opening Remark 開幕式—貴賓致詞 (貴賓合照)		
09:30~10:10	<b>Topic 1</b> Behavioral Science at the Turning Point: From Principles to a New Era of Application 行為科學的轉捩點：從原則到應用的新時代	A.P. Masahiro Heima 平間雅博 Department of Global Relations and Human Sciences in Dentistry, Kagoshima University, Japan	Prof. Jiangu-Huei Jeng Kaohsiung Medical University 鄭景暉 教授 高雄醫學大學
10:10~10:50	<b>Topic 2</b> Pediatric Craniofacial Surgery: Interventions and Interdisciplinary Collaboration in Digital Era 兒童顱顏外科：數位時代的介入與跨領域合作	Dr. Muhammad Kamil Hassan Faculty of Dentistry, University of Malaya, Malaysia	Prof. Chun-Ming Chen Kaohsiung Medical University 陳俊明 教授 高雄醫學大學
10:50~11:10	Break		
11:10~11:50	<b>Topic 3</b> Surgery First Approach: Paradigm Shift of Orthodontic Treatment Based on Bone Metabolism Acceleration 手術首要策略：基於骨代謝加速的正顎矯正治療典範轉變	Prof. Tetsu Takahashi 高橋哲 Division of Oral and Maxillofacial Reconstructive Surgery, Graduate School of Dentistry, Tohoku University, Japan	A.P. Edward Chengchuan Ko Kaohsiung Medical University 柯政全 副教授 高雄醫學大學
11:50~12:10	<b>Topic 4</b> The Impact of Craniofacial Morphology on Obstructive Sleep Apnea 顱顏形態對阻塞性睡眠呼吸中止症的影響	Asst. P. Yu-Feng Chen School of Dentistry, College of Dental Medicine, Kaohsiung Medical University 陳裕豐 助理教授 高雄醫學大學	Prof. Yu-Chuan Tseng Kaohsiung Medical University 曾于娟 教授 高雄醫學大學
12:10~13:30	Lunch		
13:30~14:10	<b>Topic 5</b> Prevention and Treatment of Osteoradionecrosis 放射骨壞死的預防與治療	Prof. Yong-Deok Kim 金容德 Oral and maxillofacial Surgery, School of Dentistry, Pusan National University, Korea	Assistant Prof. Han-Jen Hsu Kaohsiung Medical University 許瀚仁 助理教授 高雄醫學大學
14:10~14:50	<b>Topic 6</b> New Horizons: Imaging technologies, surgical interventions of jaw deformity 影像技術、顎骨異常的外科手術介入新視野	A.P. Nobuyoshi Tomomatsu 友松伸允 Maxillofacial Surgery, Institute of Science Tokyo, Japan	A.P. Wen-Chen Wang Kaohsiung Medical University 王文岑 副教授 高雄醫學大學
14:50~15:20	Coffee Break		
15:20~16:00	<b>Topic 7</b> Tissue regeneration: From Bench to Patient Bedside: The Road to Impact 組織再生：實驗室研究到病人床邊的轉化之旅	Asst. P. Paksinee Kamolratanakul Department of Oral and Maxillofacial Surgery, Chulalongkorn University, Thailand	Prof. Yan-Hsiung Wang Kaohsiung Medical University 王彥雄 教授 高雄醫學大學
16:00~16:20	<b>Topic 8</b> AI-Assisted Detection of Cervical Lymph Node Metastases in Oral Squamous Cell Carcinoma 人工智慧輔助診斷口腔鱗狀細胞癌頸部淋巴結轉移	Asst. P. Chih-Huang Tseng School of Dentistry, College of Dental Medicine, Kaohsiung Medical University 曾智皇 助理教授 高雄醫學大學	Prof. Yen-Yun Wang Kaohsiung Medical University 汪碩雲 教授 高雄醫學大學
16:30~17:00	Closing & Awards Ceremony 頒獎暨閉幕式 (大合照)		
Poster Exhibition 貼示報告海報展			
2026/03/13	E-poster Exhibition 電子海報展	Venue   6F Atrium Plaza, Chi-Chuan Building, KMHU	
2026/03/13 12:20~13:20	E-poster Session 電子海報展示交流與諮詢	地點   高醫大附設醫院 啟川大樓 6F中庭廣場	
Activities 系列活動			
2026/03/12	International Conference of the 18 <sup>th</sup> Research Day, College of Dental Medicine, Kaohsiung Medical University: Oral Presentation & Competition for Students 高雄醫學大學口腔醫學院第18屆研究日國際學術研討會 論文口頭報告暨學生論文競賽	Venue   College of Dental Medicine, 5F, International Academic Research Building, KMHU 地點   高醫大 國際學術研究大樓5F 口腔醫學院	

備註：1.本研討會已申請本校教師成長計分：研究成長2分。  
 2.主辦單位保有最終修改、變更、活動解釋及取消本活動之權利，若有相關異動將會公告於網站或另行通知。

Organizer | College of Dental Medicine, Kaohsiung Medical University (KMHU) 主辦單位 | 高雄醫學大學口腔醫學院

Co-organizers | Life Sciences Research Promotion Center, National Science and Technology Council 協辦單位 | 國家科學及技術委員會補助生命科學研究推動中心  
 Education University of Science and Technology, Ministry of Education 教育部大學校院學生雙語化學習計畫  
 School of Dentistry and Department of Oral Hygiene, KMHU 高雄醫學大學牙醫學系、口腔衛生學系  
 Department of Dentistry, KMHU 附設中和紀念醫院牙科部  
 Department of Clinical Education and Train, Physician Training Center, KMHU 附設中和紀念醫院臨床教育訓練部訓練中心  
 Dental Alumni Association, KMHU 高雄醫學大學牙醫系校友會  
 Global Center of Excellence for Oral Health Research and Development, KMHU 全球卓越口腔健康研究發展中心  
 Oral Maxillofacial Imaging Center, KMHU 口腔顎顏面影像研究中心  
 Dental Medical Devices and Materials Research Center, KMHU 齒科醫療器材產業研究中心  
 Anaerobic and Oral Microorganism Research Center, KMHU 厭氣與口腔微生物研究中心  
 Department of Dentistry, KMHU Gangshan Hospital 高雄醫學大學附設 醫岡山醫院牙科部  
 Department of Dentistry, Kaohsiung Municipal Siaoong Hospital 高雄市長小港醫院牙科部  
 Department of Dentistry, Kaohsiung Municipal Cijin Hospital 高雄市長旗津醫院牙科部

*International Conference of the 18<sup>th</sup> Research Day*

**高雄醫學大學口腔醫學院  
第 18 屆研究日國際學術研討會**

**International Conference of the 18<sup>th</sup> Research Day  
College of Dental Medicine, Kaohsiung Medical University**

活動日期：2026 年 3 月 13 日星期五

Date：Fri., March 13, 2026

活動地點：高雄醫學大學附設醫院啟川大樓 6F 第二講堂

Venue：6F Auditorium II, Chi-Chuan Building, Kaohsiung Medical University Hospital

主辦單位：高雄醫學大學口腔醫學院

Organiser：College of Dental Medicine, Kaohsiung Medical University (KMU)

協辦單位：國家科學及技術委員會補助生命科學研究推動中心

教育部大專校院學生雙語化學習計畫

高雄醫學大學口腔醫學院牙醫學系、口腔衛生學系、全球卓越口腔健康研究發展中心、口腔顎顏面影像研究中心、齒科醫療器材產業研究中心、厭氧暨口腔微生物研究中心

高雄醫學大學附設中和紀念醫院牙科部、附設中和紀念醫院臨床教育訓練部醫師訓練中心

高雄醫學大學牙醫學系總校友會

高雄醫學大學附設高醫岡山醫院牙科部

高雄市立小港醫院牙科部

高雄市立旗津醫院牙科部

Co-Organisers：Life Sciences Research Promotion Center, National Science and Technology Council

The Program on Bilingual Education for Students in College, Ministry of Education

School of Dentistry and Department of Oral Hygiene, KMU

Global Center of Excellence for Oral Health Research and Development, KMU

Oral Maxillofacial Imaging Center, KMU

Dental Medical Devices and Materials Research Center, KMU

Anaerobic and Oral Microorganism Research Center, KMU

Department of Dentistry, KMUH

Department of Clinical Education and Train, Physician Training Center, KMUH

Dental Alumni Association, KMU

Department of Dentistry, KMU Gangshan Hospital

Department of Dentistry, Kaohsiung Municipal Siaogang Hospital

Department of Dentistry, Kaohsiung Municipal Cijin Hospital

## International Conference of the 18<sup>th</sup> Research Day

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## **Preface**

### 序言（院長的話）

Dear Colleagues,

It is our great honor and pleasure to welcome you to the International Conference of the 18th Research Day, College of Dental Medicine, Kaohsiung Medical University, held on March 13, 2026, in Kaohsiung, Taiwan. Under the theme “New Horizons: Craniofacial Diagnosis, Imaging Technologies, Surgical Interventions, and Interdisciplinary Collaboration,” this conference brings together distinguished scholars, clinicians, and researchers from across Asia to share cutting-edge knowledge and foster meaningful academic exchange.

The rapid advancement of digital technologies, biomedical sciences, and interdisciplinary collaboration has profoundly transformed the landscape of dental medicine and craniofacial care. From behavioral science and pediatric craniofacial surgery to orthognathic surgery, sleep medicine, tissue regeneration, and artificial intelligence–assisted diagnostics, this conference highlights how emerging innovations are reshaping both research paradigms and clinical practice. By integrating basic science, advanced imaging, surgical expertise, and data-driven technologies, we aim to explore new strategies that enhance diagnostic accuracy, treatment effectiveness, and patient-centered outcomes.

This year’s program features an exceptional lineup of international and domestic speakers from Japan, Malaysia, Korea, Thailand, and Taiwan. Their presentations span a broad spectrum of topics, including the application of behavioral science in dentistry, digitally assisted pediatric craniofacial interventions, surgery-first orthodontic approaches based on bone metabolism acceleration, craniofacial risk factors for obstructive sleep apnea, prevention and management of osteoradionecrosis, state-of-the-art orthognathic surgical planning, tissue regeneration from bench to bedside, and AI-assisted detection of cervical lymph node metastases in oral cancer. Together, these sessions reflect the conference’s commitment to academic excellence, clinical relevance, and translational impact.

In addition to the main conference, student oral presentations, competitions, and electronic poster sessions provide an important platform for young researchers to present their work, exchange ideas, and engage with experts in the field. These activities underscore our dedication to nurturing the next generation of dental professionals and researchers.

We sincerely thank all speakers, moderators, organizers, co-organizers, and participants for their invaluable contributions and support. We hope that this conference will inspire new perspectives, stimulate interdisciplinary collaboration, and contribute meaningfully to the advancement of dental medicine and craniofacial research. We wish you a rewarding and enriching conference experience.

*Jiang-Huei Jeng*

Jiang-Huei Jeng, DDS, Ph.D.  
Dean, College of Dental Medicine  
Kaohsiung Medical University  
2026.03.13

## The Agenda of International Conference 國際學術研討會議程

International Conference (國際學術研討會)			
Date :	2026/03/13 (Fri)		
Venue :	6F Auditorium II, Chi-Chuan Building, KMHU		
地點 :	高雄醫學大學附設醫院啟川大樓 6F 第二講堂		
Agenda (議程)			
Time (時間)	Program/Topic (內容)	Speaker (主講人)	Moderator (主持人)
08 : 50~09 : 10	<b>Registration 報到</b>		
09 : 10~09 : 30	<b>Opening Remark 開幕式-貴賓致詞 (貴賓合照)</b>		
09 : 30~10 : 10	<b>Topic 1 :</b> <i>Behavioral Science at the Turning Point: From Principles to a New Era of Application (行為科學的轉捩點：從原則到應用的新時代)</i>	A.P. Masahiro Heima Department of Global Relations and Human Sciences in Dentistry Kagoshima University, Japan	Prof. Jjiang-Huei Jeng Kaohsiung Medical University 鄭景暉教授 高雄醫學大學
10 : 10~10 : 50	<b>Topic 2 :</b> <i>Pediatric Craniofacial Surgery: Interventions and Interdisciplinary Collaboration in Digital Era (兒童顱顏外科：數位時代的介入與跨領域合作)</i>	Dr. Muhammad Kamil Hassan Faculty of Dentistry University of Malaya, Malaysia	Prof. Chun-Ming Chen Kaohsiung Medical University 陳俊明教授 高雄醫學大學
10 : 50~11 : 10	<b>Break</b>		
11 : 10~11 : 50	<b>Topic 3 :</b> <i>Surgery First Approach: Paradigm Shift of Orthodontic Treatment Based on Bone Metabolism Acceleration (手術首要策略：基於骨代謝加速的正顎矯正治療典範轉變)</i>	Prof. Tetsu Takahashi Division of Oral and Maxillofacial Reconstructive Surgery, Tohoku University Graduate School of Dentistry Tohoku University, Japan	A.P. Edward Chengchuan Ko Kaohsiung Medical University 柯政全副教授 高雄醫學大學
11 : 50~12 : 10	<b>Topic 4 :</b> <i>The Impact of Craniofacial Morphology on Obstructive Sleep Apnea (顱顏形態對阻塞性睡眠呼吸中止症的影響)</i>	Asst. P. Yu-Feng Chen School of Dentistry, College of Dental Medicine Kaohsiung Medical University, Taiwan 陳裕豐助理教授 高雄醫學大學	Prof. Yu-Chuan Tseng Kaohsiung Medical University 曾于娟教授 高雄醫學大學
12 : 10~13 : 30	<b>Lunch</b>		
13 : 30~14 : 10	<b>Topic 5 :</b>	Prof. Yong-Deok Kim Oral and maxillofacial	Assistant Prof. Han-Jen Hsu Kaohsiung Medical University

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	Prevention and Treatment of Osteoradionecrosis (放射性骨壞死的預防與治療)	Surgery, School of Dentistry Pusan National University, Korea	許瀚仁助理教授 高雄醫學大學
14 : 10~14 : 50	<b>Topic 6 :</b> <i>New Horizons: Imaging technologies, surgical interventions of jaw deformity (影像技術、顎骨異常的外科手術介入新視野)</i>	A.P. Nobuyoshi Tomomatsu Maxillofacial Surgery Institute of Science Tokyo, Japan	A.P. Wen-Chen Wang Kaohsiung Medical University 王文岑副教授 高雄醫學大學
14 : 50~15 : 20	<b>Coffee Break</b>		
15 : 20~16 : 00	<b>Topic 7 :</b> <i>Tissue regeneration: From Bench to Patient Bedside: The Road to Impact (組織再生：實驗室研究到病人床邊的轉化之旅)</i>	Asst. P. Paksinee Kamolratanakul Department of Oral and Maxillofacial Surgery Chulalongkorn University, Thailand	Prof. Yan-Hsiung Wang Kaohsiung Medical University 王彥雄教授 高雄醫學大學
16 : 00~16 : 20	<b>Topic 8 :</b> <i>AI-Assisted Detection of Cervical Lymph Node Metastases in Oral Squamous Cell Carcinoma (人工智慧輔助診斷口腔鱗狀細胞癌頸部淋巴結轉移)</i>	Asst. P. Chih-Huang Tseng School of Dentistry, College of Dental Medicine Kaohsiung Medical University, Taiwan 曾智皇助理教授 高雄醫學大學	Prof. Yen-Yun Wang Kaohsiung Medical University 汪硯雲教授 高雄醫學大學
16 : 30~17 : 00	<b>Closing &amp; Awards Ceremony 頒獎暨閉幕式 (大合照)</b>		
<b>Poster Exhibition (貼示報告海報展)</b>			
2026/03/13	<b>E-poster Exhibition (電子海報展)</b>	Venue : 6F Atrium Plaza, Chi-Chuan Building, KMUH 地點：高醫大附設醫院啟川大樓 6F 中庭廣場	
2026/03/13 12 : 20~13 : 20	E-poster Session (電子海報展示交流與答詢)		
<b>Activities (系列活動)</b>			
2026/03/12	<b>International Conference of the 18<sup>th</sup> Research Day, College of Dental Medicine, Kaohsiung Medical University: Oral Presentation &amp; Competition for Students</b> (高雄醫學大學口腔醫學院第 18 屆研究日國際學術研討會論文口頭報告暨學生論文競賽)	Venue : College of Dental Medicine, 5F, International Academic Research Building, KMU 地點：高醫大國際學術研究大樓 5F 口腔醫學院	

**Topic 1**

**Behavioral Science at the Turning Point:  
From Principles to a New Era of Application**

Associate Professor Masahiro Heima  
Kagoshima University, Japan

In my lecture, two fundamental and representative theoretical models from behavioral science will be introduced, both of which are applicable to dental practice, clinic management, and revenue generation.

The lecture will also discuss non-pharmacological behavior management strategies in the dental clinic based on these models and more.

Furthermore, current challenges beyond these approaches and potential solutions will be presented.

**Speaker : A. P. Masahiro Heima**

**CURRICULUM VITAE**  
**Masahiro Heima**



**Affiliation:**

Associate professor  
Global Relations and Human Sciences in Dentistry  
Department of Social and Behavioral Medicine  
Graduate School of Medical and Dental Sciences  
Kagoshima University  
Adjunct Associate Professor  
Pediatric Dentistry  
The School of Dental Medicine  
Case Western Reserve University

**Education:**

- 07/2008 – 12/2012 Certificate of Pediatric Dentist, Case Western Reserve University, Cleveland, USA
- 04/1996 – 03/2000 PhD. Okayama University, Okayama, Japan
- 04/1990 – 03/1996 DDS. Okayama University, Okayama, Japan
- 04/1984 – 03/1986 Certificate of Dental Technician, Okayama Dental Laboratory Technicians School, Okayama, Japan

**Honors and Awards:**

- Kagoshima Startup Growth Support Program 'CHEST' Role: PI, Platform for All Regions of Kyushu & Okinawa for Startup-ecosystem (Step 1) Role: PI, 10/1/2024-9/31/2025
- The Effect of Daily Life Discrimination on Health Care Behavior among Sexual Minorities, Grant Funded by Japan Society for the Promotion of Science, Role: PI, 4/1/2024-3/31/2028
- Sakura Science Program 2024 Grant funded by Japan Science and Technology Agency, S2024F0200055, 7/21/2024-7/28/2024,
- Development of a Scale for Power Harassment and Academic Harassment in STEM Academia, Grant Funded by Japan Society for the Promotion of Science, Co-inv. 21H03171, 4/1/2021-3/31/2024
- Development of a Questionnaire to Explore the Characteristics of Hospitals that are Accessible to Sexual and Gender Minority Patients, Grant Funded by Japan Health Academy, co-PI, 4/1/2020-3/31/2022
- Provider-Patient-Caregiver Interactions in Pediatric Dentistry, Grant Funded by NIH, NIDCR, R21 DE026540-01, PI: Daniel W. McNeil & Cheryl B. McNeil Role: Co-Inv. 9/1/2017-8/31/2019

and more

**Institutional Service:**

Head of International Activities and Education  
Chair of the International Exchange Committee

and more school/university-level activities

**Professional Associations:**

The Pediatric Oral Health Research Group, the International Association for Dental, Oral, and Craniofacial Research

Vice President (2023-2024)

President-elect (2024-2025)

President (2025-2026)

**Research Interests:**

Reducing oral health disparities

Dental fear and anxiety

Behavioral science in Dentistry...

**Publications:**

- Yamazaki Y, Nomura K, Sato K, Nohara M, Kataoka H, Okubo Y, Karita K, Heima M, Shimizu I, Kitano N, Oshio A. Development of the Academic Harassment Tendency Scale for Science Academia. *Journal of Academic Ethics*. 2025 Jul 19:1-24.
- Heima M, Stehli K. Reliability and Validity of the Dental Anxiety Question Used With Children. *Anesth Prog*. 2022 Sep 1;69(3):13-19.
- Heima M, LIN YC, Miura H, Indo H, Nishitani Y, Promising Effects of An Online Studying Abroad Program with Cultural Exchange, *JDE*, 2021 Oct 6; 86(Suppl. 1):787–788.
- Chen J, Duangthip D, Gao SS, Huang F, Anthonappa R, Oliveira BH, Turton B, Durward C, El Tantawi M, Attia D, Heima M, Muthu MS, Maharani DA, Folayan MO, Phantumvanit P, Sitthisettapong T, Innes N, Crystal YO, Ramos-Gomez F, Medina AC, Lo ECM, Chu CH. Oral Health Policies to Tackle the Burden of Early Childhood Caries: A Review of 14 Countries/Regions. *Front Oral Health*. 2021 Jun 9;2:670154.
- Vincent A, Easton S, Serman J, Farkas K, Heima M. Acceptability and Demand of Therapy Dog Support Among Oral Health Care Providers and Caregivers of Pediatric Patients. *Pediatric Dentistry*. 2020 Jan 15;42(1):16-21.
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- Heima M, Ferretti M, Qureshi M, Ferretti G. The effect of social geographic factors on the untreated tooth decay among Head Start children. *J Clin Exp Dent*. 2017 Oct 1;9(10):e1224-e1229.
- Heima M, Heaton L, Gunzler D, Morris N. A mediation analysis study: The influence of mothers' dental anxiety on children's dental utilization among low-income African Americans. *Community Dent Oral Epidemiol*. 2017 Jul 20. 45(6), 506-511
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and over 40 publications and over 60 international presentations.

**Topic 2**

**Pediatric Craniofacial Surgery:  
Interventions and Interdisciplinary Collaboration in Digital Era**

Dental Lecturer Muhammad Kamil Bin Hassan  
University of Malaya, Malaysia

The advent of digital technologies has significantly transformed the field of pediatric craniofacial surgery towards enhancing precision in diagnosis, planning, intervention and outcomes. The lecture explores the evolving role of interdisciplinary collaboration facilitated by digital tools such as 3D imaging, virtual surgical planning, computer-assisted design and patient-specific implants. Emphasizing a patient-centered approach, the integration of these innovations promotes comprehensive treatment strategies, improves surgical accuracy, and optimizes long-term functional and aesthetic results. The review highlights current advancements, challenges, and future perspectives in leveraging digital solutions to advance pediatric craniofacial interventions through global collaborative efforts across specialties.

**Speaker : Dr. Muhammad Kamil Hassan**



**CURRICULUM VITAE**  
**Muhammad Kamil Bin Hassan**

**Affiliation:**

Dental Lecturer

Department of Oro-maxillofacial Surgical & Medical Sciences

Faculty of Dentistry, University Malaya, Kuala Lumpur, Malaysia

**Education:**

2019 FFDRCSI, Oral and Maxillofacial Surgery,  
Royal College of Surgeons In Ireland, UK

2018 MSc, Oral Surgery, Trinity College, Dublin, Ireland

2012 BDS, Dental Surgery, University College of Cork, Ireland

**Experience:**

- Coordinator, Faculty, 19/02/2021 to present
- Committee Members, Faculty, 07/06/2024 to 07/06/2025
- Committee Members, University Malaya, 14/06/2024 to 31/10/2024
- Task Force Member, Department, 02/01/2024 to 31/12/2024
- Committee Members, Faculty, 18/12/2023 to 18/12/2024
- Committee Members, Faculty, 17/11/2023 to 24/04/2024
- Deputy Head, Faculty, 01/03/2023 to 01/03/2024
- Chairman, Faculty, 22/08/2022 to 31/12/2024
- Coordinator, Department, 01/01/2023 to 31/12/2023
- Coordinator, Department, 01/01/2023 to 31/12/2023
- Deputy Head, Department, 01/01/2023 to 31/12/2023
- Coordinator, Department, 01/01/2022 to 31/12/2022
- Coordinator, Department, 01/01/2022 to 31/12/2022
- Deputy Head, Department, 01/01/2022 to 31/12/2022
- Committee, Faculty, 08/11/2021 to 23/03/2022
- Chairman, Faculty, 25/03/2021 to 31/12/2021

**Memberships:**

- Faculty of Dental Surgery, Royal Colleges of Surgeons (Edinburgh), Membership, Since 2015 (International)
- Fellowship of Faculty of Dentistry, Member, Since 2019 (International)
- SORG Associate Member, Member, 2024 to 2025 (International)
- Member of Malaysian Association of Oral & Maxillofacial Surgeons, Member, 2024 to 2024

(National)

- Member of the ITI International Team for Implantology, Member, 2023 to 2023

(International)

- Member of MALAYSIAN ASSOCIATION OF ORAL & MAXILLOFACIAL SURGEONS (MAOMS), Member, 2023 to 2023 (National)
- Fellowship of Faculty of Dentistry, Member, 2019 to 2022 (International)
- Membership of Faculty of Dentistry, Member, 2016 to 2022 (International)
- Royal Colleges of Surgeons in Ireland, Fellowship, 2019 to 2020 (International)

**Award and Stewardship:**

- Certificate of Excellent Service, University of Malaya, 2024 (CERTIFICATE)

**PATENT/ IPR:**

- Predictive calculator for NBa (cranial base) and ZMR-ZML (midface) regions in paediatric patients with craniofacial disorder, COPYRIGHT
- Orthodontic and Orthognathic Surgery Journey video series, COPYRIGHT Bilingual PPUM Obstructive Sleep Apnea (OSA) information leaflet, COPYRIGHT
- Standard Operating Procedure For Outpatient Clinic, Department of Oral Maxillofacial, UMMC, COPYRIGHT
- Self-Adjusting Rotating Stand, Patent (National)

