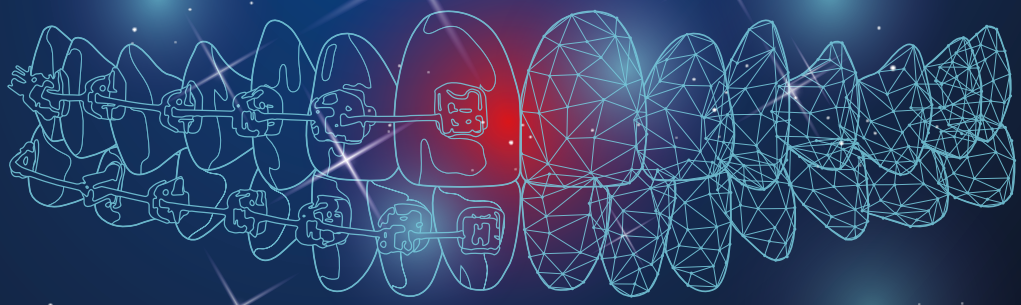
Taiwan Association of Orthodontists
中華民國齒顎矯正學會

APOS
ASIAN PACIFIC ORTHODONTIC SOCIETY

The 13th Residents' Forum of Taiwan Association Orthodontists

The 5th Residents' Forum of Asian Pacific Orthodontic Society



Dec. 2, 2024
7F, Taipei Nangang Exhibition Center
Hall2 (TaiNEX 2), Taipei Taiwan

TABLE OF CONTENTS

02 Welcome Messages

05 Competition Judges

09 Schedules

- 09 Research Report
- 10 Clinical Report

11 Oral Presentation

- 11 Research Report
- 14 Clinical Report

17 Abstracts of Research Report

- 17 APOS Research Report
- 42 TAO Research Report

51 Abstracts of Clinical Report

- 51 APOS Clinical Report
- 66 TAO Clinical Report

TAO President's Message

Dear colleague and members of APOS,

The 14th Asia Pacific Orthodontic Congress (APOC) and the 37th Annual Meeting of the Taiwan Association of Orthodontists will be grandly held from December 2nd to 5th in Taipei. This is the most significant event for the orthodontic community in the Asia-Pacific region. The first activity to inaugurate this prestigious event is the TAO-APOC Joint Residents Forum. This forum is open to training residents from around the world, beyond the Asia-Pacific region. It is the only regional organization accredited by the WFO that provides a public, open, and fair platform for graduate students to showcase their work, promote orthodontic disciplines, and build invaluable social and professional networks.

For every participating resident, this forum is a pivotal opportunity to present their efforts, regardless of whether their work is in its early stages or still developing. We deeply value and appreciate the time and dedication they have invested in their works day after day. Don't hesitate to seize this special platform to shine. We are proud of your confidence to stand here today and your potential to become excellent doctors in the future. The forum this year has gathered 73 presentations, including 48 clinical case reports and 25 academic research studies, from residents representing over 40 institutes across 20 countries. I am confident it will be an exciting and competitive forum for all participants.

Finally, I would like to extend my heartfelt gratitude to our organizing committee, led by Chair Dr. Ellen Wen-Ching Ko, Vice Chair Kevin Chang, and all the administrative team members. Your hard work and dedication have made this event an incredible and must