**Area of Expertise:**

- Oral & Maxillofacial Surgery

**Publications:**

1. Singh N, Selvaraju K, Hassan MK, Ganesan D, Hariri F. Antley-Bixler syndrome: a case report on virtual planning for monobloc distraction osteogenesis and a surgical intervention narrative review. *J Stomatol Oral Maxillofac Surg.* 2025 Sep;126(4S):102382. doi: 10.1016/j.jormas.2025.102382. Epub 2025 Apr 18.
2. Tan CS, Hariri F, Hassan MK. Severe midface and maxillary hypoplasia in non-cleft and non-syndromic patients: A 2-stage surgical strategy using distraction osteogenesis and orthognathic surgery. *J Stomatol Oral Maxillofac Surg.* 2024 Jun;125(3S):101552. doi: 10.1016/j.jormas.2023.101552. Epub 2023 Jul 4.
3. Kai LC, Khaliddin N, Hassan MK, Hariri F. Skeletal expansion via craniofacial distraction osteogenesis technique in syndromic craniosynostosis: impact on ophthalmic parameters. *Int Ophthalmol.* 2024 Mar 19;44(1):147. doi: 10.1007/s10792-024-03084-y.
4. Hussin, M. Z., Farook, M. S., Nor, N. A. M., Hariri, F., & Hassan, N. W. (2021). Resuming clinical teaching in the era of COVID-19: experiences and protocols from a dental school in Malaysia. *Sains Malays*, 50(7), 2123-2134. doi: 10.17576/jsm-2021-5007-25
5. Kai LC, Khaliddin N, Hassan MK, Hariri F. Skeletal expansion via craniofacial distraction osteogenesis technique in syndromic craniosynostosis: impact on ophthalmic parameters. *Int Ophthalmol.* 2024 Mar 19;44(1):147. doi: 10.1007/s10792-024-03084-y.
6. Hassan, M. K., & Tilakaratne, W. M. (2023). Swelling of the Lips and Shortness of Breath: Sarcoidosis. In *Clinicopathological Correlation of Oral Diseases* (pp. 585-593). Cham: Springer

International Publishing. doi:10.1007/978-3-031-24408-7\_52

7. Hassan, M. K., Singh, N., Selvaraju, K., & Ngeow, W. C. (2023). A stroke mimicker following inferior alveolar nerve block: a case report. *Journal of Oral Medicine and Oral Surgery*, 29(2), 21. doi:10.1051/mbcb/2023021
8. Hassan, M. K., & Kallarakkal, T. G. (2023). Trauma to the Lower Lip: Mucocele. In *Clinicopathological Correlation of Oral Diseases* (pp. 93-99). Cham: Springer International Publishing. doi:10.1007/978-3-031-24408-7\_8
9. Hariri, F., Hassan, M. K., & Kallarakkal, T. G. (2023). Painless and Exposed Bone in the Maxilla: Medication-Related Osteonecrosis of the Jaw (MRONJ). In *Clinicopathological Correlation of Oral Diseases* (pp. 519-528). Cham: Springer International Publishing. doi:10.1007/978-3-031-24408-7\_46
10. Rajendran S, Mohamad Zaini Z, Lim YZ, Kallarakkal TG, Ramanathan A, Chan SW, Goh YC, Tan CC, Lim D, Hassan MK, Kanapathy J, Pathmanathan D, Chan CS, Liew CS, Ismail SM, Cheong SC. Accelerated implementation of teleconsultation services for the monitoring of oral potentially malignant disorders as a result of the COVID-19 pandemic. *Oral Oncol.* 2022 Mar;126:105730. doi: 10.1016/j.oraloncology.2022.105730. Epub 2022 Feb 14.
11. Nabil, S., Nizar, M. A. M., Rashdi, M. F., Hassan, M. K., & Hariri, F. (2021). Pattern of Oral and Maxillofacial New Referrals During COVID-19 Lockdown. *Archives of Orofacial Science*, 16(2), 199-208. doi:10.21315/aos2021.16.2.10
12. Hassan, M. K., Ring, M., & Stassen, L. F. (2018). A finite element analysis study comparing 3 internal fixation techniques in mandibular sagittal split osteotomy. *Int J Otorhinolaryngol Head Neck Surg*, 7(05), 298-305. <https://doi.org/10.4236/ijohns.2018.75030>

**Books:**

- Hariri F, Lau MN, Azizi NZ, Abdul Razak MA, Hassan MK, Ananda N, Tan CC, Muthusamy R, Musa S, Othman SA, Wey MC, Wan Hassan WN, Abdul Rahman ZA, Mat Ripen Z et al (2025). *Sindrom Kraniosinostosis pada bayi dan Kanak-kanak*. Penerbitan Universiti Malaya.
- 1. Hariri F, Ganesan D, Lau MN, Azizi NZ, Abdul Razak MA, Hassan MK, Muthusamy R, Musa S, Othman SA, Wey MC, Wan Hassan WN, Abdul Rahman ZA, Mat Ripen Z et al (2025). *Sindrom Kraniosinostosis pada bayi dan Kanak-kanak*. Penerbitan Universiti Malaya.

**Topic 3**

**Surgery First Approach: Paradigm Shift  
of Orthodontic Treatment Based on Bone Metabolism Acceleration**

Prof. Tetsu Takahashi  
Tohoku University, Japan

The disadvantages of the current orthodontic treatment both before and after orthognathic surgery include a long treatment time and temporary worsening of facial appearance during the orthodontic treatment. Surgery first approach (SFA) without presurgical orthodontic treatment shortens its treatment time approximately 6-12 months compared with using a conventional orthodontics-first approach. Our orthognathic surgery-first approach is so called, “Sendai surgery first approach”, and ortho-driven approach in orthognathic surgery first treatment concept. It is well recognized that the phenomenon of postoperatively accelerated orthodontic tooth movement occurs in patients having orthognathic surgery. After an osteotomy, bone remodeling around the healing tissue facilitates the healing process. We found that alkaline phosphatase (ALP) and C-terminal telepeptide of type I collagen (ICTP), both of which are known to be related to osteoclastic activities/metabolic changes in the dento-alveolous, are after osteotomy in SFA patients. We also found that ICTP and osteocalcin (OCN) are increased after osteotomy in SFA patients.

Those results indicated that regional acceleratory phenomenon (RAP) as well as systemic acceleratory phenomenon (SAP) occur after osteotomy, which would accelerate orthodontic tooth movement, resulting in the reduced treatment time in SFA patients. In this lecture, a clinical principles of ortho-driven “Sendai surgery first” approach will be demonstrated and its scientific rationale will be presented.

**Speaker : Prof. Tetsu Takahashi**

**CURRICULUM VITAE**  
**Tetsu Takahashi**



**Affiliation:**

Professor

Department of Oral and Maxillofacial Surgery, Southern Tohoku Fukushima Hospital,  
Fukushima, Japan

Division of Oral and Maxillofacial Reconstructive Surgery, Tohoku University Graduate School  
of Dentistry, Sendai, Japan

Associate Editor

Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology

**Education:**

Apr 1983 – Mar 1987 Graduate School, Division of Dental Research, Tohoku University

- 1983 Faculty of Dentistry, Tohoku University

**Current Position:**

- Professor Emeritus, Tohoku University Graduate School of Dentistry
- Director, Department of Oral and Maxillofacial Surgery,  
Southern Tohoku Fukushima Hospital
- Executive Director, Asian Association of Oral and Maxillofacial Surgeons
- Asian Representative, International Association of Oral and Maxillofacial Surgeons
- Secretary General, PanPacific Implant Society (PPIS)
- Associate Editor, Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology

**Experience:**

- Editor-in-Chief, Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology
- 2022 Professor Emeritus, Tohoku University Graduate School of Dentistry
- 2022 Director, Department of Oral and Maxillofacial Surgery, Southern Tohoku Fukushima  
Hospital
- 2016 General Vice Director, Tohoku University Hospital
- 2012 Professor and Chairman, Div. of OMF, Tohoku University Graduate School of  
Dentistry, Sendai Japan
- 2000 Professor and Chairman, Second. Dept. OMF, Kyushu Dental College, Fukuoka, Japan
- 1994 Assistant Professor, Akita University, School of Medicine
- 1990 Assistant Professor, Tohoku University, School of Dentistry
- 1987 Visiting researcher, University of Southern California, Los Angeles, USA
- 1987 Graduated from Post-Graduate of Tohoku University School of Dentistry

**Awards (Selected):**

1999 International Association of Oral and Maxillofacial Surgeons Posteraward, International  
Association of Oral and Maxillofacial Surgeons

**Area of Interest:**

Oral and Maxillofacial Surgery  
Orthognathic Surgery  
Jaw Bone Reconstruction and bone augmentation for implant dentistry  
Dental Implants  
TMJ pathongenesis and surgery

**Professional Memberships (Selected):**

- Present Japanese Stomatological Society
- Present Japanese Society of Oral and Maxillofacial Surgeons
- Present Japanese Association for Dental Science
- Present Japanese Society of Oral and Maxillofacial Traumatology
- Present Japanese Academy of Maxillofacial Prosthetics
- Present The Japanese Society for Jaw Deformities
- Present Asian Association of Oral and Maxillofacial Surgeons
- Present International Association of Oral and Maxillofacial Surgeons
- Present Japanese Society of Oral Implantology
- Present Japanese Academy of Maxillofacial Implants
- Present Japanese Society of the temporomandibular joint

**Publications (Selected):**

- Yuki Sugai, Ryo Hamai, Yukari Shiwaku, Takahisa Anada, Kaori Tsuchiya, Tai Kimura, Manami Tadano, Kensuke Yamauchi, Tetsu Takahashi, Hiroshi Egusa ...Effect of Octacalcium Phosphate on Osteogenic Differentiation of Induced Pluripotent Stem Cells in a 3D Hybrid Spheroid Culture. *Biomimetics*, 10(4) 205-205, Mar 26, 2025
- Yushi Ezoe, Shinnosuke Nogami, Yoshio Otake, Masatoshi Chiba, Tetsu Takahashi, Kensuke Yamauchi. Clinical course of jaw function recovery following surgical treatment in patients with temporomandibular joint ankylosis- correlation with mouth opening rehabilitation. *BMC oral health*, 25(1) 423-423, Mar 22, 2025
- Takefumi Oizumi, Kazuhiro Imoto, Kanan Bando, Yukinori Tanaka, Hiromi Funayama, Kensuke Yamauchi, Hiroyuki Kumamoto, Tetsu Takahashi, Yasuo Endo. Osteonecrosis of the jaw in a patient treated with alendronate and then denosumab: A case of dramatic amelioration by minocycline and then etidronate. *Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology*, 37(2) 348-355, Mar, 2025
- Hikari Suzuki, Shinnosuke Nogami, Yoshio Otake, Yuri Takeda, Junji Sugawara, Tetsu Takahashi, Kensuke Yamauchi. Surgery-early approach combined with condylectomy for correction of severe facial asymmetry with mandibular condylar hyperplasia: a case report. *Journal of the Korean Association of Oral and Maxillofacial Surgeons*, 50(4) 227-234, Aug 31, 2024
- Kanako Kuroda, Atsumu Kouketsu, Haruka Saito, Tetsu Takahashi, Kensuke Yamauchi, Tsuyoshi Sugiura, Hiroyuki Kumamoto. Immunohistochemical assessment of stem cell-related Sox2 and Klf4 in ameloblastomas. *Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology*, Aug, 2024
- Atsumu Kouketsu, Chiaki Doi, Hiroaki Tanaka, Takashi Araki, Rina Nakayama, Tsuguyoshi Toyooka, Satoshi Hiyama, Masahiro Iikubo, Ken Osaka, Keiichi Sasaki ...Detection of oral cancer and oral potentially malignant disorders using artificial intelligence-based image

analysis. Head & neck, Jun 11, 2024

- Shun Sato, Tadasu Sato, Takehiro Yajima, Daisuke Tachiya, Tetsu Takahashi, Shinnosuke Nogami, Masahiro Saito, Kensuke Yamauchi, Hiroyuki Ichikawa. Distribution and anti-nociceptive function of endomorphin-1 in the rat cranial sensory ganglia. Biomedical research (Tokyo, Japan), 45(2) 77-89, 2024
- Ryosuke Iwama, Hitoshi Miyashita, Atsumu Koketsu, Kiyoshi Kume, Fumiyoshi Fujishima, Atsushi Masamune, Tetsu Takahashi. A case of synchronous double cancers consisting of maxillary gingival carcinoma and intraductal papillary mucinous carcinoma, invasive: case report. BMC Oral Health, 23(1), Aug 26, 2023
- Atsumu Kouketsu, Takeshi Kaneuji, Yu Yamaguma, Kensuke Yamauchi, Tsuyoshi Sugiura, Tetsu Takahashi, Hiroshi Ito, Yoshihiro Yamashita. Microvascular reconstruction for oral cancer in older adult patients: the impact of age on surgical outcomes. Oral surgery, oral medicine, oral pathology and oral radiology, Jun 29, 2023
- Pawat Sripodok, Haruka Saito, Atsumu Kouketsu, Tetsu Takahashi, Hiroyuki Kumamoto. Correction to: Immunoexpression of SIRT1, 6, and 7 in oral leukoplakia and oral squamous cell carcinoma. Odontology, Jun 15, 2023
- Pawat Sripodok, Haruka Saito, Atsumu Kouketsu, Tetsu Takahashi, Hiroyuki Kumamoto. Immunoexpression of SIRT1, 6, and 7 in oral leukoplakia and oral squamous cell carcinoma. Odontology, May 16, 2023

**Books and Other Publications (Selected):**

- Vertical alveolar ridge augmentation. Len Tolstunov (Role: Joint author, Vertical augmentation of the alveolar ridge with titanium-reinforced devices (protected bone regeneration)). Wiley Blackwell, 2016
- Horizontal alveolar ridge augmentation in implant dentistry. Len Tolstunov (Role: Joint author, Horizontal alveolar distraction and periosteal expansion osteogenesis). Wiley Blackwell, 2016
- Bone Regeneration for Dental Implants : from Basic to Clinical Technique. Tetsu Takahashi. Koonja Publishing Inc., 2011
- Preprosthetic and maxillofacial surgery. (Role: Joint author, Alveolar widening using distraction osteogenesis (DO) in maxillofacial surgery). Woodhead Publishing Limited, 2011
- Implant Dentistry -The most promising discipline of Dentistry. Iler Turkyilmaz (Role: Joint author, Dental reconstruction using secondary bone graft followed by implant placement in alveolar cleft of patents with cleft lip and/or palate). Inechweb, 2011

Publications and Academic activities

Please see below:

<https://scholar.google.co.jp/citations?user=hLs-lPEAAAAJ&hl=ja>

<https://researchmap.jp/read0055461?lang=en>

<https://www.adscientificindex.com/scientist/tetsu-takahashi/409794>

<https://www.researchgate.net/profile/Tetsu-Takahashi-2/9>

**Topic 4**

## **The Impact of Craniofacial Morphology on Obstructive Sleep Apnea**

Assistant Prof. Yu-Feng Chen  
Kaohsiung Medical University, Taiwan

**Obstructive Sleep Apnea (OSA)** is a highly prevalent disorder worldwide, characterized by repetitive episodes of upper airway collapse during sleep. The resulting intermittent hypoxemia and sleep fragmentation are major drivers of significant comorbidities, including cardiovascular disease, stroke, hypertension, coronary atherosclerosis, atrial fibrillation, metabolic syndrome, and heart failure.

Current evidence recognizes OSA as a multifactorial disease with multiple contributing factors. Established epidemiological risk factors include male sex (with an odds ratio up to 4.1 in meta-analyses) and obesity (conferring an odds ratio up to 10.5 for development compared to normal-weight controls). Additional non-modifiable risk factors include genetic predisposition, family history, and racial background. Notably, despite having similar OSA prevalence rates to Western countries, many Asian populations often present with a lower body mass index, strongly suggesting that craniofacial structure may be a critical, independent determinant of OSA pathogenesis across diverse phenotypes.

Our presentation will share our research findings to address how craniofacial morphological abnormalities can be characterized through radiographic imaging, enabling the early identification of high-risk phenotypes. Correct diagnosis of the underlying craniofacial deficiency is crucial not only for personalized risk stratification but also for accurately identifying surgical candidates and thereby enhancing long-term treatment success rates through targeted anatomical correction.

**Speaker : Asst. Prof. Yu-Feng Chen**



**CURRICULUM VITAE**  
**Yu-Feng Chen**

**Affiliation:**

Assistant Professor  
Division of Oral and Maxillofacial Surgery,  
Department of Dentistry,  
Kaohsiung Medical University  
Deputy director  
Kaohsiung Medical University sleep center

**Education:**

09/2023-Present PhD. in progress, Kaohsiung Medical University, Taiwan  
09/2018-06/2022 MS. National Cheng Kung University, Taiwan  
09/2000-06/2006 DDS. Kaohsiung Medical University, Taiwan

**Experience:**

- Taiwan sleep medicine specialist.
- International faculty of AO craniomaxillofacial foundation.
- Visiting Scholar, Sleep Surgery Division, Otolaryngology-Head and Neck surgery department, Stanford University.
- Visiting scholar, Sleep Surgery Division, Otolaryngology-Head and Neck surgery department, Stanford University.
- Visiting surgeon, CranioMaxillofacial surgery department, Chang Gung hospital, Taiwan.

**Honors and Awards:**

- 2009 Best resident of Dental Department, Kaohsiung Medical University
- 2011 Best chief resident of Dental Department, Kaohsiung Medical University
- 2013 Outstanding faculty Award, Kaohsiung Municipal Ta-Tung Hospital
- 2014 ITI (International Team of Implantology) scholarship

**Research Interests:**

Obstructive Sleep Apnea, Cranio-maxillofacial Imaging, Craniofacial Deformity, CAD/CAM aided maxillofacial surgery, Head and Neck Oncology, Dental implantation

**Publications:**

- Navigation-guided auto transplantation: A novel technique for precise and predictable tooth placement. Yang-Chih Chou; Wen-Hui Chen; Hui-Na Lee; Yu-Feng Chen. Journal of Dental Sciences. 2025 August, In press. <https://doi.org/10.1016/j.jds.2025.08.027>
- Medication related osteonecrosis of the jaw. Yu-Feng Chen; Hong-Po Chang. New England Journal of Medicine. 2023 May 25;388:e69. DOI: 10.1056/NEJMicm2209172
- Oral granulomatosis with polyangiitis. Chen-His Tsai; Yuk-Kwan Chen; Yu-Feng Chen; Chih-Huang Tseng. Journal of Dental Sciences.2023, January,18(1).451-452.

<https://doi.org/10.1016/j.jds.2022.09.012>.

- Maxillary Skeletal Expansion with Monocortical and Bicortical Miniscrew Anchorage: A 3D Finite Element Study. Pao-Hsin Liu; Yu-Feng Chen; Chin-Yun Pan; Ming-Hsuan Sheen; Bang-Sia Chen; Hong-Po Chang. *Appl. Sci.* 2022, May 12(9), 4621. <https://doi.org/10.3390/app12094621>
- Contact fracture test of monolithic hybrid ceramics on different substrates for bruxism. Lan TH, Chen PH, Fok ASL, Chen YF. *Dent Material.* 2022 Jan;38(1):44-56. <https://doi.org/10.1016/j.dental.2021.10.010>
- Accuracy and wear evaluation of the customized zirconia guided sleeves. Yu-Feng Chen, Chin-Yun Pan, Yung-Chung Chen, Je-Kang Du, Ting-Hsun Lan. *Appl. Sci.* 2021, 11(19), 9035. <https://doi.org/10.3390/app11199035>
- Modified uvulopalatalpharyngoplasty: surgical technique and 3-year outcomes in a single department. Chen-His Tsai, Chun-Liang Chang, Chen-Wen Chang-Chien, Li-Ling Huang, Stanley Yung-Chuan Liu, Yu-Feng Chen, *Taiwan J Oral Maxillofac Surg.* 2022 March,33:13-21.
- Pediatric obstructive sleep apnea: computational fluid dynamics analysis of upper airway. Yu-Feng Chen, Ming-Hsuan Sheen, Hong-Po Chang, Yu-Chuan Tseng. *Journal of dental sciences.*2021, June. 17(1): 589–591
- Evaluation of the feasibility of NaCaPo4- Blended Zirconia as a new CAD/CAM material of dental restoration. Ting-Hsun Lan, Yu-Feng Chen, Yen-Yun Wang, Mitch M.C.Chou. *Materials* 2021, 14(14), 3819.
- Interdisciplinary approach of pediatric obstructive sleep apnea with congenital second premolars. Shih-Hsuan Lin, Yu-Feng Chen, and Yu-Chuan Tseng. *Taiwanese Journal of Orthodontics* : 2020;32(4):197-207
- Obstructive Sleep Apnea Treated with Maxillomandibular Advancement Surgery by Computer-Assisted Simulation, Yang, Bing-Luen; Chen, Yu-Feng; Chou, Szu-Ting; and Tseng, Yu-Chuan. *Taiwanese Journal of Orthodontics*: 2020;32(4):208-216
- Modified Lai's suspension technique to treat zygoma complex fracture- A case report. Tsung -Wen Yen, Yu-Feng Chen, Edward Cheng-Chuan Ko, Jia-Fu Yang. *Taiwan J Oral Maxillofac Surg.*31:41-49, March 2020.
- Obstructive sleep apnea treatment in adults. Yu-Feng Chen, je-Kang Du, Hong-Po Chang. *Kaohsiung Journal of Medical Sciences*, 2020; vol.36;1:7-12.
- Optimizing Mandibular Sagittal Split of Large Maxillomandibular Advancements for Obstructive Sleep Apnea: Patient and Surgical Factors. Yu-Feng Chen, Edward Chengchun Ko, Soroush Zaghi, Audrey Yoon, Ryan Williams, Robert Riley, Stanely Yung Chuan Liu. *Clinical Oral investigation*, 2020 Mar;24(3) 1359-1367.doi: 10.1007/s00784-019-03017-5.
- The upper airway nasal complex: Structural contribution to persistent nasal obstruction. Ryan Williams, Vishal Patel, Yu-Feng Chen, Navarat Tangbumrungham, Andrew Thamboo, Sam P. Most, Jayakar V. Nayak, Stanley Y. C. Liu. *Otolaryngology- Head and Neck surgery.* March,2019.
- Hypoglossal nerve stimulation for treatment of obstructive sleep apnea (OSA): a primer for oral and maxillofacial surgeons. Sung ok Hong, Yu-Feng Chen, Junho Jung, Yong-Dae Kwon, Stanley Yung Chuan Liu. *Maxillofacial Plastic and Reconstructive Surg.* Dec,2017, 39:27
- Fibrosarcoma in Maxilla: A case report. Yu-Hsun Kao, Edward Cheng-Chuan Ko, Han-Jen Hsu, Yu-Feng Chen, Ching-Wei Shu, Chun-Ming Chen. *Taiwan J Oral Maxillofac Surg.* Vol.27,No.4 Dec 2016.

*International Conference of the 18<sup>th</sup> Research Day*

- Radiographic Feature of Ameloblastic Fibro-Odontoma: Case Reports and Review of Literature. Yi-Wen Cheng, Li-Ling Huang, Yu-Hsun Kao, Edward Cheng-Chuan Ko, Yuk-Kwan Chen, Yu-Feng Chen. Taiwan J Oral Maxillofac Surg. Vol.27,No.1 Mar 2016.
- Oral frostbite due to Dry Ice: A case report. Wan-Ru Fu, Hong-Sen Chen, Yu-Feng Chen. Taiwan Journal of Pediatric dentistry.vol.15,No.2, July 2015.
- Modern therapy for severe alveolar ridge atrophy. Yu-Feng Chen, Chin-Yun Pan, We-Chen Wang, Ting-Hsun Lan. The journal of craniofacial surgery.vol24,No.5, Sept 2013.
- A rare case of Recurrent Jaw Bone Exostoses- A case report. Chao-Hsiang Chang, Chia-Fu Yang, Yu-Feng Chen, Chung-Ho Chen. Taiwan J Oral Maxillofac Surg. vol25.No.3.225-232. Sept.2012.
- A rare case of huge pleomorphic adenoma-case report. Yu-Feng Chen, Chung-Ho Chen, Chao-Hsiang Chang, Chia-Fu Yang. Taiwan J Oral Maxillofac Surg: 102-109, June 2010
- Salivary Duct Carcinoma of Soft Palate—A Case Report. Yu-Feng Chen, Wei-Ting Lin, I-Yueh Huang, Chung-Wei Wu. Taiwan J Oral Maxillofac Surg.: 333-341, December 2010

## **Prevention and Treatment of Osteoradionecrosis**

Prof. Yong-Deok Kim  
Pusan National University, Korea

Radiation therapy is one of the key treatment modalities for malignant tumors in the oral and maxillofacial region. It has long been applied in clinical settings, and its benefits and side effects are well known. One of the major complications of radiation therapy is osteoradionecrosis (ORN), a difficult-to-overcome condition that persists even after cancer has been controlled. ORN lowers the patient's quality of life, often causes ongoing inflammation, and prolongs the treatment period.

Osteoradionecrosis tends to occur more frequently in dentate patients than in edentulous patients, especially around infected teeth or after extractions. However, it can also occur without any such events, making prognosis and prediction difficult, thereby posing challenges for both patients and clinicians. Fortunately, with the advent of advanced techniques such as intensity-modulated radiation therapy (IMRT), the prevalence of ORN is expected to be lower than in the past. Nevertheless, as modern treatments for malignancies improve and patient survival times increase, the prevalence of ORN cannot be overlooked. Furthermore, due to the lack of established treatment protocols and the diversity of clinical presentations, current treatments include basic infection management, curettage, resection, and reconstructive surgery.

This presentation aims to introduce various clinical manifestations, onset conditions, and treatment outcomes of osteoradionecrosis, providing indirect yet practical information for clinicians dealing with this condition. In particular, many patients in Taiwan suffer from oral cancer, and the decline in quality of life due to complications of radiation therapy after treatment may become a societal issue. Therefore, in addition to cancer treatment, awareness and management of osteoradionecrosis within the dental field are socially important for improving patients' quality of life.

**Speaker : Prof. Yong-Deok Kim**



**CURRICULUM VITAE**  
**Yong-Deok Kim**

**Affiliation:**

Professor  
Oral and Maxillofacial Surgery, School of Dentistry  
Pusan National University, Korea  
Assistant Editor  
Maxillofacial Plastic and Reconstructive Surgery

**Education:**

2008 - 2010 Postdoctoral Fellow, Dept. of Oral and Maxillofacial Surgery, Faculty of Dentistry, University of Toronto, Toronto, CANADA  
2003 - 2005 PhD, Graduate School, Pusan National University (Thesis: Impact of methylation of the Gene p16INK4a on prognosis of head and neck osteosarcoma)  
2000 - 2002 MSD, Graduate School, Pusan National University  
1990 - 1996 DDS, College of Dentistry, Pusan National University

**Experience:**

Dean, School of Dentistry, Pusan National University, Korea

**Postgraduate Training:**

1999 - 2000 Internship, Pusan National University Hospital  
2000 - 2003 Residency, Oral and Maxillofacial Surgery, Pusan National University Hospital  
2008 - 2010 Clinical Fellow, Dept. of Oral and Maxillofacial Surgery, Hospital for Sick Children, Toronto, Ontario, CANADA

**Academic or Professional Appointments:**

2021 - 2025 Dean, School of Dentistry, Pusan National University  
2004 - Present Professor (tenure), Pusan National University  
2008 - 2010 Postdoctoral Fellowship, Dept. of Oral and Maxillofacial Surgery, Faculty of Dentistry, University of Toronto, Toronto, CANADA, Bloorview Rehabilitation, Toronto, CANADA Sick kids Hospital, Toronto, CANADA  
2003 - 2004 Clinical Fellow, Pusan National University Hospital  
1996 - 1999 Doctor, Public Health Center, KyungSangNamDo

**Society Membership:**

2008 - Present Canadian Association of Oral and Maxillofacial Surgeons  
1999 - Present Korean Cleft Lip and Palate Association  
1999 - Present Korean Association of Maxillofacial Plastic and Reconstructive Surgeons

1999 - Present Korean Association of Oral and Maxillofacial Surgeons

1996 - Present Korean Dental Association

**Specialty:**

Dentistry

Implantology

Oral and Maxillofacial Surgery

**Publications (Selected):**

- Wu FC, Ting CC, Jeng JH, Chen H, Kim YD, Wu CC, Kao YH, Tseng CH, Chen YK, Ogasawara T, Hoshi K, Lo WL, Takahashi T, Yang YH, Ko EC. Hypoxia amplifies arecoline-induced invasion and metastasis in oral squamous cell carcinoma - Insights into TGF- $\beta$ 1 signaling and collagen production. *J Dent Sci.* 2025 Apr;20(2):1129-1138.
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**Topic 6**

**New Horizons:  
Imaging technologies, surgical interventions of jaw deformity**

Associate Professor Nobuyoshi Tomomatsu  
Institute of Science Tokyo, Japan

Dentofacial deformities (Jaw deformity) are conditions caused by the abnormal development of jaw bones. These deformities lead to malocclusion, aesthetic concerns, and psychological issues. In Japan, the number of patients with jaw deformities has increased since around 2019, especially after the SARS-CoV-2 pandemic. The basic orthognathic surgery for jaw deformities are sagittal splitting ramus osteotomy (SSRO) of the mandible and Le Fort I osteotomy of the maxilla.

Traditionally, orthognathic surgery planning was based on two-dimensional analyses, such as cephalometric analysis. CT analysis confirms the morphology of the maxilla and mandible and the position of the mandibular canal. However, recent technological advancements such as three-dimensional simulation software and computer-aided design and manufacturing (CAD/CAM) for splint fabrication enable more precise planning of maxillary segment movements in Le Fort I osteotomy. These innovations allow for more accurate analyses, the use of digital surgical tools, and improved postoperative evaluations.

In this presentation, I will focus on three key points. First, I will provide an overview of orthognathic surgery. Second, I will discuss the digital technologies used in orthognathic surgery. This includes issues related to CAD/CAM splints, how our department approaches them, and the use of navigation systems. Third, I will address complications associated with orthognathic surgery, particularly nasal ventilation issues following Le Fort I osteotomy. Some patients report nasal congestion after superior repositioning of the maxilla. Based on my research findings, I will discuss which patients are more likely to develop worsened nasal ventilation. I plan to focus on anatomical structures that affect nasal ventilation, such as the inferior nasal turbinate and nasal septum curvature.

I hope to share insights that will be useful in your clinical practice tomorrow.

**Speaker : A. P. Nobuyoshi Tomomatsu**



## **CURRICULUM VITAE**

### **Nobuyoshi Tomomatsu**

#### **Affiliation:**

Associate Professor  
Maxillofacial Surgery, Institute of Science Tokyo, Japan

#### **Education:**

- 2005-2009 Department of maxillofacial surgery, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University, Tokyo, Japan
- 1999-2005 Department of dentistry, Tokyo Medical and Dental University, Tokyo, Japan

#### **Experience:**

- 2024.10- Lecturer, Department of Maxillofacial Surgery, Institute of Science Tokyo, Japan
- 2018-2024 Assistant Professor, Department of Maxillofacial Surgery, Tokyo Medical and Dental University, Japan
- 2011-2018 Clinical Fellow, Department of maxillofacial surgery, Tokyo Medical and Dental University, Tokyo, Japan
- 2009-2011 Clinical Fellow, Oral and maxillofacial surgery, Kofu Municipal Hospital, Yamanashi, Japan

#### **Qualifications/Special Skills:**

Doctor of Philosophy (dentistry)

#### **Research Interests:**

Oral surgery  
Orthognathic surgery

#### **Publications:**

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*International Conference of the 18<sup>th</sup> Research Day*

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Grants:

- Grants-in-Aid for Scientific Research for General (C) 「 KAKENHI 」 Number 21K10086, 2021-2025. Relationship between risk of sleep apnea and jaw movement in patients with long-term history of orthognathic surgery.
- Dupuy Synthes INVESTIGATOR INITIATED INTERVENTIONAL STUDY: DPS-TCMF-2019-052, Maxillary stability after Le Fort 1 osteotomy using Rapidsorb.
- Grants-in-Aid for Scientific Research for Young Scientists (B) 「 KAKENHI 」 Number 12602, 2012-2013. Construction of a new model of osteo invasion and a new technology by TNF-a inhibition.

**Topic 7**

**Tissue regeneration: From Bench to Patient Bedside: The Road to Impact**

Assistant Professor Paksinee Kamolratanakul  
Chulalongkorn University, Thailand

The edentulous ridge significantly affects patients' quality of life by limiting both function and esthetics. To achieve successful dental rehabilitation, it is essential to stimulate, regulate, and accelerate soft tissue and bone formation. In our study, we developed an in vitro model to enhance fundamental understanding and support the development of future clinical trials aimed at improving surgical outcomes. Hence, we evaluated various factors influencing soft tissue and bone regeneration. Our findings indicate that vitamin C, when administered at specific concentrations, enhances socket healing and improves implant stability. In the context of bone regeneration, we observed that larger particulate bone grafts promoted greater bone formation compared to smaller particles of demineralized bovine bone material used in sinus augmentation procedures.

**Speaker : Asst. P. Paksinee Kamolratanakul**



## **CURRICULUM VITAE** **Paksinee Kamolratanakul**

### **Affiliation:**

Assistant professor  
Department of Oral and Maxillofacial Surgery  
Faculty of Dentistry, Chulalongkorn University

### **Education:**

- (2005, Bangkok, Thailand) Doctor of Dental Surgery, Chulalongkorn University
- (2006, Bangkok, Thailand) Graduate diploma in clinical sciences degree in oral surgery, Chulalongkorn University
- (2011, Tokyo, Japan) Doctor of philosophy in dental science, Tokyo Medical and Dental University
- (2012, Los Angeles, CA, USA) Visiting scholar in oral and maxillofacial surgery training, University of California, Los Angeles
- (2014, Chulalongkorn University, Bangkok, Thailand) Thai Board in oral and maxillofacial surgery

### **Experience:**

- 2024-Present Assistant Dean  
Hospital affairs, Faculty of Dentistry, Chulalongkorn University
- 2020-2024 Assistant Dean  
Graduate student affairs, Faculty of Dentistry, Chulalongkorn University
- 2016-2022 Board of Directors of the Royal College of Dental Surgeons of Thailand
- 2016-2022 Board of Directors of the Thai Association of Oral and Maxillofacial Surgery under the Patronage of HM the King

### **Honors and Awards:**

- Most excellent award from the Global Center of Excellence program entitled, "International research center for molecular science in tooth and bone disease", Tokyo Medical and Dental University (Tokyo, Japan, 2010)
- Young investigator travel grant for plenary poster presentation award, American Society for Bone and Mineral Research (ASBMR Annual meeting 2010, Canada)
- 1st prize of oral presentation in research study (Annual meeting of The Thai Association of Oral and Maxillofacial Surgery under the Patronage of HM the King, 2014, Thailand)

### **Certifications:**

- (2023, Urban regeneration institution, Hungary) Certificate of advanced bone and soft tissue regeneration techniques in implant therapy
- (2025, Bern, Switzerland) Certificate of The GBR Master Course 2025 by Buser & Friends
- (2025, Bangkok, Thailand) Candidate Certificate in Medical Leadership

**Research Interests:**

- Wound healing
- Bone and soft tissue regeneration
- Implant surgery
- Orthognathic surgery
- Reconstruction

**Publications:**

- **Kamolratanakul P**, Hayata T, Ezura Y, Kawamata A., Hayashi C., Yamamoto Y., Hemmi H., Nagao M., Hanyu R., Notomi T., Nakamoto T., Amagasa T., Akiyoshi K., Noda M. Nanogel-based scaffold delivery of Prostaglandin E2 receptor-specific agonist in combination with a low dose of growth factor heals critical size bone defect in mice. *Arthritis Rheum*;2011 Apr;63(4):1021-33.
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- Nowwarote N, Osathanon T, Fournier Benjamin P.J., Theerapanon T, Yodsanga S, **Kamolratanakul P.**, Porntaveetus T, Shotelersuk V. PTEN regulates proliferation and osteogenesis of dental pulp cells and adipogenesis of human adipose-derived stem cells. *Oral Dis*. 2021 Sep 24. doi: 10.1111/odi.14030.
- Pisalsitsakul N, Pinnoi C, Sutanthavibul N, **Kamolratanakul P.** Taking 200 mg Vitamin C Three Times per Day Improved Extraction Socket Wound Healing Parameters: A Randomized Clinical Trial. *Int J Dent*. 2022 Mar 10;2022:6437200.

- **Kamolratanakul P**, Mattheos N, Yodsanga S, Jansisyant P. The impact of deproteinized bovine bone particle size on histological and clinical bone healing outcomes in the augmented sinus: A randomized controlled clinical trial. *Clin Implant Dent Relat Res*. 2022 Mar 23. doi: 10.1111/cid.13083.
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**Topic 8**

**AI-Assisted Detection of Cervical Lymph Node Metastases  
in Oral Squamous Cell Carcinoma**

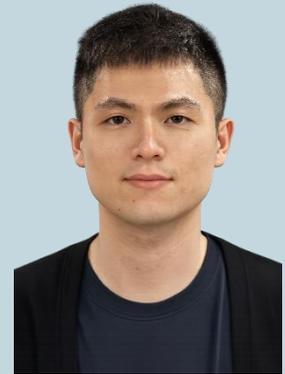
Assistant Prof. Chih-Huang Tseng  
Kaohsiung Medical University, Taiwan

Cervical lymph node metastasis is the single most critical prognostic factor in oral squamous cell carcinoma (SCC). However, identifying the earliest or most subtle metastatic deposits using conventional microscopy presents a significant, time-consuming diagnostic challenge for pathologists. The advanced Artificial Intelligence (AI) diagnostic tools can fundamentally change this workflow, delivering both enhanced precision and efficiency in the digital pathology era. Quantifying the exact impact of real-time AI guidance may improve the detection of these challenging metastases. We digitized 66 hematoxylin-eosin-stained slides containing over 600 lymph nodes. Four examiners—ranging from senior pathologists to a dental student—reviewed these slides, comparing their performance with and without the AI assistant.

The AI assistance significantly improved both diagnostic accuracy and overall interpretation efficiency across all experience levels. A critical reduction in both false-positive and false-negative interpretations, with the benefits being particularly pronounced for junior participants. Furthermore, the time required to review routine negative and large metastatic slides decreased significantly (by up to  $P < 0.0001$ ), effectively streamlining the diagnostic pipeline. The AI-assisted tool is a powerful enhancer of diagnostic quality. It proves its value not only as a high-throughput preliminary screening system but also as an invaluable educational aid for training the next generation of pathologists, underscoring its broad applicability in modern digital pathology workflows.

**Speaker : Asst. P. Chih-Huang Tseng**

**CURRICULUM VITAE**  
**Chih-Huang Tseng**



**Affiliation:**

Clinical Assistant Professor

School of Dentistry, College of Dental Medicine,  
Kaohsiung Medical University

Attending staff

Division of Oral Pathology and Oral Maxillofacial Radiology,  
Kaohsiung Medical University Hospital

**Education:**

MS, Oral Pathology, National Taiwan University, Taiwan, 2016

DDS, School of Dentistry, Kaohsiung Medical University, Taiwan, 2011

**Experience:**

- Resident, General Dentistry, Kaohsiung Medical University Hospital, 2012-2014
- Resident, Oral Pathology, National Taiwan University Hospital, 2014-2016
- Resident, Oral Pathology and Oral Maxillofacial Radiology, Kaohsiung Medical University Hospital, 2016-2019

**Certifications:**

Diplomate, Taiwan Academy of Oral Pathology, 2016

Diplomate, Taiwan Academy of Oral & Maxillofacial Radiology, 2019

**Specialty:**

Oral Pathology

Oral Radiology

Oral Diagnosis

**Publications:**

- Tseng CH, Ko ECC, Chen CY, Chen YK\*. Intraosseous mucoepidermoid carcinoma arising from odontogenic keratocyst. J Dent Sci 2023;18(1) January, 486-8 (SCI).
- Tsai CH, Chen TF, Chen YK, Tseng CH\*. Oral granulomatosis with polyangiitis. J Dent Sci 2023;18(1) January, 451-2 (SCI).
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- Tseng CH, Wang WC, Chen CY, Hsu HJ, Chen YK\*. Retrospective analysis of primary intraosseous malignancies in mandible and maxilla in a population of Taiwanese patients. J Formosan Med Assoc 2022;121(4) April:787-95 (SCI).
- Tseng CH, Lu PH, Wang YP, Chiang CP, Cheng YL, Chang JYF\*. Non-calcifying Langerhans cell rich variant of calcifying epithelial odontogenic tumor and amyloid rich variant of central odontogenic fibroma: A unique entity or a spectrum? Frontiers in Oral Health 2021;2:767201

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- Tseng CH, Wang WC, Chen CY, Hsu HJ, Chen YK\* Clinical manifestations of oral lymphomas – Retrospective study of 15 cases in a Taiwanese population and 592 cases from literature. *J Formosan Med Assoc* 2021;120(1 Pt 2): 361-70 (SCI).
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- Chen CY, Wang WC, Tseng CH, Su CW, Chen YK. Clinicopathological study of 13 cases of intraoral soft tissue metastatic carcinomas. *J Dent Sci* 2020;15:92-5 (SCI).
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- Hsu HJ, Chen YK, Wang WC, Tseng CH. Peripheral calcifying odontogenic cyst with multinucleated giant cell formation. *J Dent Sci* 2019;14(2): 211-2 (SCI).
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## Poster List

### GROUP: Fundamental Research

No.	Topic	Presenter	Institution
P1-01	The antibacterial effect of depositing zinc oxide on titanium carbonized nanotubes using atomic layer deposition	Yi-Ru Wang	Institute of Oral Medicine, National Cheng Kung University
P1-02	Element-doped nanoporous hydroxyapatite composite hydrogels for drug delivery	Pei-Chi Huang	Department of Oral Medicine, National Cheng Kung University
P1-03	Investigation of macrophage inflammatory responses triggered by extracellular vesicles (EVs) from gingival fibroblasts after long-term high glucose exposure	Li-Yun Wei	School of Dentistry, College of Dental Medicine, KMU*
P1-04	Synergistic antibiofilm effects of titanium surface modified with bioactive glass co-loaded with silver and ebselen	Bo-Chiau Huang	School of Dentistry, College of Dental Medicine, KMU*
P1-05	Dental aesthetic treatment history and its association with psychosocial impact among medical university students	Tzu-Ling Chen	Department of Oral Hygiene, College of Dental Medicine, KMU*
P1-06	The relationship between social media related factors and dental aesthetic treatment demand among medical university students	Xuan-Wen Xu	Department of Oral Hygiene, College of Dental Medicine, KMU*
P1-07	A study on the effectiveness of immersive, technology-driven oral hygiene education in changing health awareness and behavior among different ethnic groups	Hsiu-Hsiang Liu	Department of Oral Hygiene, College of Dental Medicine, KMU
P1-08	Evaluation of the Effects of Various Dental Provisional Restorative Materials on Color Stability and Surface Roughness	Lin-Ya Cheng	Department of Oral Hygiene, College of Dental Medicine, KMU*

\*KMU (Kaohsiung Medical University), KMUH (Kaohsiung Medical University Hospital)

No.	Topic	Presenter	Institution
<b>P1-09</b>	Associations of self-perceived orofacial aesthetic, social media usage, and self-esteem among medical university students	Pin-Chi Kuo Ting-Yi You Bo-Syun Lin	Department of Oral Hygiene, College of Dental Medicine, KMU*
<b>P1-10</b>	Associations of oral hygiene status, handgrip strength, and oral diadochokinesis among older adults in rural Kaohsiung	Tzu-Yu Su Wen-Ching Chiu Zhao-Kai Yang	Department of Oral Hygiene, College of Dental Medicine, KMU*
<b>P1-12</b>	Association between oral frailty and oral health-related quality of life among community-dwelling older adults	Wen-Hsiu Pan Hui-Min Tu	Department of Oral Hygiene, College of Dental Medicine, KMU*
<b>P1-13</b>	Effectiveness of oral health education intervention for aboriginal elders in indigenous cultural health station	Zhen-Ting Lin	Department of Oral Hygiene, College of Dental Medicine, KMU*
<b>P1-15</b>	Correlation between treatment modalities and oral self-care knowledge among patients with oral cancer.	I-Chun Fang Tz-Yan Wang	Department of Oral Hygiene, College of Dental Medicine, KMU*
<b>P1-16</b>	Association between perceived oral functional impacts and objective clinical Measures of Mouth Opening and Oral Diadochokinesis in oral cancer patients	Tz-Yan Wang I-Chun Fang Chih-Ling Lin	Department of Oral Hygiene, College of Dental Medicine, KMU*
<b>P1-17</b>	Subgingival microbial differences between rheumatoid arthritis (RA) and non-RA individuals after exclusion of diabetes mellitus	Yi-Jing Chen	Department of Microbiology and Immunology, School of Medicine, College of Medicine, KMU*

\*KMU (Kaohsiung Medical University), KMH (Kaohsiung Medical University Hospital)

No.	Topic	Presenter	Institution
<b>P1-18</b>	Alendronate Disrupts Hypoxia-Induced HIF-1 $\alpha$ and Periostin Expression in Human Periodontal Ligament Fibroblasts – An In Vitro Study	Edward Chengchuan Ko	School of Dentistry, College of Dental Medicine, KMU*
<b>P1-19</b>	Effect of different polishing systems on the surface roughness of dental zirconia	Ming-Hung Ko	Department of Dentistry, KMH*
<b>P1-20</b>	Impact of environmental moisture on deformation of 3D printing PMMA dental resin	Ching-I Huang	Department of Dentistry, KMH*
<b>P1-21</b>	Effects of different surface treatments on the bond strength and durability of 5Y-TZP	Hsin-Jou Yang	School of Dentistry, College of Dental Medicine, KMU*
<b>P1-22</b>	Comparative accuracy of Image-Guided Photogrammetry, Intraoral Photogrammetry, and Intraoral scanning for complete-arch implant impressions: An In-Vitro Study	Hsiao-Lan Huang	School of Dentistry, College of Dental Medicine, KMU*
<b>P1-23</b>	Study on oral cleaning effects of fully acetylated high molecular weight chitosan toothpaste	Allen Bai	School of Dentistry, College of Dental Medicine, KMU*
<b>P1-24</b>	Study on gum cleaning effects of a fully Acetylated high-molecular-weight chitosan mouthwash	Kuan-Wen Chen	School of Dentistry, College of Dental Medicine, KMU*
<b>P1-25</b>	Effects of melatonin on cell viability, HIF-1 $\alpha$ and collagen type I expression of periodontal ligament fibroblasts under hypoxia.	Chen-Yu Kuo	School of Dentistry, College of Dental Medicine, KMU*

\*KMU (Kaohsiung Medical University), KMH (Kaohsiung Medical University Hospital)

*International Conference of the 18<sup>th</sup> Research Day*

No.	Topic	Presenter	Institution
<b>P1-26</b>	The association of parental reading activity, family impact, and pediatric dental care literacy with caries experience among preschool children	Yi-Ting Weng Zhi-Xuan Chen Chih-Yi Lo	Department of Oral Hygiene, College of Dental Medicine, KMU*
<b>P1-27</b>	Effects of dental status and occlusal support on perceived chewing difficulty of bento foods in older adults	Wen-Hsuan Lu Yu-Xuan Dai Yu-Hsuan Ko	Department of Oral Hygiene, College of Dental Medicine, KMU*
<b>P1-28</b>	Anti-inflammatory Effects of Ugonins from <i>Helminthostachys zeylanica</i> in Periodontal-Related Cell Models	Hai-Wei Chuang	Department of Oral Hygiene, College of Dental Medicine, KMU*

\*KMU (Kaohsiung Medical University), KMUH (Kaohsiung Medical University Hospital)

## The antibacterial effect of depositing zinc oxide on titanium carbonized nanotubes using atomic layer deposition

▲Yi-Ru Wang<sup>1</sup>, Tzer-Min Lee<sup>1</sup>, Chan-Yuen Chang<sup>2</sup>, Chi-Chung Kei<sup>2</sup>

<sup>1</sup> Institute of Oral Medicine, National Cheng Kung University, Tainan, Taiwan

<sup>2</sup> Taiwan Instrument Research Institute, Hsinchu, Taiwan

**Objectives:** This study aimed to develop titanium carbide (TiC) nanotube arrays with enhanced mechanical properties and improved antibacterial activity through zinc oxide (ZnO) deposition using atomic layer deposition (ALD). **Methods:** TiO<sub>2</sub> nanotubes were fabricated by anodization at two voltages (20 V, 25 V) and converted into TiC through vacuum heat treatment at 700°C. ZnO coatings of varying thicknesses were deposited via ALD. Surface morphology and composition were characterized using SEM, EDS, XRD, and XPS. Antibacterial activity was evaluated against *E. coli* and *S. aureus*, and biocompatibility was assessed by cell morphology and proliferation assays. **Results:** Nanotube diameters increased with anodization voltage, and XRD confirmed successful formation of TiC after heat treatment. ALD pilot testing revealed that increasing ZnO thickness improved antibacterial efficacy, although excessive deposition (50 nm) induced cytotoxicity. The optimal coating parameter was determined to be 100°C–10 nm. When applied to TiC nanotubes, ZnO coatings significantly enhanced antibacterial performance compared with ATO and TiC alone. Samples with thicker ZnO layers (5, 10, 20 nm) demonstrated strong inhibition of both bacterial strains. Although ZnO-modified surfaces exhibited slower early cell proliferation, cell numbers continued to increase without cytotoxic effects. **Conclusions:** ZnO coating effectively suppresses bacterial growth while maintaining acceptable cellular compatibility without cytotoxicity. Although ZnO-modified TiC surfaces showed significantly slower cell proliferation, normalized ALP activity was markedly higher, indicating potential for enhanced osteogenic differentiation. Optimized ZnO-coated (5–20 nm) TiC nanotube arrays significantly improve antibacterial performance compared to ATO and uncoated TiC. This approach offers a strategy to reduce infection risk in titanium-based implants, with further optimization required to better balance proliferation and differentiation.

## **Element-doped nanoporous hydroxyapatite composite hydrogels for drug delivery**

▲Pei-Chi Huang<sup>1</sup>, Tzer-Min Lee<sup>1</sup>, Chih-Ling Huang<sup>2</sup>

<sup>1</sup>Institute of Oral Medicine, National Cheng Kung University, Tainan, Taiwan

<sup>2</sup>Center for Fundamental Science, Kaohsiung Medical University, Kaohsiung, Taiwan

**Objective:** This study aimed to develop drug-loaded mesoporous hydroxyapatite (MHA) and enhance its properties by doping with bioactive ions (Sr, Mg, Zn), and to optimize polyvinyl alcohol/chitosan (PVA/CS) composites to improve their mechanical strength and bioactivity. **Methods:** MHA was hydrothermally synthesized at 150 °C using a Pluronic F127 template, with different concentrations of ion (Sr, Mg, Zn) substitution. Teicoplanin was loaded via adsorption. PVA/CS hydrogels were prepared using the sol-gel method (pH 6). The materials were analyzed and evaluated in vitro. **Results:** The MHA composite synthesized at 150 °C exhibited high crystallinity, with the MHAZn10 sample showing a specific surface area of 154 m<sup>2</sup>/g and a pore size of 17 nm. MHA loaded with 10 wt% teicoplanin achieved a cumulative release rate of 99% on day 7. The swelling ratio of the PVA/CS/MHA composite reached 200-250%. In the antibacterial tests of MHA powder and PVA/CS composites against *Staphylococcus aureus* and *Escherichia coli*, the inhibition rate against *Staphylococcus aureus* was higher than that against *Escherichia coli*. The drug-loaded samples showed better antibacterial performance than the unloaded samples, with the MHA-Zn10 metal-doped sample exhibiting the best antibacterial properties. The addition of MHA significantly improved the tensile strength of the PVA/CS composite, while drug-loaded MHA maintained good ductility in PVA/CS. **Conclusion:** The PVA/CS/MHA composite possesses excellent mechanical integrity, controllable drug release, and strong antibacterial activity, making it a promising periodontal regeneration membrane material.

**Investigation of macrophage inflammatory responses triggered by extracellular vesicles (EVs) from gingival fibroblasts after long-term high glucose exposure**

▲Li-Yun Wei, Yan-Hsiung Wang

School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** Hyperglycemia, a defining feature of poorly controlled diabetes mellitus, compromises immune function and increases vulnerability to infections, thereby promoting the development of periodontal disease. Although diabetes is recognized as a major risk factor for periodontitis, the underlying mechanisms remain unclear. To mimic the diabetic environment, this study investigated whether extracellular vesicles (EVs) derived from human gingival fibroblasts (HGFs) exposed to long-term high-glucose (HG) conditions modulate macrophage inflammatory responses and elucidated the associated molecular pathways. **Methods:** HGFs were maintained under normal or HG conditions for two weeks. Following incubation, EVs were collected through ultracentrifugation and subsequently characterized using nanoparticle tracking analysis (NTA). The purified EVs were then applied to RAW 264.7 cells, after which the mRNA levels of pro-inflammatory cytokines (IL-1 $\beta$ , IL-6, TNF- $\alpha$ ) were validated by qPCR. Upon confirmation of the pro-inflammatory effects induced by EVs secreted from HGFs under HG conditions, next-generation sequencing (NGS) was performed to identify EV-associated microRNAs involved in the inflammatory regulation. **Results:** The results demonstrated that EVs derived from HGFs cultured under HG conditions for two weeks markedly upregulated the mRNA expression of pro-inflammatory cytokines in RAW 264.7. Furthermore, NGS analysis identified multiple microRNAs, including miR-26a-5p, miR-184, and miR-143-3p, belonging to the top 20 most abundant EV-associated microRNAs and displaying approximately threefold differential expression between EVs derived from HG-treated and non-treated HGFs. These findings suggest that these microRNAs may contribute to the regulation of HG-induced inflammatory responses in macrophages. **Conclusion:** EVs released by HGFs under prolonged HG exposure induce pro-inflammatory activation of macrophages, thereby implicating a microRNA-dependent mechanism linking diabetes and periodontitis.

## **Synergistic antibiofilm effects of titanium surface modified with bioactive glass co-loaded with silver and ebselen**

▲Bo-Chiau Huang<sup>1</sup>, Jung-Chang Kung<sup>1,2</sup>, Chi-Jen Shih<sup>3</sup>

<sup>1</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>2</sup>Division of Family Dentistry, Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>3</sup>Department of Fragrance and Cosmetic Science, College of Pharmacy, Kaohsiung Medical University, Kaohsiung, Taiwan

Objective: Early implant failure and post-surgical infection frequently occur during the primary healing stage following dental implant placement. Rapid bacterial adhesion and early biofilm formation on implant surfaces are recognized as critical contributing factors. Therefore, surface functionalization strategies for early antibacterial protection are critical in dental implant research. Methods: Grade IV sandblasted, acid-etched (SLA) titanium discs were used as substrates. Mesoporous bioactive glass (MBG, 80SiO<sub>2</sub>–15CaO–5P<sub>2</sub>O<sub>5</sub>) coatings were fabricated via spin coating followed by high-temperature sintering. Silver (Ag) and ebselen were co-loaded into the MBG matrix to form functional antibacterial coatings. Surface morphology, elemental distribution, and crystalline phases were characterized using scanning electron microscopy (SEM), energy-dispersive spectroscopy (EDS), and X-ray diffraction (XRD). Surface roughness was measured using a stylus profilometer. Process-dependent mass changes were recorded to monitor coating formation and drug loading consistency. Antibacterial activity was evaluated using a disk diffusion assay against *Streptococcus mutans* and *Staphylococcus aureus*. Fatigue testing was conducted to assess the influence of the coating process on the mechanical behavior of the titanium substrates. Results: SEM and EDS analyses confirmed successful formation of continuous MBG-based coatings and effective incorporation of Ag. XRD results indicated amorphous MBG features without altering the crystalline structure of the titanium substrate. Surface roughness measurements showed a slight decrease in Ra and Rz values for MBG- and MBG–Ag-coated samples compared with untreated SLA titanium. Process-dependent mass changes exhibited consistent trends across fabrication stages. Fatigue testing indicated no noticeable detrimental effect on substrate mechanical behavior. Disk diffusion assays demonstrated antibacterial activity, with the MBG–Ag–ebselen co-loaded group exhibiting the largest inhibition zone. Conclusions: The developed MBG-based coatings provide effective early-stage antibacterial functionality while maintaining surface and mechanical stability, supporting their potential application during the primary healing period; however, further evaluation is still required.

## **Dental aesthetic treatment history and its association with psychosocial impact among medical university students**

▲Tzu-Ling Chen<sup>1</sup>, Xuan-Wen Xu<sup>1</sup>, Chen-Yi Lee<sup>1</sup>, Han-Jen Hsu<sup>1,2</sup>

<sup>1</sup>Department of Oral Hygiene, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>2</sup>Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objectives:** This study investigated the association between dental aesthetic treatment history and dental aesthetic conditions, as well as their psychosocial impacts, among university students. **Methods:** A cross-sectional study design was adopted, and participants were recruited using non-random sampling methods. Participants were drawn from seven academic departments, including both clinical and non-clinical practicum departments. All students filled in a questionnaire which assessed their self-perceived dental aesthetic status, dental aesthetic treatment history and psychosocial impact of dental aesthetic. The instruments included the Oro-facial Esthetic Scale (OES), Self-perceived Occlusion Status (POS) which including self-perceived anterior occlusal condition and satisfaction with dental alignment, Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) which including three domains (dental confidence, social impact, and aesthetic concern). **Results:** Four hundred eighty-eight students participated in this study. There were 205 males (42.0%) and 281 females (57.6%), with an average age of 21.72 ±2.148 years. Among the participants, 60 (12.3%) had previously received treatment, currently undergoing treatment (n=46, 9.4%), considering treatment (n=227, 46.5%), or not interested in treatment (n=155, 31.8%). Stepwise linear regression analysis revealed that OES and satisfaction with dental alignment significantly negatively associated with PIDAQ, social impact, and aesthetic concern, positively associated with dental confidence. Self-perceived anterior occlusal condition significantly positively associated with PIDAQ and aesthetic concern. Not interested in treatment group exhibited lower PIDAQ, social impact, and aesthetic concern scores compared with the group had previously received treatment. The considering treatment group exhibited lower dental confidence compared with the group had previously received treatment, and compared with dental students, students from certain departments (FC, MAC, and OH) exhibited lower dental confidence. **Conclusion:** Oro-facial esthetic, self-perceived anterior occlusal condition, and dental aesthetic treatment history are significant factors associated with the psychosocial impact of dental esthetics among university students. However, the findings may not be generalizable to all medical university students.

**The relationship between social media related factors  
and dental aesthetic treatment demand among medical university students**

▲Xuan-Wen Xu<sup>1</sup>, Tzu-Ling Chen<sup>1</sup>, Han-Jen Hsu<sup>1,2</sup>, Chen-Yi Lee<sup>1</sup>

<sup>1</sup>Department of Oral Hygiene, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>2</sup>Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objective:** This study aimed to investigate the associations among social media use, appearance anxiety, self-esteem, and self-perceived demand for dental aesthetic treatment among medical university students. **Methods:** A cross-sectional study design was adopted. Using purposive sampling, students in at least their third year from seven departments at Kaohsiung Medical University were recruited. Based on dental aesthetic treatment experience and current treatment intention, participants were classified into four groups: “no intention,” “intention, not yet treated,” “treated, no further intention,” and “treated, still intention.” Social media related factors included habits of social media use, social media addiction, social media appearance anxiety, and self-esteem. Nominal logistic regression was used to examine the associations between demographic characteristics, social media related factors, and demand for dental aesthetic treatment. **Results:** A total of 488 students were included in the analysis. Among them, 205 identified as male (42.0%), 281 as female (57.6%), and 2 as other genders (0.4%), with a mean age of  $21.72 \pm 2.15$  years. 96.3% students reported daily social media use. Overall, 19.3% of students had previously received dental aesthetic treatment, while 62.5% reported an intention to undergo treatment. Female exhibited significantly higher levels of appearance anxiety than male ( $p < 0.001$ ). Among the participants, 48.2% were classified into the “intention, not yet treated” group, whereas 5.1% participants were in the “treated, no further intention” group. Compared with the “treated, still intention” group, the other three groups were significantly less likely to report appearance anxiety (OR = 0.963,  $p = 0.002$ ; OR = 0.978,  $p = 0.046$ ; OR = 0.947,  $p = 0.006$ , respectively). Furthermore, nursing students showed a lower likelihood of being classified into the “no intention” group. (OR = 0.281,  $p = 0.038$ ). **Conclusion:** Social media appearance anxiety is a significant factor influencing the intention to seek dental aesthetic retreatment among medical university students.

**A study on the effectiveness of immersive, technology-driven oral hygiene education in changing health awareness and behavior among different ethnic groups**

▲Hsiu-Hsiang Liu<sup>1</sup>, Je-Kang Du<sup>2</sup>, Kung-Tsung Lee<sup>1</sup>

<sup>1</sup>Department of Oral Hygiene, College of Dentistry, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

**Objectives:** This study aimed to examine whether immersive, technology-driven oral hygiene education could effectively improve health awareness and behavior among diverse populations. Special attention was given to rural and workplace groups, with the goal of reducing disparities in oral health literacy and practices through AR/VR modules and interactive apps. **Methods:** A randomized design was applied to 313 participants, divided into traditional lecture and immersive learning groups. The intervention included VR-based brushing skill modules and interactive app exercises. Outcomes were assessed using KAP (Knowledge, Attitude, Practice) measures and clinical plaque control records (PCR), with evaluations conducted at baseline, post-intervention, and three-month follow-up. **Results:** Preliminary findings revealed significant improvements in the immersive group across brushing skills (+1.21), oral health knowledge (+1.11), and attitudes (+1.20) ( $p < 0.05$ ). Urban participants demonstrated greater gains in knowledge, while rural participants showed stronger retention of behavioral changes. PCR scores decreased, indicating sustained clinical improvement. **Conclusion:** Immersive oral health education significantly enhanced literacy and behavioral outcomes, particularly benefiting rural populations by compensating for resource limitations. These results support the use of immersive, low-cost digital tools as scalable interventions for oral health promotion and provide empirical evidence for future policy dissemination.

## **Evaluation of the effects of various dental provisional restorative materials on color stability and surface roughness**

▲Lin-Ya Cheng, Chen-Yi Lee, Ju-Hui Wu

Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** Provisional restorations are essential in dental treatment for maintaining function and aesthetics while protecting pulp tissues. However, these materials are susceptible to discoloration and increased surface roughness caused by dietary pigments. This study aims to compare the color stability and surface roughness Ra changes of autopolymerizing (Unifast III), dual-cured (Tempsmart), and CAD/CAM resin composites (PMMA DISK, VITA CAD-Temp) after immersion. **Methods:** Sixty standardized specimens were prepared and immersed in coffee and distilled water at 37 degrees Celsius for two weeks. Color differences  $\Delta E_{00}$  were measured using a spectrophotometer with the CIEDE2000 formula, and surface roughness was monitored with a profilometer. **Results:** ANOVA showed significant effects of material and solution types on both color change and roughness. After two weeks in coffee, all materials exceeded the clinical acceptability threshold 1.8; Unifast showed the highest discoloration ( $3.72 \pm 0.11$ ), followed by Tempsmart ( $3.25 \pm 0.12$ ), PMMA ( $2.45 \pm 0.15$ ), and VITA, which exhibited the best stain resistance ( $2.05 \pm 0.54$ ). Regarding surface roughness in coffee, Ra values increased significantly; Unifast ( $0.162 \pm 0.008 \mu\text{m}$ ) and Tempsmart ( $0.134 \pm 0.023 \mu\text{m}$ ) showed the greatest increases, while CAD/CAM materials PMMA ( $0.105 \pm 0.008 \mu\text{m}$ ) and VITA ( $0.095 \pm 0.007 \mu\text{m}$ ) maintained better surface smoothness. **Conclusion:** After two weeks in a simulated environment, CAD/CAM resin composites demonstrated superior performance in color stability and surface roughness compared to traditional resins. These findings provide an evidence-based reference for clinicians when selecting materials for long-term provisional restorations.

**Associations of self-perceived orofacial aesthetic, social media usage, and self-esteem among medical university students**

▲Pin-Chi Kuo<sup>1</sup>, ▲Ting-Yi You<sup>1</sup>, ▲Bo-Syun Lin<sup>1</sup>, Tzu-Ling Chen<sup>1</sup>, Xuan-Wen Xu<sup>1</sup>,  
Chen-Yi Lee<sup>1</sup>, Han-Jen Hsu<sup>1,2</sup>

<sup>1</sup> Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

<sup>2</sup> Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objective:** This study aimed to examine the associations between basic characteristics (including sex, age, grade, and department), social media usage, self-perceived orofacial aesthetic, and self-esteem among medical university students. **Methods:** A cross-sectional study was conducted using purposive sampling, and the students completed a structured self-administered questionnaire consisting of four parts: demographic information, social media usage, Oro-facial Esthetic Scale, and Rosenberg Self-Esteem Scale. Multiple linear regression analysis was performed, with self-esteem as the dependent variable. **Results:** Four hundred and eighty-eight students from Kaohsiung Medical University participated in this study. There were 205 males (42.0%) and females (57.6%), with an average age of  $21.72 \pm 2.148$  years. The mean self-esteem score among all respondents was 32.83 (S.D. = 7.327), indicating a relatively high level of self-esteem. The independent-sample t-test showed a significant difference in self-esteem scores between users and non-users. One-way analysis of variance (ANOVA) revealed significant differences in self-esteem scores across departments. After post hoc analysis, dental and sports medicine students have higher self-esteem than chemical students. Pearson correlation analysis indicated a moderate positive correlation between self-perceived orofacial aesthetic and self-esteem scores. Multiple linear regression analysis showed that self-perceived orofacial aesthetic was moderately and positively associated with self-esteem ( $\beta = 0.443$ ,  $p < 0.001$ ) and was the strongest explanatory factor. In addition, chemical students ( $\beta = -0.139$ ,  $p = 0.001$ ), and use of the social media platform X ( $\beta = -0.123$ ,  $p = 0.002$ ) were both significantly negatively associated with self-esteem. Overall, the entire model explained 23% of the variation in self-esteem. **Conclusions:** The findings of this study support an association between self-perceived orofacial aesthetic and self-esteem, suggesting that students' self-evaluation of their appearance plays an important role in self-worth formation. Additionally, department affiliation and use of X were also identified as significant factors influencing self-esteem.

## **Associations of oral hygiene status, handgrip strength, and oral diadochokinesis among older adults in rural Kaohsiung**

▲Tzu-Yu Su, ▲Wen-Ching Chiu, ▲Zhao-Kai Yang, Pei-Chen Lin

Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** Rapid population aging in Taiwan has exacerbated oral health disparities, particularly in rural areas with limited healthcare resources. Oral function is closely associated with systemic physical frailty; however, this relationship remains insufficiently explored among socioeconomically disadvantaged elderly populations. This study aimed to examine the associations between handgrip strength (HGS), oral diadochokinesis (ODK), and oral hygiene status among older adults residing in rural Kaohsiung. **Methods:** A cross-sectional study was conducted between March and August 2025 in 11 socioeconomically disadvantaged villages in rural Kaohsiung. A total of 79 older adults were recruited (22 males, 27.85%; 57 females, 72.15%). Handgrip strength was measured twice in each hand and averaged. Oral motor function was assessed using ODK rates for /pa/ and /ta/ syllables. Oral hygiene status included denture use, cleaning frequency, and dental scaling habits. Pearson correlation analyses and independent-samples t-tests were applied, with statistical significance set at  $p < 0.05$ . **Results:** Among the participants, 38.0% were aged 75 years or older, and 32.9% had no formal education. Overall, 72.15% of participants wore dentures. Non-denture wearers demonstrated significantly higher /pa/ syllable rates compared with denture wearers ( $23.25 \pm 5.90$  vs.  $19.72 \pm 5.78$ ,  $p = 0.009$ ). In gender-stratified analyses, significant correlations between /pa/ syllable rates and bilateral HGS were observed in males (right hand  $p = 0.042$ ; left hand  $p = 0.023$ ), while /ta/ syllable rates were significantly correlated with right-hand HGS ( $p = 0.016$ ). Participants with normal right-hand HGS exhibited significantly higher /ta/ syllable rates than those below the standard threshold ( $23.06 \pm 5.71$  vs.  $19.69 \pm 6.79$ ,  $p = 0.035$ ). **Conclusions:** These findings suggest that systemic muscle strength is associated with oral motor performance in rural older adults, with potential gender-specific patterns. Denture use appears to primarily influence labial articulation (/pa/), whereas tongue motor function (/ta/) is more strongly related to overall muscle strength. Integrating sarcopenia prevention with oral functional rehabilitation may be beneficial for addressing oral frailty in socioeconomically disadvantaged elderly populations.

## **Association between oral frailty and oral health-related quality of life among community-dwelling older adults**

▲Hui-Min Tu<sup>1</sup>, ▲Wen-Hsiu Pan<sup>1</sup>, Feng-I Chen<sup>2,3</sup>, Hsiu-Yueh Liu<sup>1</sup>

<sup>1</sup>Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

<sup>3</sup>Division of Prosthodontics, Department of Dentistry,  
Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objective:** Older adults commonly experience oral health issues associated with aging, including tooth loss, xerostomia, and functional decline. Poor oral conditions may lead to oral frailty, which can subsequently impair oral health-related quality of life (OHRQoL). This study aimed to investigate the association between oral frailty and OHRQoL among community-dwelling older adults. **Methods:** This cross-sectional study recruited 437 older adults aged 60 years and above from community care centers. The Oral Frailty Five-item Checklist (OF-5), combined with objective oral examination and Oral Diadochokinesis (ODK), was used to assess the older adults' oral function (number of natural teeth, chewing difficulties, swallowing difficulties, dry mouth, and frequency of oral alternation movements). The Geriatric Oral Health Assessment Index (GOHAI) and a five-point Likert scale were used to assess subjective oral health-related quality of life among older adults. **Results:** The gender distribution of participants was 80.5% female and 19.5% male, with a mean age of 74.85 years. The prevalence of oral frailty was 70.71%. Age showed a significant positive correlation with oral frailty proportion ( $p < 0.001$ ), increasing markedly with advancing age and reaching 84.26% in those aged 80 years and above. Regarding OHRQoL, the overall mean of the GOHAI score was  $47.88 \pm 5.17$ ; the oral frailty group scored  $47.08 \pm 5.11$ , significantly lower than the non-oral frailty group at  $49.90 \pm 4.81$  ( $p = 0.002$ ). The oral frailty group demonstrated significantly lower scores in both physical function and psychosocial function dimensions ( $p < 0.001$ ). Oral frailty scores showed a significant negative correlation with GOHAI scores ( $r = -0.247$ ,  $p < 0.001$ ). **Conclusions:** Community-dwelling older adults with oral frailty are associated with lower oral OHRQoL. Future interventions are recommended to strengthen oral function among community-dwelling older adults and improve their OHRQoL.

**Effectiveness of oral health education intervention for Aboriginal elders  
in indigenous cultural health station**

▲Zhen-Ting Lin, Pei-Shan Ho

Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** Aboriginal elders in Taiwan face oral health disparities due to geographical and medical resource limitations. This study evaluates the effectiveness of oral health education on the knowledge and attitudes of elders at Indigenous Cultural Health Stations. **Methods:** This study utilized a single-group pre-test/post-test design. A total of 121 aboriginal elders aged 55 and above were recruited from Indigenous Cultural Health Stations in Kaohsiung, Pingtung, and Taitung. Structured questionnaires were administered before and after the intervention. The educational curriculum included oral health knowledge, practical instruction on cleaning tools (for both natural teeth and dentures), and promotion of government health policies. **Results:** A total of 121 eligible participants were included (41 males and 80 females). Following the intervention, the overall oral health knowledge score significantly increased from  $2.01 \pm 1.275$  to  $6.92 \pm 2.525$  ( $p < 0.001$ ), with the most pronounced improvement observed in the 55–64 age group ( $ES = 4.22$ ). Regarding oral health attitudes, the overall score significantly increased from  $22.53 \pm 3.171$  to  $23.49 \pm 2.711$  ( $p = 0.014$ ). Statistically significant improvements in attitude were specifically observed among females ( $p = 0.020$ ), elders aged 75 and above ( $p = 0.011$ ), and the illiterate group ( $p = 0.004$ ). **Conclusions:** Implementing oral health education interventions at Indigenous Cultural Health Stations can significantly enhance the oral health knowledge of Aboriginal elders and improve the attitudes of some subgroups. The improvements in attitude was only among females, the oldest-old, and the illiterate group. It is suggested that more tailored interventions for attitude transformation should be developed for male and younger groups in the future.

## **Correlation between treatment modalities and oral self-care knowledge among patients with oral cancer**

▲I-Chun Fang, ▲Tz-Yan Wang, Pei-Chen Lin

Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** Oral cancer treatments often result in oral functional limitations, prompting early initiation of oral hygiene education and oral motor exercise instruction to prevent or delay treatment-related complications. However, during the prolonged treatment course, the accuracy and retention of oral self-care knowledge may vary and subsequently influence patients' self-care behaviors. This study aimed to evaluate oral self-care knowledge among patients who had received oral health education and to examine whether knowledge levels were associated with disease severity and treatment modalities. **Methods:** This cross-sectional study enrolled 144 oral cancer patients from a southern Taiwan medical center between September 2021 and December 2023. Oral self-care knowledge was assessed using a 12-item questionnaire encompassing two primary domains: oral hygiene and oral motor exercises. Statistical analyses, including ANOVA and Chi-square tests, were performed to evaluate the correlations between variables. **Results:** A total of 144 participants were analyzed, with a mean age of  $56.42 \pm 8.89$  years. Clinical characteristics showed that 16.78% of patients had cancer involvement in two or more anatomical sites, and 65.73% were in advanced stages (Stages III and IV). The overall mean score for oral self-care knowledge was  $8.74 \pm 2.02$  (total score: 12), with a passing rate of 62.5%. Notably, patients currently undergoing radiotherapy demonstrated significantly higher knowledge scores ( $10.03 \pm 1.16$ ) compared to those not receiving treatment ( $P=0.0084$ ). In contrast, no significant correlation was found between oral self-care knowledge and clinical cancer stage. **Conclusion:** Oral self-care knowledge among patients with oral cancer was more strongly associated with active radiotherapy than with disease severity. Treatment-related discomfort may enhance patients' attention to and reinforcement of previously provided oral health education, highlighting the importance of continuous, stage-appropriate reinforcement of self-care education throughout the treatment.

**Association between perceived oral functional impacts and objective clinical Measures of Mouth Opening and Oral Diadochokinesis in oral cancer patients**

▲Tz-Yan Wang, ▲I-Chun Fang, ▲Chih-Ling Lin, Pei-Chen Lin

Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan,

**Objective:** Oral cancer is the fourth most common cancer among Taiwanese men. Treatment often leads to disfigurement and oral dysfunction. Clinical treatments lead to oral functional limitations, notably in mouth opening (MMO), patients' subjective experiences are crucial. This study investigates the correlation between objective measures—maximal mouth opening (MMO) and Oral Diadochokinesis (DDK)—and perceived oral function. **Methods:** This cross-sectional study enrolled 110 oral cancer patients from a southern Taiwan medical center between September 2021 and December 2023. Objective measures included MMO and Oral-DDK. Statistical analyses, including Analysis of Variance (ANOVA), were performed using IBM SPSS v.30 to explore associations between clinical measures and functional outcomes. **Results:** The buccal mucosa was the most common tumor site (54.5%). Patients with greater chewing difficulty demonstrated significantly lower MMO ( $p = 0.003$ ) and reduced Oral-DDK times within 5 seconds, Ta ( $p = 0.001$ ) and Ka ( $p = 0.006$ ) syllables. Furthermore, perceived speech impairment was strongly linked to reduced performance in Ta ( $p < 0.001$ ) and Ka ( $p < 0.001$ ) syllables. Notably, social self-consciousness showed significant associations with all Oral-DDK parameters (Pa:  $p = 0.003$ ; Ta:  $p < 0.001$ ; Ka:  $p < 0.001$ ), indicating that objective motor coordination reflects both the functional and psychosocial challenges experienced by these patients. **Conclusion:** Perceived oral functions are significantly associated with clinical indicators. Chewing difficulty relates to MMO, while social self-consciousness and speech impairments correlate with Oral-DDK performance. Objective clinical measures serve as sensitive markers of subjective challenges, highlighting the importance of integrating these assessments into clinical rehabilitation programs.

**Subgingival microbial differences between rheumatoid arthritis (RA) and non-RA individuals after exclusion of diabetes mellitus**

▲Yi-Jing Chen<sup>1</sup>, Wei-Chun Hung<sup>1</sup>, Yu-Hsiang Chou<sup>2,3</sup>, Chern-Hsiung Lai<sup>3,4</sup>,  
Jeng-Hsien Yen<sup>5,6</sup>

<sup>1</sup>Department of Microbiology and Immunology, School of Medicine, College of Medicine,  
Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>2</sup>Division of Periodontics, Department of Dentistry, Kaohsiung Medical University Hospital,  
Kaohsiung, Taiwan.

<sup>3</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

<sup>4</sup>Anaerobic and Oral Microbiology Testing Center, Kaohsiung Medical University, Kaohsiung,  
Taiwan

<sup>5</sup>Division of Rheumatology, Department of Internal Medicine,  
Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>6</sup>Graduate Institute of Clinical Medicine, College of Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** To characterize subgingival microbial community patterns associated with established rheumatoid arthritis (RA) after accounting for periodontal status and excluding diabetes mellitus (DM). **Methods:** Subgingival plaque samples from RA and non-RA individuals were analyzed using 16S rRNA gene sequencing. Participants were stratified by periodontal condition, with primary analyses focusing on individuals with periodontitis without DM (PDnoDM). Microbial community diversity and composition were compared using alpha and beta diversity metrics, and differentially abundant taxa were identified. **Results:** Distinct subgingival microbial community structures were observed between RA and non-RA individuals in the PDnoDM subgroup. RA-associated microbial profiles showed increased representation of anaerobic taxa commonly linked to periodontal inflammation, whereas non-RA profiles were characterized by enrichment of Proteobacteria-associated taxa. Several RA-enriched taxa were consistently identified across multiple analytical subgroups. **Conclusion:** Established RA is associated with a distinct subgingival microbial profile in the context of periodontitis, independent of DM status, supporting the presence of an RA-associated microbial signature within the periodontal nich.

**Alendronate disrupts hypoxia-induced HIF-1 $\alpha$  and periostin expression in human periodontal ligament fibroblasts – an in vitro study**

Chun-Chan Ting<sup>1,2,3</sup>, Hangshen Chen<sup>1,4</sup>, Chia-Chen Wu<sup>1</sup>, Feng-Cheng Wu<sup>1,5</sup>, Yu-Hsun Kao<sup>1,6</sup>,  
▲Edward Chengchuan Ko<sup>1,4,7</sup>

<sup>1</sup>Liberty Lab of Tissue Engineering Takao, Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Medicine, National Cheng Kung University, Tainan, Taiwan

<sup>3</sup>Department of Stomatology, National Cheng Kung University Hospital, Tainan, Taiwan

<sup>4</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

<sup>5</sup>Graduate Institute of Life Science, National Defense Medical Center, Taipei, Taiwan

<sup>6</sup>Division of Oral and Maxillofacial Surgery, Kaohsiung Medical University Hospital, Kaohsiung,  
Taiwan

<sup>7</sup>Institute of Precise Medicine, College of Medicine, National Sun Yat-sen University, Kaohsiung,  
Taiwan

**Aim:** To investigate the effects of alendronate on hypoxia-inducible factor-1 alpha (HIF-1 $\alpha$ ), periostin, and Ki-67 expression in human periodontal ligament fibroblasts (hPDLFs) under normoxic and hypoxic conditions, with implications for cell proliferation and extracellular matrix remodeling. **Materials and Methods:** Primary hPDLFs were cultured under normoxic (21% O<sub>2</sub>) or hypoxic (1% O<sub>2</sub>) conditions and treated with 10  $\mu$ M alendronate for 48 hours. Cell viability was assessed using the CCK-8 assay. The expression of Ki-67, HIF-1 $\alpha$ , and periostin was evaluated by Western blotting and immunofluorescence. Statistical analyses were performed using one-way ANOVA with Tukey's post hoc test. **Results:** Hypoxia significantly increased HIF-1 $\alpha$  and periostin expression, while alendronate treatment notably suppressed periostin and Ki-67 levels in both normoxic and hypoxic conditions ( $p < 0.05$ ). Although HIF-1 $\alpha$  was elevated under hypoxia, its expression was relatively attenuated by concurrent alendronate treatment. These data indicate that alendronate impairs hypoxia-induced signaling and cellular proliferation in hPDLFs. **Conclusions:** This study is the first, to our knowledge, to show that alendronate modulates HIF-1 $\alpha$  expression in human periodontal ligament fibroblasts under both normoxic and hypoxic conditions, along with concurrent suppression of periostin and Ki-67. These findings suggest that alendronate may disrupt periodontal tissue adaptation to hypoxia and impair wound healing, highlighting potential risks of bisphosphonate use in patients with compromised periodontal or vascular conditions.

## **Effect of different polishing systems on the surface roughness of dental zirconia**

▲Ming-Hung Ko<sup>1</sup>, Ting-Shun Lan<sup>1,2</sup>

<sup>1</sup>Division of Prosthodontics, Department of Dentistry,  
Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** Polishing zirconia after occlusal adjustment is vital for clinical outcomes. However, the effectiveness and material-related mechanisms of various polishing systems remain unclear. This in vitro study compared the surface roughness of dental zirconia across different commercial systems and analyzed the elemental composition of the polishing burs using energy-dispersive X-ray spectroscopy (EDS). **Methods:** Y-TZP specimens were ground to simulate adjustment and polished using Meisinger, Komet, and Shofu systems. Surface roughness (Ra) was measured via contact profilometer. The effect of additional polishing with paste was also evaluated. Bur composition was determined using SEM and EDS. Data were analyzed using ANOVA and Tukey tests ( $\alpha = 0.05$ ). **Results:** All systems achieved clinically acceptable Ra values. The Meisinger system yielded significantly lower Ra than Komet or Shofu ( $P < .05$ ). Polishing paste further reduced Ra across all groups ( $P < .05$ ). EDS revealed that Meisinger utilized a gradual reduction in inorganic filler, whereas Shofu exhibited an abrupt transition in its polishing sequence. **Conclusions:** Zirconia surface roughness is influenced by both the polishing protocol and bur composition. A hierarchically designed polishing sequence facilitates superior surface refinement.

## **Impact of environmental moisture on deformation of 3D printing PMMA dental resin**

▲Ching-I Huang<sup>1</sup>, Ting-Hsun Lan<sup>1,2</sup>, Yu-Jing Zhou<sup>1,2</sup>

<sup>1</sup>Division of Prosthodontics, Department of Dentistry,  
Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Background and purpose:** This study aimed to evaluate the influence of moisture levels on the dimensional stability of 3D-printed dental resin. Deformation was assessed using both traditional methods (digital calipers) and advanced digital approaches (3D scanning and software analysis) to understand the impact of environmental factors on the precision of 3D-printed dental resin. **Materials and methods:** Nine PMMA specimens (5 × 5 × 25 mm) with reference points were fabricated using the Phrozen XL4K 3D printer. The specimens were divided into three groups based on environmental storage conditions (n=3 per group): dry, normal, and humid. Dimensional changes were evaluated at 1, 7, and 14 days. Deformation was measured using two methods: traditional measurement with digital calipers and advanced analysis via 3D scanning performed with a desktop scanner (F8, 3Shape Co.). The scanned digital images were further analyzed using EXOCAD software to quantify deformation and assess dimensional change. **Result:** Using the 1-day measurements as the baseline, caliper data at 7 days showed mean deformations of -0.03 mm for the dry group, -0.02 mm for the normal group, and -0.02 mm for the humid group. At 14 days, the mean deformations were -0.03 mm (dry), -0.03 mm (normal), and -0.06 mm (humid), indicating a notable increase in deformation under humid conditions. Digital image analysis revealed mean deformations at 7 days of -0.24 mm (dry), -0.08 mm (normal), and -0.08 mm (humid). At 14 days, these values were -0.16 mm (dry), -0.09 mm (normal), and -0.20 mm (humid). The results demonstrate that deformation progresses over time, with humid environments causing the greatest degree of dimensional change. **Conclusion:** Environmental moisture significantly impacts the dimensional stability of 3D-printed PMMA dental resin. Dry conditions minimize deformation, while humid conditions exacerbate it, underscoring the importance of environmental control in optimizing the precision and reliability of 3D-printed dental resin.

## **Effects of different surface treatments on the bond strength and durability of 5Y-TZP**

▲Hsin-Jou Yang<sup>1</sup>, Lan Ting-Hsun<sup>1,2</sup>

<sup>1</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>2</sup>Division of Prosthodontics, Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objectives:** To evaluate the effects of different surface treatments, including mechanical treatment, chemical treatment, and ceramic deposition spray, on the shear bond strength (SBS) and bonding durability of 5Y-translucent zirconia polycrystal (5Y-TZP). **Methods:** A total of 150 specimens of 5Y-TZP were fabricated and randomly assigned to five groups (n = 30): Al<sub>2</sub>O<sub>3</sub> airborne-particle abrasion, Single Bond Universal Adhesive (SBU; 3M), a 20 wt.% ZrO<sub>2</sub> nanopowder-containing adhesive (KMU), glass-ceramic spray coating (Aidite Lisi Connect), and an untreated control. All specimens were bonded to light-cured resin composite (Filtek™ Z350 XT; 3M) using a resin cement system (Scotchbond Universal Plus and RelyX™ Resin Cement). Half of the specimens were stored in air for 24 hours, while the other half underwent 5,000 thermocycles. SBS was measured using a universal testing machine at a crosshead speed of 1.5 mm/min. Data were analyzed using repeated-measures one-way ANOVA and Tukey's HSD test ( $\alpha = 0.05$ ). Failure modes were examined under an optical microscope. **Results:** After 24 hours of storage, the KMU (14.81±3.13 MPa) showed the highest SBS values; however, there was no statistically significant difference compared with the other groups ( $P > 0.05$ ). Following thermocycling, a significant decrease in SBS was observed in the untreated (8.29±2.89 MPa) and Lisi groups (11.54±2.66 MPa) ( $P < 0.05$ ). In contrast, the KMU group maintained stable bond strength after thermocycling (15.33±3.55 MPa). Failure mode analysis revealed predominantly adhesive failure in the untreated group, while cohesive failure was mainly observed in the KMU group. **Conclusions:** Surface treatments can enhance the short-term bond strength of 5Y-TZP; however, bonding durability is influenced by aging conditions. Within the limitations of this study, the KMU treatment demonstrated the most stable bond strength before and after thermocycling.

**Comparative accuracy of Image-Guided Photogrammetry, Intraoral Photogrammetry, and Intraoral scanning for complete-arch implant impressions: an In-Vitro study**

▲Hsiao-Lan Huang<sup>1</sup>, Yu-Feng Chen<sup>1,2</sup>, Ting-Hsun Lan<sup>1,3</sup>

<sup>1</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>2</sup>Division of Oral and Maxillofacial Surgery, Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>3</sup>Division of Prosthodontics, Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objectives:** This study compared the accuracy of image-guided photogrammetry (IGP), intraoral photogrammetry (IPG), and intraoral scanning (IOS) for complete-arch implant-supported impressions in edentulous arches and evaluated performance differences between the maxilla and mandible. **Methods:** Two completely edentulous full-arch models (maxillary and mandibular), each with six implants, were fabricated using three-dimensional printing technology. Digital impressions were obtained using IGP (X-Guide), IPG (Shining Elite in photogrammetry mode), and two IOS systems (Virtuo Vivo and Shining Elite in scanning mode). A laboratory scanner (3Shape F8) served as the reference standard. Ten scans were performed per system for both maxillary and mandibular models. Scan data were converted into virtual multi-unit abutments using Exocad and analyzed in Geomagic Control X. Linear distance and angular deviations of abutment platforms were calculated. Statistical analysis was performed using one-way ANOVA. **Results:** In the mandible, IPG showed the lowest linear deviation ( $38.91 \pm 4.30 \mu\text{m}$ ), whereas higher deviations were observed with IGP ( $60.06 \pm 5.27 \mu\text{m}$ ) and Virtuo Vivo ( $55.09 \pm 6.78 \mu\text{m}$ ). In the maxilla, IGP demonstrated the lowest deviation ( $45.67 \pm 6.49 \mu\text{m}$ ), followed by IPG ( $49.86 \pm 3.93 \mu\text{m}$ ), while Shining Elite IOS ( $69.31 \pm 12.02 \mu\text{m}$ ) and Virtuo Vivo ( $58.55 \pm 7.81 \mu\text{m}$ ) exhibited higher values. Overall linear deviations ranged from 39 to 69  $\mu\text{m}$  ( $P < 0.001$ ). Angular deviations were comparable across all systems ( $0.15^\circ$ – $0.26^\circ$ ,  $P < 0.001$ ). **Conclusions:** Digital impression accuracy for complete-arch implant restorations is influenced by both scanning system and arch location. IGP performed best in the maxilla, while IPG demonstrated consistently stable accuracy across arches. IOS accuracy varied among devices, suggesting greater sensitivity to scanning strategy and image stitching. Overall, each digital impression technique presents specific advantages and limitations, and clinical selection should be based on the characteristics of the scanning system.

## **Study on oral cleaning effects of fully acetylated high molecular weight chitosan toothpaste**

▲ Allen Bai<sup>1</sup>, Kai-Fang Hu<sup>2,3</sup>, Yu-Hsiang Chou<sup>1,2</sup>

<sup>1</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

<sup>2</sup>Division of Periodontics, Department of Dentistry, Kaohsiung Medical University Hospital,  
Kaohsiung, Taiwan

<sup>3</sup>Institute of Clinical Medicine, National Yang-Ming University, Taipei, Taiwan

**Objectives:** Traditional chitosan-based toothpaste formulations exhibit limited efficacy due to low molecular weight (~10 kDa), incomplete deacetylation (85%), and poor water solubility. This study aimed to develop and validate a novel toothpaste formulation incorporating fully acetylated, high-molecular-weight chitosan to overcome these technical limitations. Specific objectives included: (A) synthesizing chitosan polymer with molecular weight of 500 kDa, acetylation degree  $\geq 99\%$ , and complete water solubility; (B) systematically evaluating protein contaminant removal capacity; (C) quantifying antiviral efficacy to achieve  $>99\%$  viral removal; (D) elucidating the mechanism by which complete water solubility enhances dental biofilm disruption through synergistic effects of high molecular weight and cationic properties. **Methods:** Fully acetylated chitosan (MW: 500 kDa, acetylation degree  $\geq 99\%$ ) was synthesized via chemical methods and characterized using viscosity measurements and deionized water solubility tests. Toothpaste formulations containing 0.02-0.2% chitosan were prepared. Protein removal efficacy was assessed using bovine serum albumin (BSA) and milk proteins on hydroxyapatite surfaces, quantified by turbidity (TPU) analysis. Antiviral activity against COVID-19 was evaluated by Polymerase Chain Reaction (PCR) testing at the P3 laboratory in the National Health Research Institutes. Design of Experiments (DOE) methodology using Design Expert 11.0 software was employed for formulation optimization, screening five factors: calcium carbonate, glycerol, sorbitol, Sodium Lauryl Sulfate (SLS), and chitosan concentration through fractional factorial design (25-1), followed by steepest ascent and central composite design. A single-blind, randomized clinical trial enrolled 60 participants and compared chitosan toothpaste with conventional toothpaste; analyses used a two-sample t-test and a paired t-test. **Results:** Fractional factorial screening identified sorbitol, SLS, and chitosan concentration as significant factors. Optimal formulation achieved at 15% (v/v) sorbitol, 2.5% (v/v) SLS, and 0.3% (v/v) chitosan, yielding 98.5% protein removal rate. ( $p < 0.05$ ). **Conclusions:** Fully acetylated high-molecular-weight chitosan toothpaste demonstrates superior plaque-control efficacy and  $>98\%$  protein-degradation capacity, providing a promising approach for caries and periodontal disease prevention.

## **Study on gum cleaning effects of a fully Acetylated high-molecular-weight chitosan mouthwash**

▲Kuan-Wen Chen<sup>1</sup>, Kai-Fang Hu<sup>2,3</sup>, Yu-Hsiang Chou<sup>1,2</sup>

<sup>1</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

<sup>2</sup>Division of Periodontics, Department of Dentistry, Kaohsiung Medical University Hospital,  
Kaohsiung, Taiwan

<sup>3</sup>Institute of Clinical Medicine, National Yang-Ming University, Taipei, Taiwan

**Objectives:** Traditional chitosan-based oral care products suffer from low molecular weight (~10 kDa), incomplete deacetylation (85%), and poor solubility, resulting in limited efficacy in protein removal and antimicrobial activity. This study developed and validated a novel mouthwash formulation based on fully acetylated, high molecular weight chitosan to overcome these limitations and enhance oral health outcomes. **Methods:** Fully acetylated chitosan (MW: 500 kDa, acetylation degree  $\geq 99\%$ ) with complete water solubility was synthesized and characterized by gel permeation chromatography (GPC). Design of Experiments (DOE) methodology was employed to optimize formulation parameters including glycerol, PEG-40, propylene glycol, and chitosan concentration. Protein removal efficacy was assessed using bovine serum albumin (BSA) and milk protein models on hydroxyapatite surfaces, quantified by turbidity (TPU) and BCA assays. Antiviral activity against influenza A/B and COVID-19 was evaluated in collaboration with National Health Research Institutes. A double-blind, randomized clinical A clinical IRB trial will be conducted to compare chitosan mouthwash versus conventional mouthwash, by measuring gingival index (GI) and plaque index (PI) after 5-7 day usage. Statistical analysis employed two sample t-test and paired t-test. **Results:** DOE optimization identified the optimal formulation: 0.07% (v/v) chitosan + 2.5% (v/v) propylene glycol, achieving 99% protein removal versus 3% for conventional mouthwash ( $p < 0.01$ ). **Conclusions:** High molecular weight, fully acetylated chitosan mouthwash demonstrates superior protein removal capacity and clinical efficacy in improving gingival health, offering a promising therapeutic approach for oral infection prevention.

## Effects of melatonin on cell viability, HIF-1 $\alpha$ and collagen type I expression of periodontal ligament fibroblasts under hypoxia

▲Chen-Yu Kuo<sup>1,2</sup>, Edward Chengchuan Ko<sup>1,2,3,4\*</sup>

<sup>1</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>2</sup>Liberty Lab of Tissue Engineering Takao, Kaohsiung, Taiwan

<sup>3</sup>Division of Oral and Maxillofacial Surgery, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>4</sup>Department of Oral and Maxillofacial Surgery, Graduate School of Medicine and Faculty of Medicine, The University of Tokyo, Tokyo, Japan

**Background:** Periodontal ligament fibroblasts (PDLFs) play a central role in maintaining periodontal homeostasis through extracellular matrix (ECM) production, particularly type I collagen. Hypoxia, a characteristic microenvironment in periodontal disease, stabilizes hypoxia-inducible factor-1 $\alpha$  (HIF-1 $\alpha$ ), disrupts collagen synthesis, and impairs fibroblast viability. Melatonin, a potent antioxidant and anti-inflammatory molecule, has demonstrated cytoprotective effects in various tissues; however, its influence on hypoxic PDLFs remains unclear. **Purpose:** This study aimed to evaluate whether melatonin modulates cell viability, HIF-1 $\alpha$  expression, and collagen type I production in PDLFs under hypoxic conditions. **Methods:** Human periodontal ligament fibroblasts (passages 10–14) were cultured under normoxia (21% O<sub>2</sub>) or hypoxia (2% O<sub>2</sub>) for 24 hours and treated with melatonin (0, 50, 100, and 200  $\mu$ M). Cell viability was assessed using the CCK-8 assay (n = 3 independent experiments). Protein expression levels of HIF-1 $\alpha$  and collagen type I were analyzed by Western blotting. Data are presented as mean  $\pm$  standard error (SE). Statistical comparisons were performed using one-way ANOVA followed by Tukey's post hoc test. A p-value < 0.05 was considered statistically significant. **Results:** Under normoxic conditions, melatonin slightly reduced metabolic activity to 95%, 94%, and 93% of control at 50, 100, and 200  $\mu$ M, respectively (p < 0.05). Hypoxia significantly decreased cell viability to 76.75%  $\pm$  2.50% relative to normoxic controls (p < 0.0001). Melatonin treatment partially attenuated hypoxia-induced viability loss, increasing relative viability to 83.75%  $\pm$  2.22% (50  $\mu$ M), 85.00%  $\pm$  2.94% (100  $\mu$ M), and 84.25%  $\pm$  2.22% (200  $\mu$ M) (all p < 0.01 vs hypoxic control). Western blot analysis demonstrated hypoxia-induced upregulation of HIF-1 $\alpha$  and downregulation of collagen type I expression. Melatonin at 50 and 100  $\mu$ M attenuated HIF-1 $\alpha$  elevation, whereas collagen type I expression was not significantly restored within 24 hours. Additionally, prolonged exposure (48

hours) to 200  $\mu\text{M}$  melatonin under hypoxia resulted in significant nuclear enlargement ( $n = 84$  nuclei; mean area =  $361.90 \pm 12.82 \mu\text{m}^2$ ), indicating morphological adaptation beyond metabolic changes. **Conclusion:** Hypoxia markedly impairs PDLF viability and ECM-related protein expression. Melatonin partially mitigates hypoxia-induced viability loss and suppresses HIF-1 $\alpha$  activation but does not restore collagen type I expression within 24 hours. The observed nuclear enlargement following prolonged exposure suggests potential structural or metabolic adaptation. These findings warrant further mechanistic investigation into melatonin's role in periodontal regenerative therapy.

**The association of parental reading activity, family impact, and pediatric dental care literacy with caries experience among preschool children**

▲Yi-Ting Weng, ▲Zhi-Xuan Chen, ▲Chih-Yi Lo, Wan-Jhen Su, Yung-Kai Huang

Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** This study aimed to investigate the associations among parental reading activity, family impact, pediatric dental care literacy, and caries experience in preschool children. **Methods:** This cross-sectional study used convenience sampling to recruit preschool children aged 3-6 years and their caregivers from a pediatric dental clinic. A total of 110 child-caregiver pairs participated. Caregivers completed a self-administered questionnaire that included demographic characteristics, reading activities, the family impact section of the Early Childhood Oral Health Impact Scale (ECOHIS), and a pediatric dental care literacy assessment covering knowledge, numeracy, and comprehension. Children's caries experience was assessed by dentists using the decayed, extracted, and filled teeth (deft) index based on World Health Organization criteria. **Results:** Correlation analyses showed significant associations among parental reading behaviors, reading ability, and children's caries experience. More frequent parental engagement in reading Chinese printed materials, digital information, and co-reading Chinese creative books with children was associated with higher parental reading ability ( $r = 0.193$  to  $0.309$ ,  $p < 0.05$ ). In addition, more frequent parental reading and co-reading behaviors were significantly associated with lower deft scores in children ( $r = -0.245$  to  $-0.271$ ,  $p < 0.05$ ). Furthermore, family impact related to children's dental problems or treatment was positively associated with children's deft ( $r = 0.344$  to  $0.398$ ,  $p < 0.05$ ). **Conclusions:** Parental reading and co-reading behaviors were associated with lower caries experience in preschool children. Higher reading frequency was associated with higher parental knowledge scores, while family impact was also associated with children's dental problems.

## **Effects of dental status and occlusal support on perceived chewing difficulty of bento foods in older adults**

▲Wen-Hsuan Lu, ▲Yu-Xuan Dai, ▲Yu-Hsuan Ke, Pei-Chen Lin

Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** Adequate oral function is essential for maintaining sufficient nutritional intake in older adults. This study investigated the association between dental status, occlusal support, perceived chewing difficulty, and actual food intake using a standardized bento-based meal among community-dwelling adults aged 65 years and older. **Methods:** Participants who were able to attend a communal lunch independently underwent dental examinations to assess remaining teeth, denture use, and occlusal support, classified by the Eichner Index. Standardized bento meals containing rice, vegetables, and meat dishes were consumed. Subjective texture perception, including hardness, chewability, and ease of swallowing, was rated for each food item using a 5-point Likert scale. Objective food texture properties were measured using a texture analyzer, and food intake was quantified by weighing leftovers after the meal. **Results:** Fifty participants were included in the final analysis. The maximum cutting force required for sausage and Chinese kale was 2853 N and 1054 N, respectively, while the hardness of rice was 96 N/m<sup>2</sup>. For sausage, 100% of participants in Eichner Group A and 92% in Group C rated chewing as easy or very easy. For rice, 75% of Group A and 85% of Group C reported easy chewing. No significant differences in perceived chewing difficulty were observed among occlusal groups. Despite this, participants with fewer remaining teeth and reduced occlusal support reported significantly lower texture acceptance for harder or more fibrous foods and demonstrated significantly greater leftover food weights, indicating reduced consumption. Softer foods such as rice showed consistently high acceptance and intake regardless of dental condition. **Conclusions:** Overall, masticatory ability influenced both subjective texture perception and objective food intake. These findings highlight the importance of considering dental and occlusal conditions when designing texture-modified meals for older adults and demonstrate that bento-based meal testing is a and ecologically valid method for evaluating eating difficulties in real-life meal settings.

## **Anti-inflammatory effects of ugonins from *helminthostachys zeylanica* in periodontal-related cell models**

▲Hai-Wei Chuang, Kun-Tsung Lee

Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objective:** Periodontitis is a prevalent chronic inflammatory disease characterized by persistent immune activation and progressive destruction of periodontal supporting tissues. Current treatment strategies primarily rely on mechanical debridement with adjunctive antibiotics; however, long-term antibiotic use is associated with limited control of chronic inflammation and increasing concerns regarding antimicrobial resistance. Therefore, the development of alternative therapeutic agents with effective anti-inflammatory properties and favorable safety profiles is urgently needed. This study aimed to investigate the anti-inflammatory effects and cytotoxicity of ugonins, prenylated flavonoids isolated from *Helminthostachys zeylanica*, using periodontal-related cell models. **Methods:** Human gingival fibroblasts (HGF) and murine macrophages (RAW264.7) were employed as in-vitro models. Cells were treated with Ugonin S, Ugonin M, Ugonin L, and flavone glycoside derivatives at concentrations ranging from 1 to 7.5  $\mu\text{M}$ . Cell viability was evaluated using the CCK-8 assay. Inflammatory responses were induced by *Porphyromonas gingivalis* lipopolysaccharide (Pg-LPS, 20  $\mu\text{g}/\text{mL}$ ). The mRNA expression levels of inflammatory mediators were quantified by real-time quantitative polymerase chain reaction (qPCR). **Results:** CCK-8 assays demonstrated that all tested ugonin compounds exhibited no significant cytotoxicity in HGF cells at concentrations up to 7.5  $\mu\text{M}$ . Pg-LPS stimulation significantly increased the expression of pro-inflammatory genes in both HGF and RAW264.7 cells. Treatment with ugonins markedly attenuated Pg-LPS-induced inflammatory gene expression, with Ugonin L and Ugonin M showing the most pronounced inhibitory effects ( $p < 0.05$ ). Comparable anti-inflammatory trends were observed in both cell types, indicating a consistent immunomodulatory response. **Conclusion:** Ugonins derived from *Helminthostachys zeylanica* effectively suppress inflammatory responses in periodontal-related cell models without inducing cytotoxicity. These findings suggest that ugonins represent promising plant-derived candidates for the development of safe and alternative therapeutic strategies for periodontal inflammation management.

## Poster List

### GROUP: Clinical Research

No.	Topic	Presenter	Institution
<b>P2-01</b>	Association between body dysmorphic disorder tendency and postoperative outcomes in orthognathic surgery patients	Wan-Lung Yang	Department of Oral Hygiene, College of Dental Medicine, KMU*
<b>P2-02</b>	Effects of AI-assisted dental monitoring with health counseling on periodontal disease and oral health-related quality of life in periodontitis patients: a randomized controlled trial	Yu-Ting Lu Chen-Hao Yang Yang-Ting Lee	Department of Oral Hygiene, College of Dental Medicine, KMU*
<b>P2-03</b>	EMG of masticatory muscle under different posture	Chien-Jen Wang	School of Dentistry, College of Dental Medicine, KMU*
<b>P2-04</b>	Analysis of the soft tissue chin profile in acceptable aesthetic profiles using a 3-dimensional camera facial scan system compared to normative values based on 2-dimensional radiographic analysis	Sasawat Putpinij	Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Chulalongkorn University
<b>P2-05</b>	Comparison of marginal bone loss in two different systems of bone-level, tapered implant designs: a cohort study	Kanyarak Kunyawatyuwapong	Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Chulalongkorn University
<b>P2-06</b>	Comparison of the effects of hypochlorous acid-containing mouthwash and chlorhexidine-containing mouthwash on dental plaque	Yong-Hsuan Lai	Department of Oral Hygiene, College of Dental Medicine, KMU*
<b>P2-07</b>	Enhancing color accuracy in ceramic staining education through digital shade-matching software	Yi-Hsuan Li	Department of Oral Hygiene, College of Dental Medicine, KMU*

\*KMU (Kaohsiung Medical University), KMUH (Kaohsiung Medical University Hospital)

## **Association between body dysmorphic disorder tendency and postoperative outcomes in orthognathic surgery patients**

▲Wan-Lung Yang<sup>1</sup>, Han-Jen Hsu<sup>1,2</sup>, Chen-Yi Lee<sup>1</sup>

<sup>1</sup>Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>2</sup>Division of Oral and Maxillofacial Surgery, Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objectives:** This prospective study examined whether preoperative body dysmorphic disorder (BDD) tendency affects postoperative psychological outcomes, surgical satisfaction, and quality of life in patients undergoing orthognathic surgery (OgS). **Methods:** Adult patients (aged  $\geq 18$  years) scheduled for OgS completed self-administered questionnaires preoperatively and at 4–6 weeks, 3, 6, and 12 months postoperatively. Assessments included the Body Dysmorphic Disorder Questionnaire (BDDQ), Yale–Brown Obsessive–Compulsive Scale modified for BDD (BDD-YBOCS), Beck Anxiety Inventory (BAI), Beck Depression Inventory-II (BDI-II), Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ), and surgical expectation measures. Anxiety tendency was  $BAI \geq 14$ ; depressive severity was categorized as none, mild, moderate, or severe. Patient numbers varied at follow-ups. Postoperative outcomes were defined as changes in psychological status, surgical satisfaction, and quality of life across follow-up time points. Statistical analyses used IBM SPSS Statistics version 30.0, including chi-square tests, group comparisons, and repeated-measures analyses. **Results:** Among 463 patients (279 females and 184 males), preoperative data were available for 284 and therefore constituted the primary focus of the present analysis. Postoperative follow-up rates were low, with only 48, 66, 45, and 20 patients completing assessments at 4–6 weeks, 3, 6, and 12 months, respectively. Preoperative BDD prevalence was 38.9%, decreasing to 9.6% postoperatively. BDD was not significantly associated with anxiety tendency ( $\chi^2 = 1.13$ ,  $p = 0.288$ ) and showed marginal differences in depressive severity ( $\chi^2 = 7.49$ ,  $p = 0.058$ ). Psychological distress and pain decreased over time ( $p < 0.001$ ). Patients with preoperative BDD reported lower surgical satisfaction and poorer quality of life, with significant BDD-by-time interactions ( $p < 0.05$ ). **Conclusions:** Preoperative BDD tendency is associated with greater psychological vulnerability and less favorable postoperative outcomes. Routine psychological screening may enhance patient-centered care in OgS patients.

**Effects of AI-assisted dental monitoring with health counseling on periodontal disease and oral health-related quality of life in periodontitis patients: a randomized controlled trial**

▲Yu-Ting Lu<sup>1</sup>, ▲Chen-Hao Yang<sup>1</sup>, ▲Yang-Ting Lee<sup>1</sup>, Ai-Hua Chang<sup>2</sup>, Hsiao-Ling Huang<sup>1</sup>

<sup>1</sup>Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

**Objectives:** This study aimed to evaluate the effects of AI-assisted dental monitoring, with and without personalized health counseling, on periodontal parameters and oral health-related quality of life (OHRQoL) in patients with periodontitis. **Methods:** A total of 118 patients with periodontitis were enrolled in a single-blind randomized controlled trial and randomly assigned to AIHC group (n = 39), AI group (n = 35), or a control group (n = 44). All participants received nonsurgical periodontal treatment and standardized oral hygiene instruction. AI and AIHC groups used an AI-based dental monitoring system for home-based oral surveillance, while the AIHC group additionally received personalized oral health counseling tailored to individual periodontal conditions. Periodontal parameters—including probing pocket depth (PPD), clinical attachment level (CAL), plaque index (PI), gingival index (GI), were assessed by a dentist at baseline and 1-month follow-up. OHRQoL was evaluated using a self-administered structured questionnaire. Group differences were analyzed using paired t tests and one-way ANOVA. **Results:** In regression analyses, follow-up time was independently associated with reductions in probing pocket depth (PPD;  $\beta = -0.63$ , 95% CI:  $-0.93$  to  $-0.34$ ), clinical attachment level (CAL;  $\beta = -0.61$ , 95% CI:  $-1.03$  to  $-0.20$ ), and gingival index (GI;  $\beta = -0.42$ , 95% CI:  $-0.65$  to  $-0.19$ ). Significant interaction effects were observed in the AIHC group at 1 month, indicating additional reductions in PPD ( $\beta = -0.56$ , 95% CI:  $-1.00$  to  $-0.13$ ) and plaque index (PI;  $\beta = -0.32$ , 95% CI:  $-0.62$  to  $-0.02$ ) compared with the control group. In contrast, no significant main or interaction effects were identified for oral health-related quality of life (OHRQoL). **Conclusion:** AI-assisted dental monitoring combined with personalized counseling provided additional short-term benefits for selected periodontal parameters, whereas no significant effects were observed on patient-reported oral health-related quality of life.

## **EMG of masticatory muscle under different posture**

▲Chien-Jen Wang<sup>1</sup>, Yan-Hsiung Wang<sup>1,2</sup>

<sup>1</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

<sup>2</sup>Orthopaedic Research Center, College of Medicine, Kaohsiung Medical University, Kaohsiung,  
Taiwan

**Objectives:** Disorders of the masticatory muscles typically present as pain and impaired function, often resulting from excessive muscular exertion that leads to tissue damage. Elevated muscle activity is frequently linked to parafunctional behaviors within the stomatognathic system, such as bruxism, or heightened emotional stress and depression. In recent years, the integration of electromyography (EMG) with artificial intelligence-based neural network analysis has become increasingly prevalent. The present study aims to explore whether upper limb positioning influences masticatory muscle activity under different body postures. **Methods:** Surface EMG signals were simultaneously collected from the bilateral superficial masseter and anterior temporalis muscles using the IX-TA (IX-BIO4) system, in accordance with the manufacturer's kinesiology protocol. Recordings were obtained at a sampling frequency of 1000 Hz. Disposable, self-adhesive Ag/AgCl dual-snap electrodes were employed, each with two circular conductive areas of 2 cm in diameter and separated by 1 cm. A ground electrode was positioned at the sternal end of the clavicle. To minimize artifacts, external disturbances such as smiling or facial movements were carefully controlled. Following electrode placement and preparatory practice, participants rested for five minutes to ensure relaxation before measurements commenced. Statistical analyses were conducted using SPSS software, version 25.0 (SPSS Inc., Chicago, IL). **Results:** Electromyographic activity of the muscles exhibits lateral asymmetry, and the masseter EMG demonstrates posture-dependent variations, with maximal activation observed when both hands are placed flat and pressing firmly. **Conclusions:** The EMG of masticatory muscle is not the same at different posture. This study should be considered carefully while applying to clinical use due to the limitation in the study.

**Analysis of the soft tissue chin profile in acceptable aesthetic profiles using a 3-dimensional camera facial scan system compared to normative values based on 2-dimensional radiographic analysis**

(This article is under consideration for the International Journal of Oral & Maxillofacial Surgery)

▲Sasawat Putpinij<sup>1</sup>, Sappasith Panya<sup>1</sup>, Thanit Charoenratana<sup>2</sup>, Pisha Pittayapat<sup>3</sup>,  
Paksinee Kamolratanakul<sup>1</sup>

<sup>1</sup>Department of Oral and Maxillofacial Surgery, Chulalongkorn University, Thailand

<sup>2</sup>Department of Orthodontics, Faculty of Dentistry, Chulalongkorn University, Thailand

<sup>3</sup>Department of Radiology, Faculty of Dentistry, Chulalongkorn University, Thailand

Chin profile plays a critical role in determining lower facial aesthetics, significantly affects perceptions of facial balance and attractiveness. Conventional assessment methods, which primarily rely on two-dimensional cephalometric norms, are limited by projection errors and a reduced capacity to accurately evaluate soft tissue contours. The development of three-dimensional facial scanning technology has facilitated more accurate assessment of facial morphology; nevertheless, aesthetic evaluation in acceptable aesthetic profile using 3-dimensional camera facial scan remains no evidence. Objectives: To investigate soft tissue chin profiles in clinically acceptable facial aesthetics using a three-dimensional camera system, comparing with traditional two-dimensional cephalometric values. Methods: A total of 100 acceptable facial aesthetics participants were enrolled based on expert assessment of silhouette images derived from three-dimensional scans. Chin profile data including chin prominence, lip position, chin-throat length (TL), and lip-chin-throat angle (LCTA) were analyzed. Results: The three-dimensional data revealed significantly greater chin retrusion and more acute chin-throat angles than two-dimensional norms. Conclusion: Based on the validated accuracy and precision of the 3D camera facial scan system which refer to clinical appraisal, particularly TL and LCTA, in individuals with aesthetically acceptable profiles tend to appear significantly more retruded when assessed in 3D compared to traditional 2D cephalometric norms.

## **Comparison of marginal bone loss in two different systems of bone-level, tapered implant designs: a cohort study**

▲Kanyarak Kunyawatyuwapong<sup>1</sup>, Paksinee Kamolratanakul<sup>1</sup>, Pisha Pittayapat<sup>2</sup>

<sup>1</sup>Department of Oral and Maxillofacial Surgery, Faculty of Dentistry,  
Chulalongkorn University, Bangkok, Thailand,

<sup>2</sup>Department of Radiology, Faculty of Dentistry, Chulalongkorn University,  
Bangkok, Thailand

**Objectives:** Among the tapered, bone-level implants available in the market, Straumann Bone Level Tapered (BLT)<sup>®</sup> implant system (Straumann<sup>®</sup>, Switzerland) and Helix GM<sup>®</sup> implant system (Neodent<sup>®</sup>, Brazil) are widely used. However, to our knowledge, there is no evidence that compares the difference in marginal bone loss among these two systems. Therefore, this research study focused on the difference of the marginal bone loss in radiographic findings between these two implant systems 1 year after implant placement. **Methods:** Patients with Straumann Bone Level Tapered (BLT)<sup>®</sup> and Helix GM<sup>®</sup> implants were recruited. The intraoral periapical radiographs at baseline (T0), 6 months (T1), and 1 year (T2) after implant placement were evaluated and the change in level of marginal bone was measured. **Results:** The result showed no significant difference in marginal bone changes between the two implant systems 1 year after implant placement. However, a statistically significant difference in marginal bone loss was found in distal sites of Straumann Bone Level Tapered (BLT)<sup>®</sup> implants at 6 months and 1 year (P=0.028). **Conclusion:** Preliminary data of the study showed no difference in changes of marginal bone level between the two implant systems after 1 year of placement but a difference was observed in distal sites of Straumann Bone Level Tapered (BLT)<sup>®</sup> implants.

## **Comparison of the effects of hypochlorous acid-containing mouthwash and chlorhexidine-containing mouthwash on dental plaque**

▲Yong-Hsuan Lai<sup>1</sup>, Hsiao-Ling Huang<sup>1</sup>, Ying-Chu Lin<sup>2</sup>

<sup>1</sup>Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

**Objectives:** Our aim was to compare the effects of different types of commercial mouthwash (0.01% hypochlorous acid (HOCl) and 0.05% chlorhexidine (CHX), respectively) on the reduction of dental plaque index (DPI). Participants with good oral health or periodontal disease were recruited in this study. **Methods:** There were 24 participants were enrolled in this study. Their mean age was: 50.5±8.9 years, 54.2% was male, 66.7% of participants reported using floss picks, and 50% reported using mouthwash in previous time. Fifteen participants with periodontal disease were randomly assigned into two intervention groups: HOCl and CHX mouthwash groups, respectively. Nine participants with clinically healthy gingiva used the HOCl mouthwash. Dental plaque index was recorded at day 0 baseline and after intervention 14 and 30 days. All participants were instructed to use the assigned mouthwash twice daily after tooth brushing in the morning and before bedtime. Except this, no oral health habit was changed during the intervention period. **Results:** The DPI reduction was significantly differed among groups at both Day 14 and Day 30 (one-way ANOVA,  $p = 0.026$  and  $p = 0.042$ , respectively). Post hoc Tukey's HSD analysis showed that DPI was significantly decreased in the periodontal HOCl group compared with healthy gingiva HOCl group ( $p = 0.020$ ;  $p = 0.046$ ), whereas no significant difference was observed between the periodontal HOCl and periodontal CHX groups. A significant decrease trend in DPI was also found from healthy gingiva HOCl group, periodontal CHX group, and to periodontal HOCl group. **Conclusions:** Our results suggest that the usage of HOCl mouthwash can improve the DPI, especially in patients with periodontal disease. Compared with the usage of CHX mouthwash, the HOCl mouthwash can do more favors in the decrease of DPI in patients with periodontal disease.

## **Enhancing color accuracy in ceramic staining education through digital shade-matching software**

▲Yi-Hsuan Li, Ju Hui Wu

Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** This study aimed to evaluate the effectiveness of integrating digital shade-matching software into dental technology education to improve dental technology students' color accuracy in ceramic block staining after sintering. The objective was to determine whether digital assistance could enhance students' ability to predict post-sintering color outcomes and reduce subjectivity associated with conventional visual shade selection. **Methods:** Thirty-two dental technology students were randomly assigned to either an experimental group receiving instruction with digital shade-matching software or a control group receiving traditional visual-based training. All participants performed ceramic block staining followed by sintering. The color accuracy of the final ceramic blocks relative to the target shade was evaluated by instructors using a 5-point Likert-type satisfaction scale (5 = strongly agree; 1 = strongly disagree). Independent-samples t-tests were used to compare outcomes between groups. **Results:** Students in the digital shade-matching group demonstrated significantly higher overall color satisfaction than those in the control group. The experimental group achieved a mean satisfaction score of  $3.2 \pm 0.83$ , compared with  $1.9 \pm 0.96$  in the control group. This difference was statistically significant ( $p = 0.001$ ), indicating improved color discrimination accuracy and greater technical consistency among dental technology students using digital assistance. **Conclusions:** Integrating digital shade-matching software significantly enhanced dental technology students' color accuracy and reduced reliance on subjective visual judgment. This approach shortened the learning curve for ceramic color reproduction and provides empirical support for digital transformation in dental technology education, with meaningful implications for both teaching and clinical practice.

## Poster List

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<b>P3-02</b>	Skeletal Class III jaw relationship with anterior and posterior crossbite treated with orthodontic combined orthognathic surgery: a case report	Meng-Xuan Sung	Department of Dentistry, KMUH*
<b>P3-03</b>	Bite correction for Class III camouflage treatment with lower anterior 3-incisors - a case report	Shin-Yi Hsieh	Division of Orthodontics, Department of Dentistry, KMUH*
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<b>P3-08</b>	Orthodontic treatment of agenesis of mandibular lateral incisor– a case report	Yu-Chun Lo	Department of Dentistry, KMUH*
<b>P3-09</b>	Orthodontic treatment combine MARPE in class III malocclusion with unilateral posterior crossbite–a case report	Jia-Wen Lu	Department of Dentistry, KMUH*

\*KMU (Kaohsiung Medical University), KMUH (Kaohsiung Medical University Hospital)

No.	Topic	Presenter	Institution
<b>P3-10</b>	Non-surgical treatment of an adult Class II division 2 malocclusion combined with unilateral scissors-bite.	Tin-Jia Hsu	Department of Dentistry, KMUH*
<b>P3-11</b>	Reconstruction of posterior superior buccal cancer using temporalis muscle flap: case presentation and oral cancer surgical experience at KMUGH	Chen-Hsi Tsai	Department of Dentistry, Kaohsiung Medical University Gangshan Hospital
<b>P3-12</b>	A case of facial asymmetry treated with orthodontic treatment and orthognathic surgery	Kuan-Ying Huang	School of Dentistry, College of Dental Medicine, KMU*
<b>P3-13</b>	Osteoradionecrosis of the mandible developing during oral preparation for dental implant placement: a case report	Kasira Kritsutthikun	Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Chulalongkorn University

\*KMU (Kaohsiung Medical University), KMUH (Kaohsiung Medical University Hospital)

**Root coverage of a single deep RT2 recession  
in a post-orthodontic mandibular incisor: a case report**

▲ Yu-Chen Lin, Tsung-En Chen

Division of Periodontics, Department of Dentistry, Kaohsiung Medical University Hospital,  
Kaohsiung, Taiwan

**Objectives:** Post-orthodontic patients frequently present with gingival recession as a complication following treatment. When this occurs in the anterior region, it can cause significant esthetic concern, especially in patients with high esthetic demands. Management of Recession Type 2 (RT2) defects in the mandibular anterior area is challenging due to limited keratinized tissue and a thin periodontal phenotype, and is further complicated by buccally displaced roots and interproximal attachment loss. Complete root coverage in such cases is often unpredictable.

**Materials and Methods:** A 42-year-old female, who had completed orthodontic treatment 10 years ago, presented with esthetic concerns from progressive gingival recession on mandibular incisor. Clinical examination revealed an RT2 defect on tooth 41, with 8 mm recession, a buccally prominent root, and frenum insertion at the mesial aspect. Root coverage was treated using a subepithelial connective tissue graft (SCTG) combined with a coronally advanced flap (CAF).

**Results:** Healing was uneventful, with stable soft tissue integration throughout the follow-up period. Approximately 81.25% root coverage was achieved, reducing recession depth from 8 mm to 1.5 mm. This was accompanied by increased gingival thickness and keratinized tissue width, enhancing soft tissue stability. The patient reported high esthetic satisfaction and improved ease of oral hygiene.

**Conclusions:** This case shows that SCTG combined with CAF can achieve substantial and esthetically satisfactory root coverage in RT2 defects, even in mandibular anterior teeth with a buccally prominent root. While complete coverage is less predictable than in RT1, meaningful improvements in esthetics and function can still be achieved.

**Skeletal Class III jaw relationship with anterior and posterior crossbite treated with orthodontic combined orthognathic surgery: a case report**

▲Meng-Xuan Sung<sup>1,2</sup>, Szu-Ting Chou<sup>1,2</sup>

<sup>1</sup>Division of Orthodontics, Department of Dentistry, Kaohsiung Medical University Hospital,  
Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

A large skeletal discrepancy is often accompanied by an open bite or crossbite, which can exhibit numerous functional problems and severe facial disharmony. Difficulties in speech and mastication are commonly encountered which impact the quality of life. This clinical report presents a case of skeletal Class III jaw relation with large maxillomandibular discrepancy, anterior open bite, and bilateral posterior crossbite, treated by orthodontic treatment combined with orthognathic surgery. This was a 20-year-old patient with a protrusive mandible and an open bite problem who undergone orthodontic treatment combined with orthognathic surgery. Pre-surgical orthodontic treatment extracted tooth 15,18,24,28,38,48, corrected L't posterior crossbite with TADs, followed by bilateral IVRO for mandible setback. Post-surgical orthodontic treatment consolidated residual spaces and created proper space for dental substitutes. After 42 months of treatment, harmonious esthetics and ideal occlusion are achieved.

**Bite correction for Class III camouflage treatment  
with lower anterior 3-incisors - a case report**

▲Shin-Yi Hsieh<sup>1</sup>, Chao-Yu Lu<sup>1</sup>, Chin-Yun Pan<sup>1,2</sup>

<sup>1</sup>Division of Orthodontics, Department of Dentistry, Kaohsiung Medical University Hospital,  
Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** For patients with mild to moderate skeletal Class III malocclusions and acceptable facial profile, camouflage treatment provides a compensation for the skeletal discrepancy. Lower incisor extraction is an option for Class III camouflage treatment, with bite deepening often the result in such cases. In this case, deep bite was a result of previous orthodontic treatment. One of our treatment goals is to correct and obtain a reasonable overbite and overjet while maintaining well alignment in both arches. **Case report:** A 16-year-old female patient was diagnosed with skeletal Class III jaw relation and Angle's Class III malocclusion. Past dental history included orthodontic treatment at local dental clinic. Her chief complaint was unsatisfactory anterior tooth display. Thus, she came to our OPD hoping for further evaluation. Extra-oral examinations revealed a hyperdivergent facial pattern and convex lateral profile. Intra-oral examinations revealed deep bite, retroclined lower incisors and missing of lower left central incisor. Orthodontic camouflage treatment was selected after discussing with the patient and her guardian. After leveling and alignment of teeth, a reverse curve NiTi was added to the lower arch for deep bite correction. Elastics were used for midline correction and space closure. After 60 months of treatment, optimal anterior esthetics and occlusion are achieved. **Discussions:** Space discrepancy, periodontal and dental status, and the dental midline deviations are critical aspects that should be considered before the decision-making of 3-incisors-finish. **Conclusions:** Several factors should be considered before orthodontic camouflage treatment, including facial profile, space discrepancy, and dental status. In this case, single lower incisor extraction was performed during previous orthodontic treatment. Dental morphology and anterior Bolton ratio were considered to obtain an ideal occlusion and anterior esthet.

## **Orthodontic management of Class III deep-bite malocclusion with bilateral mandibular incisor agenesis: a case report**

▲Ying-Sheng Chen<sup>1</sup>, Yu-Chuan Tseng<sup>1</sup>

<sup>1</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>2</sup>Division of Orthodontics, Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objectives:** The prevalence of tooth agenesis in Asians was 6.9%, with a higher occurrence in females. The most commonly congenitally missing teeth are the mandibular second premolars. In contrast, agenesis of the mandibular lateral incisors is relatively rare, with a reported prevalence of only 0.1–0.3%. This clinical report presents a case of skeletal Class I jaw relation and mandibular incisors missing with deep overbite treated by canine substitution. **Diagnosis & treatment overview:** Skeletal Class I jaw relation, and dental Class III malocclusion, combine with lower incisors missing and deepbite **Treatment Overview:** A 13-year-old female patient presented seeking comprehensive orthodontic treatment to achieve optimal alignment of the dentition. Pretreatment examinations revealed a normodivergent facial pattern and a convex lateral profile, congenitally missing mandibular lateral incisors without prior history of extractions. Pure orthodontic treatment was selected, and alignment and leveling were performed following the extraction of the maxillary first premolars. Canine substitution was carried out, and interproximal enamel reduction of the lower incisors and canines were performed to reshape for the replacement. After 24 months of treatment, the final occlusion goals of Canine Class III and Molar Class I relationship were achieved. **Discussion:** Management of congenitally missing mandibular incisors may include canine substitution, restorative replacement, or single-tooth implants. **Conclusion:** In patients with Class III malocclusion and a convex profile, extraction of two maxillary premolars combined with mandibular canine substitution provides an effective treatment approach, offering a favorable prognosis for long-term stability.

## **A case of skeletal class III jaw relation treated with orthodontic treatment and orthognathic surgery**

▲Cheng-Ying Lin<sup>1,2</sup>, Chao-Yu Lu<sup>2,3</sup>, Szu-Ting Chou<sup>2,3</sup>, Han-Jen Hsu<sup>3,4</sup>

<sup>1</sup>School of Dentistry, College of National Yang Ming Chiao Tung University, Taipei, Taiwan

<sup>2</sup>Division of Orthodontics, Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>3</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>4</sup>Division Department of Oral and Maxillofacial Surgery, Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

Objectives: Class III malocclusion is considered one of the most difficult and complex orthodontic problems to treat. Patients with Class III malocclusion often combine skeletal and dentoalveolar components. One of the main chief complaints from patients is poor facial profile. This clinical report presents a case of skeletal Class III jaw relation treated by orthodontic treatment combined with one-jaw orthognathic surgery. Case report: A 24-year-old adult male patient whose chief complaint was protrusive chin. Extra-oral examinations revealed a concave lateral profile. Orthodontic treatment combined with one-jaw orthognathic surgery was selected after discussion with the patient. Presurgical orthodontic treatment was carried out to create adequate reverse overjet by extraction of tooth 14, 24 and anterior teeth retraction. Then, bilateral intra-oral vertical ramus osteotomy (IVRO) was performed to achieve better jaw relation. Results: After 38 months of treatment, both harmonious esthetics and ideal occlusion were achieved. Conclusions: To improve facial esthetics and achieve proper occlusion in Class III patients, careful diagnosis and treatment planning should be done. After careful assessment, we combined orthodontic treatment and one-jaw orthognathic surgery to treat mandibular prognathism and Class III malocclusion. Skeletal discrepancies could be corrected in a short time by surgical approach. Orthodontic treatment combined with orthognathic surgery could be regarded as an effective method for Class III patients.

**Management of a missing maxillary central incisor  
using lateral incisor substitution: a case report**

▲Chieh-Yin Chan<sup>1</sup>, Zong-Zhe Cai<sup>1</sup>, Shih-Chieh Chen<sup>1,2</sup>, Shih-Hsuan Lin<sup>1</sup>

<sup>1</sup> Division of Orthodontics, Department of Dentistry, Kaohsiung Medical University Hospital,  
Kaohsiung, Taiwan

<sup>2</sup> School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Introduction:** Orthodontic space closure with tooth substitution is an option for missing, poor-prognosis, or impacted teeth. Issues include treatment complexity, risk for space reopening, and esthetic quality. This clinical report presents the treatment process of a patient with skeletal Class I jaw relation and Angle's Class II malocclusion; after the extraction of tooth 21, incisor substitution was achieved through orthodontic treatment. **Diagnosis and Treatment Overview:** A 37-year-old male patient visited our OPD with chief complaints of poor alignment of teeth. Intraoral examination revealed anterior crowding, supernumerary tooth 19 as mesiodens, tooth 21 was non-vital and exhibited grade II mobility. After examinations, the patient was diagnosed as skeletal Class I jaw relation and Angle's Class II malocclusion with anterior deepbite and crowding; tooth 21 had poor prognosis due to severe periodontitis. The treatment plan was as follow: tooth 22 was moved mesially to replace tooth 21 and restored with composite resin to replicate the morphology of tooth 21. Tooth 34 was extracted to relieve lower arch crowding. After 31 months of treatment, the patient achieved an improved profile and an ideal occlusion. **Discussion:** In cases of a missing maxillary central incisor, several reconstructive options are available, including autotransplantation, dental implant, a fixed bridge, or orthodontic space closure. In our case, orthodontic space closure with tooth substitution was selected because of the presence of crowding dentition, an anterior deepbite, and Angle's Class II malocclusion. **Conclusion:** This case presented tooth substitution of an extracted central incisor, managing both esthetic and functional.

**Ultrasonic-assisted management of a maxillary second molar with apically located canal bifurcation: a case report**

▲I-Yun Chiang, Ying-Hui Su

Division of Endodontics and Operative Dentistry, Department of Dentistry,  
Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objectives:** In the Taiwanese population, the prevalence of two root canals in the mesiobuccal (MB) root of maxillary second molars is approximately 7.7%. Deep root canal bifurcations frequently pose significant clinical challenges. This case report aims to demonstrate that utilizing preoperative CBCT and intraoperative ultrasonic instruments achieving more conservative tooth structure removal. A 50-year-old female presented for endodontic treatment of the right maxillary second molar. CBCT analysis revealed that the primary buccal canal bifurcated into the mesiobuccal (MB) and distobuccal (DB) canals at a working length of 9.5 mm. The MB canal subdivided into a MB2 canal at a working length of 11 mm. Both the MB and MB2 canals exited the apex through independent apical foramen. Under microscopic guidance, an ultrasonic tip was utilized to reveal the MB1, MB2, and DB canal orifice. The canals were cleaned and shaped using ProTaper Gold rotary instruments, then obturated using the vertical compaction technique with Bio-C sealer. **Discussions and Conclusions:** A review of literature by Plotino et al.(2007) reported that ultrasonic instruments allow for 'troughing' with high precision. This minimizes the risk of excessive tooth structure removal and prevents weakening of the pericervical dentin, thereby improving its long-term prognosis.

## **Orthodontic treatment of agenesis of mandibular lateral incisor – a case report**

▲Yu-Chun Lo<sup>1,2</sup>, Kuan-Ling Lin<sup>1,2</sup>, Szu-Ting Chou<sup>1,2</sup>

<sup>1</sup>Division of Orthodontics, Department of Dentistry, Kaohsiung Medical University Hospital,  
Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** Agenesis of the mandibular lateral incisor is a common dental anomaly. The global prevalence of congenitally missing mandibular incisors (mainly the lateral incisor) accounts for 9% of all agenesis and is much more frequent in Eastern Asians. Etiology includes genetic problems and environmental factors. A missing mandibular tooth can affect occlusion, appearance, and speech, which may require orthodontic treatment intervention. **Case presentation:** A 31-year-old female patient was diagnosed with a gummy smile and malaligned anterior teeth and sought orthodontic treatment. Clinical examination revealed a bilateral class III molar relationship with a congenitally missing tooth 32. Radiographic examination indicated a skeletal Class I relationship and a hyperdivergent facial pattern. As part of the treatment overview, teeth 14, 24, and 42 were extracted prior to the application of the full-mouth direct bonding system. Space closure was started after leveling and alignment. For the maxillary arch, bilateral infrazygomatic screws were applied for anterior teeth retraction, and an anterior nasal spine screw was inserted for gummy smile correction. As for the mandibular arch, bilateral canine and first premolar substitution and interproximal reduction from teeth 34 to 44 were performed for tooth size correction. After 27 months of treatment, the gummy smile and crowding dentition were solved. Stable occlusion and harmonious facial pattern were also achieved. **Discussions:** Regarding the management of mandibular lateral incisor agenesis, space closure or space regain would be considered depending on the esthetic and functional aspects. **Conclusions:** This case report provides a treatment option for agenesis of the mandibular lateral incisor.

**Orthodontic treatment combine MARPE in class III malocclusion  
with unilateral posterior crossbite - a case report**

▲Jia-Wen Lu<sup>1,2</sup>, Yu-Chuan Tseng<sup>1,2</sup>

<sup>1</sup>Division of Orthodontics, Department of Dentistry, Kaohsiung Medical University Hospital,  
Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Purpose:** Maxillary transverse deficiency is a skeletal problem that is often not recognized, as it may not cause obvious impairment in daily life. Nevertheless, its presence can manifest as posterior crossbite, dental crowding, and may contribute to airway constriction. This clinical report presents a case of Angle's Class III malocclusion with unilateral posterior crossbite treated by orthodontic treatment combine Mini-implant-assisted rapid palatal expansion (MARPE). **Case data content:** Skeletal Class I jaw relation, Angle's Class III malocclusion Anterior open bite, Unilateral cross bite A 31-year-old female patient whose chief complaints were crooked teeth and anterior open bite, underwent orthodontic treatment combine with MARPE. After 40 days of activation, posterior crossbite was corrected. Upper dentition was better aligned with the space created by maxilla expansion. Anterior open bite was closed by relative extrusion of incisors. At the 16 month of treatment, dentition was well-aligned with anterior and posterior teeth showing ideal overbite and overjet. **Discussion:** Posterior crossbite can be classified into bilateral and unilateral. The former typically involves a true skeletal transverse deficiency, whereas the latter often results from a functional mandibular shift. While palatal expansion is a common treatment, Miniscrew-Assisted Rapid Palatal Expansion (MARPE) offers a more effective and less invasive alternative to adult patients. **Conclusion:** By incorporating skeletal anchorage with mini-implants, MARPE achieves greater skeletal expansion with fewer dentoalveolar side effects compared with traditional tooth-borne expanders. In addition to correcting posterior crossbite, MARPE may contribute to the correction of facial asymmetry associated with maxillary constriction. In conclusion, MARPE has shown to be a clinically effective and minimally invasive approach for postpubertal and adult patients with maxillary transverse deficiency.

## **Non-surgical treatment of an adult Class II division 2 malocclusion combined with unilateral scissors-bite**

▲Tin-Jia Hsu<sup>1</sup>, Yu-Chuan Tseng<sup>1,2</sup>, Ching-Ling Huang<sup>1,2</sup>

<sup>1</sup>Division of Orthodontics, Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

Purpose: Angle's Class II division 2 malocclusion is a significant challenge for orthodontists. It is characterized by mesially positioned molars and canines, retroclined maxillary incisors and excessive overbite. Besides, scissors-bite is a not uncommon problem to appear with Class II division 2 malocclusion. It frequently involves second molars with the mandibular dentition completely contained in the maxillary dentition in habitual occlusion. This clinical report presents a young female adult who had Class II division 2 malocclusion with deep overbite and unilateral scissors-bite. Case data content: A 22 year-old female sought treatment with chief complaint of crooked anterior teeth. Clinical examinations reveal a Class II division 2 malocclusion with deep overbite and unilateral scissors-bite. She decided to receive non-surgical orthodontic treatment. The treatment progress included intrusion of incisors, scissors-bite correction with posterior bite raiser for disocclusion, TADs to assist maxillary molar intrusion and vertical dimensional control. After 16 months of treatment, the deep overbite and scissors-bite were mostly corrected. Discussion: To correct scissor-bite, various treatment protocols could be considered, including cross-elastic, TADs, TPA with distal extension hook, and the prescription of the bracket. Since every approach has distinct merits and limitations, understanding of these methods are essential for optimizing clinical outcomes and treatment efficiency. Conclusion: The application of TADs with posterior bite raiser was efficient to correct scissors-bite. With elastomeric chain or other traction force, TADs can prevent side effects such as extrusion of posterior teeth and clockwise rotation of mandible. It is also easier for patient to adapt with no further cooperation.

## **Reconstruction of posterior superior buccal cancer using temporalis muscle flap: case presentation and oral cancer surgical experience at KMUGH**

▲Chen-Hsi Tsai

Division of Oral & Maxillofacial Surgery, Department of Dentistry,  
Kaohsiung Medical University Hospital, Kaohsiung, Taiwan  
Department of Dentistry, Kaohsiung Medical University Gangshan Hospital,  
Kaohsiung, Taiwan

**Objectives:** Posterior superior buccal cancers often require wide excision and partial maxillectomy, which may result in large oroantral communications requiring reliable reconstruction. In Kaohsiung Medical University Gangshan Hospital (KMUGH), where complex free-flap reconstruction is not routinely available, regional and local flaps play a central role in oral cancer reconstruction. **Case Presentation:** We report a case of stage III (pT3N0M0) posterior superior buccal squamous cell carcinoma treated with wide excision, partial maxillectomy, marginal resection, and right selective neck dissection, resulting in a substantial oroantral defect. Reconstruction was performed using a temporalis muscle flap to restore separation between the oral cavity and maxillary sinus. Donor-site temporal hollowing was subsequently corrected using bone cement contouring to improve craniofacial symmetry. **Results:** The temporalis muscle flap provided reliable closure of the large oroantral communication with sufficient soft-tissue volume to obliterate the defect. Progressive mucosalization of the muscle flap was observed, resulting in stable intraoral lining without persistent fistula formation. No flap-related complications occurred, and separation between the oral cavity and maxillary sinus was maintained throughout follow-up. Donor-site contour deformity was effectively corrected, with no significant cosmetic concerns. At six months postoperatively, oral scanning was utilized to fabricate an interim removable prosthesis, facilitating postoperative functional rehabilitation, including mastication and oral function. **Discussion:** The temporalis muscle flap offers dependable vascularity, adequate tissue bulk, and favorable reach for reconstruction of large posterior maxillary defects. Donor-site morbidity can be minimized with contour restoration techniques. This case reflects KMUGH's reconstructive strategy, emphasizing feasible, function-oriented solutions tailored to institutional resources. **Conclusions:** Temporalis muscle flap reconstruction is a dependable option for extensive posterior maxillary defects after oral cancer surgery. A regional-flap-based approach can achieve acceptable functional and aesthetic outcomes in settings without routine free-flap reconstruction.

## **A case of facial asymmetry treated with orthodontic treatment and orthognathic surgery**

▲Kuan-Ying Huang<sup>1,2</sup>, Po-Yuan Chiu<sup>1,2</sup>, Han-Jen Hsu<sup>2,3</sup>, Szu-Ting Chou<sup>1,2</sup>

<sup>1</sup>Division of Orthodontics, Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>3</sup>Division of Oral and Maxillofacial Surgery, Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objectives:** Facial asymmetry can affect both occlusion and facial esthetics. Asymmetric facial deformities involve three-dimensional malposition of the maxilla and mandible, requiring precise rotational and translational movements to achieve facial harmony. Orthognathic surgery offers a crucial approach for addressing facial asymmetry, involving strategic osteotomies and repositioning of the maxillofacial skeleton to correct facial irregularities and restore proper dental occlusion. This clinical report presents a case of facial asymmetry treated by orthodontic treatment combined with orthognathic surgery. The diagnosis revealed a skeletal Class I jaw relationship with a hyperdivergent facial pattern. Facial asymmetry was present, characterized by mandibular deviation to the left side, along with an Angle's Class III malocclusion. **Treatment Overview:** A 30-year-old female patient sought treatment for facial asymmetry and a protrusive chin. Clinical examinations showed facial asymmetry with the chin deviated to the left side. Orthodontic treatment combined with orthognathic surgery was carried out after discussion with the patient. Presurgical orthodontic treatment, including leveling and alignment, dental decompensation was performed, followed by 3-piece Le-Fort I surgery, bilateral maxillary second premolars extraction, intraoral vertical ramus osteotomy, and genioplasty. Postsurgical orthodontic treatment involving remaining space closure, finishing, and detailing was conducted. After 52 months of treatment, harmonious esthetics and ideal occlusion are achieved. **Discussions:** Facial asymmetry requires careful diagnosis and treatment planning for a successful outcome. Identifying the etiology and ensuring that the problems in the maxilla and mandible, respectively, play a big role in the treatment of facial asymmetry. **Conclusions:** In this case, Le-Fort I osteotomy combined with intraoral vertical ramus osteotomy offers a comprehensive approach to address facial deformities.

## **Osteoradionecrosis of the mandible developing following tooth extraction during oral preparation before dental implant placement: a case report**

▲Kasira Kritsutthikun, Sirimanus Jiaranuchart, Paksinee Kamolratanakul, Sappasith Panya,  
*Keskanya Subbalekha*

Department of Oral and Maxillofacial Surgery, Faculty of Dentistry,  
Chulalongkorn University, Bangkok, Thailand

Osteoradionecrosis (ORN) is a serious late complication of radiotherapy for head and neck malignancies, caused by radiation-induced vascular compromise and impaired bone healing, with the mandible being particularly susceptible. This case report aims to describe the development and progression of ORN during oral preparation for dental implant placement and to emphasize the importance of careful clinical follow-up and thorough radiographic evaluation in treatment assessment. Case data content A 74-year-old Thai female was referred for dental implant placement at tooth 44. Her medical history was significant for mucoepidermoid carcinoma of the left submandibular salivary gland, treated with surgical excision, chemotherapy, and adjuvant radiotherapy (66 Gy) three years prior to presentation. **Oral preparation for dental implant placement involved comprehensive dental evaluation and elimination of infection sources, including extraction of non-restorable teeth, periodontal stabilization, radiographic assessment of bone quality, and improvement of oral hygiene; in irradiated patients, this process requires heightened caution due to impaired bone healing capacity.** During oral preparation for implant therapy, the patient developed ORN following extraction of tooth 38 and subsequently presented with progressive pain and swelling in the left posterior mandible. Radiographic evaluation demonstrated progressive bone destruction extending from the posterior mandible to the retromolar region, without evidence of tumor recurrence, consistent with ORN. The patient underwent sequestrectomy; however, approximately three weeks later, the clinical course was complicated by a pathological fracture of the left posterior mandible. This case highlights the potential risk of ORN associated with dental intervention in irradiated bone and underscores the necessity of comprehensive oral preparation, meticulous dental management, and close radiographic follow-up both before and after radiotherapy to reduce the risk of severe complications and preserve quality of life in head and neck cancer survivors.

## Poster List

### GROUP: The Achievement Exhibition of Resident Training in Dental Department

No.	Topic	Presenter	Institution
<b>P4-01</b>	A case series of endodontic management of internal root resorption	I-Ching Lin	Department of Dentistry, KMUH*
<b>P4-02</b>	Radiopacity Evolution Following Implant Placement with Simultaneous Transcrestal Sinus Augmentation: A Case Report	Yan-Jun Chen	Department of Dentistry, KMUH*
<b>P4-03</b>	Effect of tool wear on the cutting quality of PMMA crowns: a three-dimensional surface analysis	Chu-Chun Hsiao	Department of Dentistry, KMUH*
<b>P4-04</b>	CAD/CAM Wax pattern-assisted casting gold restoration: a case report	Fang Wei	Department of Dentistry, KMUH*
<b>P4-05</b>	Lateral dislocation of the mandibular condyle associated with contralateral mandible fracture: a case report	Zhong-Chun Li	Department of Dentistry, KMUH*
<b>P4-06</b>	A case report of endodontic management of mandibular first molar with disto-lingual canal	Yu-Fang Huang	Department of Dentistry, KMUH*
<b>P4-07</b>	Digital evaluation of alveolar ridge height changes following alveolar ridge preservation using xenogeneic bone graft: a case report	Yu Cheng Chen	Department of Dentistry, KMUH*

\*KMU (Kaohsiung Medical University), KMUH (Kaohsiung Medical University Hospital)

## **A case series of endodontic management of internal root resorption**

▲I-Ching Lin, Fu-Hsiung Chuang, Chieh-Ju Chen

Division of Endodontics and Operative Dentistry, Department of Dentistry,  
Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objectives:** Internal resorption is a pathological loss of tooth structure caused by inflammation, which typically presents no clinical symptoms in its early stages. **Case description:** This case report aims to describe the diagnostic process and clinical management of two cases: one involving a maxillary central incisor with internal resorption and no obvious perforation, and another involving a maxillary lateral incisor with internal resorption complicated by perforation. **Discussion:** Both cases were treated using microscopic endodontic treatment and repaired with a bioceramic material (Biodentine). For the diagnosis of teeth with internal resorption, the use of Cone Beam Computed Tomography (CBCT) is highly beneficial for subsequent treatment planning and prognosis evaluation. **Conclusions:** The choice of filling material for repairing internal resorption depends on whether a perforation is present; if the resorptive defect has caused a perforation, it is recommended to use bioceramic materials with superior biocompatibility for sealing.

**Radiopacity evolution following implant placement  
with simultaneous transcrestal sinus augmentation: a case report**

▲Yan-Jun Chen<sup>1</sup>, Yu-Hsiang Chou<sup>1,2</sup>

<sup>1</sup>Division of Periodontics, Department of Dentistry, Kaohsiung Medical University Hospital,  
Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Background:** Transcrestal sinus augmentation is a less invasive alternative to the lateral window approach. When combined with implant placement and bone grafting, it provides an effective means for maxillary sinus floor elevation while reducing patient morbidity. **Materials and Methods:** At site #26, preoperative cone-beam computed tomography (CBCT) revealed a residual bone height of 6.5 mm. Therefore, transcrestal sinus elevation was performed using the osteotome technique in conjunction with implant placement. To achieve sinus elevation, 0.5 cc of freeze-dried bone allograft (FDBA, LifeNet Health OraGRAFT®) was gradually introduced into the sinus cavity through the implant osteotomy site. A Straumann® 4.8 × 10 mm BLT implant was placed simultaneously under the guidance of a digital surgical template. Immediate postoperative periapical radiographs demonstrated a pronounced dome-shaped sinus elevation. Follow-up radiographs were taken at 1.5, 3, 4.5, and 6 months, and CBCT was performed at 6 months postoperatively to evaluate sinus remodeling and bone regeneration. **Results:** During radiographic follow-up, the dome-shaped structure and graft material became progressively less distinguishable on periapical films. Nonetheless, 6-month CBCT and periapical film confirmed the formation of a new sinus floor and substantial hard tissue gain. The implant was restored with a prosthesis and maintained excellent clinical stability and function. No postoperative complications or sinus-related symptoms were observed. **Conclusion:** This case highlights the effectiveness of transcrestal sinus augmentation with FDBA grafting via the osteotome technique. Despite early radiographic ambiguity, long-term imaging confirmed predictable sinus bone regeneration and successful implant rehabilitation.

**Effect of tool wear on the cutting quality of PMMA crowns:  
a three-dimensional surface analysis**

▲Chu-Chun Hsiao<sup>1,2</sup>, Yu-Jing Zhou<sup>1</sup>, Ting-Hsun Lan<sup>1,2</sup>

<sup>1</sup>Division of Prosthodontics, Department of Dentistry,  
Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** This study aimed to evaluate the effect of cutting tool wear on the cutting quality of dental restorations by assessing the cutting integrity and fit accuracy of PMMA single crowns fabricated using new and progressively worn cutting tools. **Methods:** Sixteen maxillary molar single crowns were fabricated under four cutting tool conditions: brand-new (n = 1), 25%-worn (n = 5), 50%-worn (n = 5), and 76%-worn (n = 5). Marginal and intaglio discrepancies were quantified using specialized three-dimensional analysis software (Geomagic® Control X™). **Results:** All crowns exhibited intact external morphology regardless of tool wear condition. Mean intaglio discrepancies were  $0.104 \pm 0.013$  mm for 25%-worn tools,  $0.141 \pm 0.060$  mm for 50%-worn tools, and  $0.127 \pm 0.017$  mm for 76%-worn tools. Mean marginal discrepancies were  $0.100 \pm 0.031$  mm,  $0.094 \pm 0.039$  mm, and  $0.126 \pm 0.033$  mm for the 25%-, 50%-, and 76%-worn tool groups, respectively. An increase in intaglio discrepancy was observed when tool wear reached 50%, whereas a noticeable increase in marginal discrepancy occurred only when tool wear exceeded 76%. **Conclusions:** Cutting tool wear adversely affects crown fit accuracy, with internal adaptation deteriorating earlier than marginal fit. These findings highlight the importance of monitoring cutting tool wear to ensure optimal cutting quality and dimensional accuracy of CAD/CAM-fabricated PMMA crowns.

## **CAD/CAM wax pattern-assisted casting gold restoration: a case report**

▲Fang Wei, Ying-Hui Su

Division of Operative Dentistry, Department of Dentistry,  
Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Introduction:** Gold alloy restorations continue to be a gold standard in restorative dentistry due to their superior material properties and marginal precision. Integrating CAD/CAM wax patterns with traditional casting techniques creates a hybrid workflow that optimizes laboratory efficiency while maintaining the high accuracy of the casting process. **Objective:** This case report describes the restoration of an extensive posterior tooth defect using a cast gold restoration fabricated via a digitally designed wax pattern. **Case description:** a 50-year-old male presented with a crown fracture of the maxillary right first molar. Comprehensive assessment of the defect size and occlusal forces indicated the need for a restoration that ensures structural integrity. A gold onlay was selected to restore function and protect the remaining tooth structure. The fabrication process incorporated a digital wax-up into the traditional casting workflow, thereby significantly decreasing the technician's working time and procedural complexity. The final gold restoration successfully restored occlusal function and provided necessary tooth protection. Clinical follow-up findings indicated a stable condition, with the patient remaining asymptomatic and without reported discomfort. **Conclusion:** This case demonstrates that integrating a digital wax-up into the fabrication of gold restorations significantly reduces laboratory time and technical complexity, while providing excellent clinical outcomes with respect to marginal fit and occlusal stability in extensive posterior defects.

**Lateral dislocation of the mandibular condyle associated  
with contralateral mandible fracture: a case report**

▲Zhong-Chun Li<sup>1</sup>, Edward Chengchuan Ko<sup>1,2</sup>

<sup>1</sup>Division of Oral and Maxillofacial Surgery, Department of Dentistry,  
Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, Kaohsiung Medical College, Kaohsiung Medical University,  
Kaohsiung, Taiwan

Lateral dislocation of the mandibular condyle is an uncommon entity, which is usually associated with high-energy trauma and frequently coexists with complex mandibular fractures. Here, we present a case of lateral dislocation of the mandibular condyle associated with contralateral mandible fracture. On the day of injury, maxillary and mandibular alginate impressions were obtained despite limited mouth opening, and a simple acrylic lingual splint was fabricated. Surgical intervention was performed under general anesthesia on post-injury day 2. Manual reduction of the laterally dislocated right condyle was achieved using inward and downward pressure over the molar region. The lingual splint was fixed with circumdental wiring to restore pre-injury occlusion, with concurrent repositioning of luxated teeth. Open reduction and internal fixation of the mandibular body fracture was performed through the existing chin laceration. Elastic intermaxillary fixation was maintained for 11 days. At 3 months postoperatively, the patient demonstrated stable occlusion, satisfactory mandibular function, and no residual symptoms. This case highlights the clinical features and potential mechanism of lateral dislocation of mandibular condyle, providing insights for clinicians facing these challenging case and effectively restore function and occlusion in complex mandibular trauma involving lateral condylar dislocation.

**A case report of endodontic management of mandibular first molar  
with disto-lingual canal**

▲ Yu-Fang Huang, Ying-Hui Su

Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objective:** The mandibular first molar is a clinically common treated tooth in endodontics, yet its intricate root canal anatomy poses significant clinical challenges. This report aims to demonstrate the efficacy of utilizing a dental operating microscope and chemo-mechanical protocols to manage anatomical variations and enhance treatment success. **Case:** a 75 years old male underwent endodontics treatment of his left mandibular first molar due to spontaneous pain for 1 week. **Discussion and conclusion:** Mandibular first molars typically present with a three-canal configuration. According to various clinical studies, the prevalence of a fourth canal ranges from 30% to 60%, with a reported incidence of approximately 45% in Asian populations. A thorough understanding of root canal morphology is essential for clinical success. Combining magnification devices with advanced irrigation protocols not only minimizes the risk of procedural errors but also improves the quality of endodontic treatment.

**Digital evaluation of alveolar ridge height changes following alveolar ridge preservation using xenogeneic bone graft: a case report**

▲Yu Cheng Chen, Jung-Chang Kung

Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objectives:** Using the slow resorption characteristics of xenograft bone graft materials to preserve alveolar ridge height and reduce ridge resorption following the extraction of posterior teeth. **Case description:** A 59-year-old female patient has severe periodontitis. After comprehensive evaluation, extraction of most teeth with poor periodontal prognosis was indicated, followed by planned fabrication of an overdenture. To minimize post-extraction alveolar ridge resorption, ridge preservation techniques were employed. Under sterile conditions, teeth #12, 13, 15, 16, 41, 42, and 44 were atraumatically extracted using forceps. The extraction sockets were filled with a mixture of deproteinized bovine bone mineral (Bio-Oss) and platelet-rich fibrin (PRF), covered with a PRF membrane, and sutured with 4-0 nylon. Impressions were taken at 2 and 8 months postoperatively, and digital scanning was performed to compare changes in alveolar ridge dimensions over time and to compare these changes with alveolar bone dimensional alterations reported in the literature for freeze-dried bone allograft (FDBA). **Discussion:** The remaining teeth were used as reference points for image registration, and superimposition analysis was conducted to assess changes in alveolar ridge dimensions between 2 and 8 months postoperatively. **Conclusions:** Alveolar ridge preservation techniques can reduce dimensional changes of the ridge following tooth extraction, while the use of xenograft materials and FDBA can prolong the resorption process of the alveolar ridge.

## **Oral Presentation List**

### **GROUP: Oral Biology & Oral Hygiene**

<b>No.</b>	<b>Topic</b>	<b>Presenter</b>	<b>Institution</b>
<b>Oral-01</b>	Development of ebselen-loaded silver-containing mesoporous bioactive glass as a bioceramic sealer with antibacterial activity and bioactivity	Chu-Yun Wei	School of Dentistry, College of Dental Medicine, KMU*
<b>Oral-02</b>	Exosomal miR-122-5p modulates arecoline-induced epithelial–fibroblast crosstalk in oral submucous fibrosis	Fu-Tzu You	School of Dentistry, College of Dental Medicine, KMU*
<b>Oral-03</b>	Effect of an augmented reality–based system on maternal self-efficacy and behavioral intention toward infant oral care in postpartum care centers: a quasi-experimental study	Nieh-Yu Kuo	Department of Oral Hygiene, College of Dental Medicine, KMU*
<b>Oral-04</b>	Biocompatibility assessment of a novel 3-dimensional (3D) printed aligner in orthodontics	Szu-Ju Chen	School of Dentistry, College of Dental Medicine, KMU*
<b>Oral-05</b>	Assessment of cranial base flexion among different craniofacial skeletal relationships: a CBCT study	Pei-Huan Tsai	School of Dentistry, College of Dental Medicine, KMU*

\*KMU (Kaohsiung Medical University), KMHU (Kaohsiung Medical University Hospital)

## **Development of ebselen-loaded silver-containing mesoporous bioactive glass as a bioceramic sealer with antibacterial activity and bioactivity**

▲Chu-Yun Wei<sup>1</sup>, Jung-Chang Kung<sup>1</sup>, Chi-Jen Shih<sup>2</sup>

<sup>1</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

<sup>2</sup>Department of Fragrance and Cosmetic Science, College of Pharmacy,  
Kaohsiung Medical University, Kaohsiung, Taiwan

**Objectives:** Successful root canal therapy relies on the elimination of biofilms and the effective sealing of the canal system. Despite mechanical preparation, persistent pathogens like *Enterococcus faecalis* often survive by penetrating deep into dentinal tubules, leading to treatment failure. Conventional sealers frequently fail to address these deep-seated bacteria. Therefore, the objective of this study was to synthesize a novel ebselen-loaded silver-containing mesoporous bioactive glass (ebselen/MBG-Ag) and evaluate its potential as a bioactive sealer to overcome the limitations of current endodontic therapies. **Methods:** Material characterization was performed using FTIR and UV-Vis. The antibacterial efficacy against *Enterococcus faecalis* was assessed using growth curve analysis and colony-forming assays, while anti-biofilm potential was evaluated specifically for biofilm inhibition. The material's ability to induce hydroxyapatite (HA) formation and promote remineralization was tested on bovine dentin surfaces. **Results:** FTIR and UV-Vis analyses confirmed the successful fabrication of (ebselen/MBG-Ag. The material exhibited potent antibacterial properties against *E. faecalis* (MIC: 10 mg/mL; MBC: 20 mg/mL) and effectively inhibited biofilm formation (MBIC: 20 mg/mL). Furthermore, *in vitro* assays demonstrated significant HA deposition on treated dentin, confirming the material's capacity to facilitate dentin remineralization. **Conclusions:** In conclusion, (ebselen/MBG-Ag exhibits dual functionality with potent antibacterial activity and significant dentin remineralization capability, suggesting its great potential as a novel bioceramic sealer.

## **Exosomal miR-122-5p modulates arecoline-induced epithelial–fibroblast crosstalk in oral submucous fibrosis**

▲Fu-Tzu You, Yan-Hsiung Wang

School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** Oral submucous fibrosis (OSF) is a debilitating fibrotic disorder with malignant potential, strongly linked to chronic betel quid exposure. Persistent activation of fibroblasts and excessive extracellular matrix deposition are central to disease progression. Increasing evidence suggests that epithelial cell–derived exosomes act as key mediators of intercellular communication, yet their contribution to fibroblast activation in OSF remains incompletely defined. **Methods:** Exosomes were isolated from arecoline-stimulated human keratinocytes (HaCaT) and characterized by transmission electron microscopy, nanoparticle tracking analysis, and exosomal marker expression. The biological effects of arecoline-associated exosomes (ARE-Exos) on human gingival fibroblasts (HGFs) were evaluated by assessing cell proliferation, migration, contractility, and fibrotic gene expression. Comprehensive miRNA profiling and pathway analyses were performed to identify critical exosomal miRNAs involved in fibrotic regulation, followed by functional and mechanistic validation. **Results:** Exposure of HGFs to ARE-Exos resulted in suppressed proliferative and migratory capacity, accompanied by enhanced myofibroblast differentiation, increased expression of TGF- $\beta$ ,  $\alpha$ -SMA, and collagen I, and augmented contractile activity. miRNA sequencing revealed miR-122-5p as the most prominently downregulated miRNA in ARE-Exos. Restoration of miR-122-5p significantly attenuated fibroblast contractility and fibrotic marker expression. Mechanistic analyses demonstrated that miR-122-5p directly targets TGF $\beta$ 2 and SMAD3, thereby dampening downstream profibrotic signaling. **Conclusions:** Our findings indicate that arecoline reshapes the epithelial secretome to drive pathogenic epithelial–fibroblast communication via exosome-mediated miRNA signaling. Loss of exosomal miR-122-5p plays a pivotal role in promoting fibroblast activation in OSF, while its restoration confers anti-fibrotic effects. This study highlights exosomal miR-122-5p as a potential biomarker and therapeutic target for modulating fibrosis in OSF.

**Effect of an augmented reality–based system on maternal self-efficacy and behavioral intention toward infant oral care in postpartum care centers: a quasi-experimental study**

▲Nieh-Yu Kuo, Hsiao-Ling Huang

Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

**Objectives:** Early establishment of appropriate infant oral care practices is critical for preventing early childhood caries, yet many first-time mothers report limited confidence and uncertainty regarding infant oral hygiene. Augmented reality (AR)–based educational tools may enhance learning engagement and self-efficacy beyond conventional instruction. This study aimed to evaluate the effects of an augmented reality–based system on maternal self-efficacy and behavioral intention toward infant oral care in postpartum care centers. **Methods:** A quasi-experimental design was employed in 2025 across four postpartum care centers in Taiwan. Primiparous postpartum mothers aged  $\geq 18$  years were allocated to an AR group ( $n = 19$ ) or a comparison group ( $n = 16$ ). Both groups received standardized oral health education delivered by a dental hygienist in a 35-minute session. The AR group additionally received AR-based oral care training, whereas the comparison group received toothbrushing instruction using dental models. Data were collected at baseline and post-intervention using a structured self-administered questionnaire assessing oral care–related knowledge, attitudes, self-efficacy, and behavioral intention. Within-group and between-group differences were analyzed using the Wilcoxon signed-rank test and Mann–Whitney U test, respectively. **Results:** The AR group showed significant improvements in oral care–related knowledge (Effect Size (ES) = 1.44), attitudes (ES = 1.06), self-efficacy (ES = 1.02), and behavioral intention (ES = 0.86) (all  $p < 0.001$ ). The comparison group also demonstrated significant improvements, with effect sizes ranging from 0.59 to 1.75. Between-group effect sizes ranged from 0.07 to 0.71; however, no statistically significant differences were observed in pre–post changes between groups. **Conclusions:** The AR-based intervention produced outcomes comparable to traditional instruction, suggesting that AR-based education may serve as an alternative approach for delivering infant oral care education in postpartum care settings.

## **Biocompatibility assessment of a novel 3-dimensional (3D) printed aligner in orthodontics**

▲Szu-Ju Chen<sup>1</sup>, Yan-Hsiung Wang<sup>1,2</sup>, Kun-Tsung Lee<sup>1,3,4</sup>, Yu-Chuan Tseng<sup>1,5</sup>

<sup>1</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>2</sup>Orthopaedic Research Center, College of Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>3</sup>Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

<sup>4</sup>Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>5</sup>Division of Orthodontics, Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objectives:** Previous studies have reported concerns regarding the biocompatibility of aligner materials after intraoral aging, which may alter their chemical composition. Therefore, this study aimed to evaluate whether different aligner materials affect cell cultures by assessing changes in cell viability at various time points through cytotoxicity testing, and to determine their potential adverse effects on human tissues. **Methods:** Three types of 3D-printed clear aligners (Tough-HBC, Tera Harz TC-85, and LuxCreo) and one thermoplastic aligner (Invisalign) were selected. Extract solutions were prepared at a concentration of 0.2 g/mL. Extracts were collected at different time points (1, 3, 5, 7, and 14 days) for cytotoxicity testing. Human gingival fibroblasts (HGF) and human skin keratinocytes (HaCaT cells) were used as experimental cell lines. Cell viability following exposure to the extract solutions was evaluated using the MTT assay at 24, 48, and 72 hours. Cell viability rates were calculated using spectrophotometric analysis and compared with those of the negative control group. **Results:** Both cell types exhibited cytotoxic effects in all experimental groups, with more pronounced effects observed in extracts collected at 14 days. HaCaT cells demonstrated greater sensitivity to the extract solutions compared with HGF cells. **Conclusions:** All four types of aligners exhibited cytotoxic effects, and cell viability was associated with the duration of extract collection. Among the materials tested, Invisalign demonstrated the least cytotoxic effect on both cell types.

**Assessment of cranial base flexion among different craniofacial skeletal relationships: a CBCT study**

▲Pei-Huan Tsai<sup>1</sup>, Szu-Ting Chou<sup>1,2</sup>

<sup>1</sup>Division of Orthodontics, Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

**Objectives:** The cranial base separates the brain from the face and significantly influences facial growth. This study aimed to analyze cranial base flexion across skeletal Class I, II, and III relationships using 3D CBCT and evaluate potential gender differences. **Methods:** This retrospective study included 210 subjects (70 per skeletal class) aged 20–49 years. Six cranial base angles (N-S-Ba, N-TS-Ba, N-DS-Ba, Fc-S-Ba, Fc-TS-Ba, and Fc-DS-Ba) were measured using 3D Slicer software. Inter-group comparisons and gender dimorphism were analyzed using ANOVA and independent T-tests. **Results:** Statistical analysis using one-way ANOVA demonstrated no significant differences in any cranial base angles among the three skeletal classes ( $p > 0.05$ ). Independent T-tests revealed significant gender dimorphism, where females exhibited significantly flatter cranial bases than males in N-S-Ba ( $p=0.046$ ) and N-TS-Ba ( $p=0.009$ ). Pearson correlation analysis indicated very weak, non-significant associations between flexion angles and the sagittal jaw relationship. Additionally, independent T-tests showed that females presented a significantly steeper mandibular plane angle (SNMP,  $p=0.021$ ). **Conclusions:** Cranial base flexion is not a primary etiologic factor for sagittal skeletal discrepancies. 3D CBCT reveals gender-based morphological nuances that were previously obscured in 2D imaging. Future research is required to determine if vertical dimensions influence these measurements.

## Oral Presentation List

### GROUP: Dental Clinic

No.	Topic	Presenter	Institution
Oral-06	Association between osteoporosis indicators on dental panoramic radiographs and oral health: a cross-sectional study	Bo-Hao Zhong	Graduate Institute of Oral Biology, National Taiwan University Medical College
Oral-07	Alveolar bone changes of mandibular central incisors of skeletal Class III malocclusion patients undergoing surgical orthodontic treatment	Li-Yun Lin	School of Dentistry, College of Dental Medicine, KMU*
Oral-08	Effectiveness of a board game intervention on oral health among rural elementary school children: a pilot study	Jun-Jie Yang Yi-Jia Ke	Department of Oral Hygiene, College of Dental Medicine, KMU*
Oral-09	Optimizing zygomaticomaxillary fracture reduction: a case report utilizing intraoperative real-time imaging in hybrid OR	Yi-Cheng Su	Department of Dentistry, KMUH*
Oral-10	Conservative surgical management of Odontogenic Keratocyst in an adolescent: a case report	Pei-Yu Peng	Department of Dentistry, KMUH*
Oral-11	From deep ulcer to eosinophilic granuloma: a diagnostic turnaround in chronic buccal lesion	Tsung-Hsien Huang	Department of Dentistry, KMUH*
Oral-12	Intraoral open reduction without internal fixation for subcondylar fractures in teenagers: a paradigm shift in adolescent subcondylar fracture management Subcondylar Fracture Management	Edward Chengchuan KO	School of Dentistry, College of Dental Medicine, KMU*

\*KMU (Kaohsiung Medical University), KMUH (Kaohsiung Medical University Hospital)

## **Association between osteoporosis indicators on dental panoramic radiographs and oral health: a cross-sectional study**

▲Bo-Hao Zhong<sup>1</sup>, Wan-Chuen Liao<sup>1,2</sup>, Jjiang-Huei Jeng<sup>1,2,3,4</sup>

<sup>1</sup>Graduate Institute of Oral Biology, National Taiwan University Medical College,  
Taipei, Taiwan

<sup>2</sup>Department of Dentistry, National Taiwan University Hospital, Taipei, Taiwan

<sup>3</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

<sup>4</sup>Department of Dentistry, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

**Objectives:** Osteoporosis is a systemic skeletal disorder characterized by reduced bone mineral density and increased fracture risk, representing a major public health concern in aging populations. Dental panoramic radiography has been proposed as a potential opportunistic screening tool for osteoporosis. Given that oral conditions involving bone loss may reflect systemic skeletal status, this study aimed to investigate the associations between osteoporosis-related mandibular cortical measurements on panoramic radiographs and oral health indicators. **Methods:** This retrospective cross-sectional study evaluated dental clinic patients who underwent panoramic radiographic examinations. Mandibular cortical width (MCW) and mandibular cortical index (MCI) were assessed and analyzed in relation to sociodemographic characteristics, medical and lifestyle factors, and oral health indicators, including the DMFT index, number of molars, periodontal status, and apical condition. Crude associations were initially examined, followed by inverse probability of treatment weighting (IPTW) to adjust for potential confounding by non-oral health factors and to estimate independent associations. **Results:** A total of 675 patients were included. In unadjusted analyses, females had 2.98-fold higher odds of presenting with MCW <3 mm compared with males ( $p = 0.012$ ). Patients with periodontal disease exhibited 1.58-fold higher odds of MCW <3 mm than those without periodontal disease. Additionally, individuals with DMFT  $\geq 7$  had 1.83-fold higher odds of presenting with MCI classifications 2 or 3 compared with those with DMFT <7. However, after adjustment using IPTW for sociodemographic, medical, and lifestyle confounders, most of these associations were attenuated and no longer statistically significant. **Conclusion:** Mandibular cortical measurements on panoramic radiographs were associated with multiple oral health indicators in crude analyses. However, these associations were largely explained by underlying sociodemographic, medical, and lifestyle factors after adjustment. These findings suggest that apparent relationships between osteoporosis indicators on panoramic radiographs and oral health may be substantially confounded and should be interpreted with caution.

**Alveolar bone changes of mandibular central incisors of skeletal Class III malocclusion patients undergoing surgical orthodontic treatment**

▲Li-Yun Lin, Chin-Yun Pan

School of Dentistry, College of Oral Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

Division of Orthodontics, Department of Dentistry, Kaohsiung Medical University Hospital,  
Kaohsiung, Taiwan

**Objectives:** This study aimed to evaluate the longitudinal changes in alveolar bone surrounding the mandibular central incisors in skeletal Class III patients undergoing surgical orthodontic treatment. A better understanding of alveolar bone remodeling before and after orthognathic surgery is essential for improving periodontal stability and treatment planning. **Methods:** CBCT images of 30 adult patients with skeletal Class III malocclusion were collected at three time points: before treatment (T0), after presurgical orthodontics (T1), and one year after orthognathic surgery (T2). Buccal and lingual alveolar bone thickness and height at the mandibular central incisors were measured using Dolphin Imaging software (Version 11.95, Dolphin Imaging and Management Solutions, Chatsworth, CA, USA). The null hypothesis assumed no significant changes among the three time points. **Results:** Significant differences were observed in both buccal and lingual alveolar bone dimensions across the three time points ( $p < 0.05$ ), with a notable reduction in lingual bone thickness. Buccal bone changes were less consistent; an increasing trend was observed in the apical buccal region, whereas other buccal thickness and height measurements showed no significant change. Post hoc analysis revealed that the most prominent changes occurred between T0 and T1. **Conclusions:** The null hypothesis was rejected for certain variables, particularly lingual bone thickness. Recognizing these alveolar bone changes may contribute to more precise treatment planning and better preservation of long-term periodontal health.

**Effectiveness of a board game intervention on oral health among rural elementary school children: a pilot study**

▲Jun-Jie Yang, ▲Yi-Jia Ke, Ju-Hui Wu

Department of Oral Hygiene, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

**Objectives:** To evaluate the effectiveness of a newly developed board game compared with lecture-based instruction on oral health knowledge, attitudes, behaviors, and self-efficacy among rural elementary school children. **Methods:** A quasi-experimental pretest–posttest design was conducted in two rural elementary schools in southern Taiwan (Schools A and B). Students first received lecture-based oral health education and, one month later, participated in a board game intervention covering identical content. Each session lasted 30–40 minutes. Only students who completed both pretest and posttest assessments were included (School A: lecture  $n = 15$ , board game  $n = 13$ ; School B: lecture  $n = 11$ , board game  $n = 14$ ). A self-administered questionnaire assessed oral health knowledge, attitudes, behaviors, and self-efficacy. Paired t-tests examined within-group changes, and independent t-tests compared improvements between interventions ( $p < .05$ ). **Results:** The board game intervention significantly improved knowledge, behavior, and self-efficacy scores in both schools (all  $p < .05$ ). Attitude scores improved significantly only in the School B board game group ( $4.12 \pm 0.57$  to  $4.62 \pm 0.34$ ;  $p < .001$ ). Lecture-based education also resulted in significant improvements in knowledge and behavior scores in both schools, while self-efficacy improved only in School B ( $p = .014$ ). Between-group comparisons showed no significant differences in knowledge or behavior gains; however, improvement in attitude scores was significantly greater in the board game group than in the lecture group ( $p = .009$ ). **Conclusions:** Both teaching methods effectively improved oral health knowledge and behaviors. The board game intervention demonstrated additional benefits for attitudes and self-efficacy.

## **Optimizing zygomaticomaxillary fracture reduction: a case report utilizing intraoperative real-time imaging in hybrid OR**

▲ Yi-Cheng Su, Wei-Chia Chuan

Division of Oral and Maxillofacial Surgery, Department of Dentistry,  
Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

Optimizing Zygomaticomaxillary Fracture Reduction: A case report utilizing Intraoperative Real-time Imaging in Hybrid OR. Post-operative facial asymmetry is a common complication following zygomaticomaxillary complex (ZMC) fracture. Currently, most surgeons rely on direct visual inspection of anatomy reduction during surgery. The Hybrid Operating Room integrates advanced intraoperative imaging systems including realtime CBCT and angiography, offers a solution to enhances surgical safety and precision. We present a case of right side ZMC fracture reduction in Hybrid OR with digital workflow:

Preoperative preparation:

1. Diagnostic CBCT : the raw DICOM data is converted into a Standard Triangle Language mesh.
2. Materialise Mimics ® software was utilized for segmentation and virtual reduction.
3. Intraoperative procedure:
4. Expose fracture lines with lateral eyebrow. Subciliary and intraoral approach.
5. Initial fracture segment reduction and temporary fixation.
6. Realtime CBCT with Siemens ARTIS pheno ®.
7. Immediate superimposed the current reduction result.
8. Minimum adjustment was executed to achieve ideal result.

Integrating intraoperative real-time imaging into the ZMC fracture workflow allows for immediate verification of precise reduction. This technology reduces the risk of residual asymmetry and optimizes surgical outcomes, potentially facilitating less invasive approaches.

## **Conservative surgical management of Odontogenic Keratocyst in an adolescent: a case report**

▲Pei-Yu Peng<sup>1</sup>, Chun-Min Chen<sup>1,2</sup>

<sup>1</sup>Division of Oral and Maxillofacial Surgery, Department of Dentistry,  
Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

Odontogenic keratocyst (OKC) is a developmental odontogenic cyst commonly encountered in clinical practice. Treatment options include enucleation, curettage, marsupialization, and decompression. Decompression and marsupialization are often preferred as initial treatment modalities for large jaw cysts in adolescents due to their conservative nature and favorable outcomes. We report the case of a 13-year-old female who presented to our department on December 28, 2023, with a two-week history of left buccal swelling and halitosis. Clinical examination revealed facial asymmetry with swelling of the left cheek and mandibular vestibule, as well as a sinus tract at the distal aspect of tooth 36 with light yellow discharge. Panoramic radiography demonstrated a large unicystic radiolucent lesion with cortical expansion involving the left mandibular ramus. The lesion extended from the distal aspect of tooth 36 to the posterior mandible and from the sigmoid notch to the mandibular base, measuring approximately  $5.5 \times 4.3$  cm. Tooth 37 was displaced inferiorly toward the apical distal region of tooth 36, while tooth 38 was displaced superiorly and posteriorly toward the inferior aspect of the left condyle. An incisional biopsy and placement of a decompression button in the left mandibular body were performed on the same day. Initial histopathological examination revealed an inflamed odontogenic cyst. Serial panoramic radiographs obtained during a twenty-month decompression period demonstrated progressive reduction in cyst size. Subsequently, cyst enucleation and extraction of tooth 38 were performed under general anesthesia on August 8, 2025. Final histopathological analysis confirmed the diagnosis of an inflamed odontogenic keratocyst. At the most recent follow-up, no evidence of recurrence was observed, and tooth 37 had successfully erupted.

**From deep ulcer to eosinophilic granuloma: a diagnostic turnaround  
in chronic buccal lesion**

▲Tsung-Hsien Huang<sup>1</sup>, Edward Cheng-Chuan Ko<sup>1,2</sup>

<sup>1</sup>Division of Oral and Maxillofacial Surgery, Department of Dentistry,  
Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>2</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University,  
Kaohsiung, Taiwan

Traumatic ulcerative granuloma with stromal eosinophilia (TUGSE) is a rare, self-limiting ulcerative condition of the oral mucosa that often clinically mimics malignancy. We report a unique case involving the right buccal mucosa of a 41-year-old female who presented with a painful, non-healing ulcer for over three months. Ultrasonography showed a poorly demarcated submucosal hypoechoic lesion. An initial incisional biopsy revealed deep ulceration with mixed inflammatory infiltrate but no evidence of malignancy. Given the persistent induration, the patient was treated with oral methylcobalamin and a melatonin receptor agonist (ramelteon), resulting in approximately 50% reduction in lesion size. However, residual firmness prompted surgical excision and reconstruction with platelet-rich fibrin, artificial dermis, and a Thermopad® dressing. Histopathologic analysis of the excised tissue demonstrated dense lymphoeosinophilic infiltration extending into the muscle layer, consistent with TUGSE. This case highlights two novel features: (1) the first reported use of ultrasonography to characterize TUGSE, and (2) potential clinical response to melatonin pathway modulation. While further studies are needed to validate therapeutic implications, these findings raise important considerations for diagnosis and non-invasive management of persistent oral ulcers.

**Intraoral open reduction without internal fixation for subcondylar fractures in teenagers: a paradigm shift in adolescent subcondylar fracture management**

Hsin-Yi Tsou<sup>1</sup>, Kazuto Hoshi<sup>2</sup>, Michael Yuanchien Chen<sup>3</sup>, Yong-Deok Kim<sup>4</sup>,  
Tetsu Takahashi<sup>5</sup>, ▲Edward Chengchuan Ko<sup>1,6</sup>

<sup>1</sup>Division of Oral and Maxillofacial Surgery, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>2</sup>Oral-Maxillofacial Surgery and Orthodontics, Department of Tissue Engineering, The University of Tokyo Hospital, Tokyo, Japan

<sup>3</sup>Division of Oral and Maxillofacial Surgery, China Medical University Hospital, Taichung, Taiwan

<sup>4</sup>Department of Oral and Maxillofacial Surgery, Pusan National University, Busan, Korea

<sup>5</sup>Department of Oral and Maxillofacial Surgery, Southern Tohoku Fukushima Hospital, Fukushima, Japan

<sup>6</sup>School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

Subcondylar fractures in adolescents present a unique clinical challenge. While younger children benefit from high remodeling potential and often receive conservative treatment, teenagers approaching skeletal maturity frequently require surgical intervention to restore vertical mandibular height and occlusal harmony. Conventional open reduction with internal fixation (ORIF) via extraoral access carries risks such as facial nerve injury, visible scarring, and potential disturbance to condylar growth. We introduce a novel intraoral approach that avoids internal fixation yet achieves successful anatomical and functional reduction of a medially displaced subcondylar fracture in a 13-year-old male patient. The patient sustained a unilateral subcondylar fracture with contralateral open bite and vertical shortening of the mandibular ramus. Manual reduction under general anesthesia was unsuccessful. Through an intraoral mucosal incision along the buccal shelf, the coronoid process and medial ramus were exposed. A posterior border retractor, commonly used in sagittal split osteotomy, was positioned at the ramus. A Gillies' zygomatic elevator was inserted through the sigmoid notch and directed posterosuperiorly to reposition the medially displaced condyle into the glenoid fossa. Occlusion was verified intraoperatively, and intermaxillary fixation (IMF) using screws was maintained for 14 days. Postoperative radiographs confirmed restoration of vertical height and acceptable alignment. At 1- and 2-month follow-ups, the patient exhibited full mouth opening, stable occlusion, symmetrical mandibular movement, and

no midline deviation. This technique offers a minimally invasive, scar-free, and nerve-sparing alternative for selected adolescent cases. It is particularly suited for anteromedially displaced condylar fragments, where extraoral access proves difficult. By redirecting the reduction vector through a direct intraoral route, this approach represents a paradigm shift in the management of teenage subcondylar fractures.

Organizer | College of Dental Medicine, Kaohsiung Medical University (KMU)

主辦單位 | 高雄醫學大學口腔醫學院

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Department of Dentistry, KMU Gangshan Hospital  
Department of Dentistry, Kaohsiung Municipal Siaogang Hospital  
Department of Dentistry, Kaohsiung Municipal Cijin Hospital

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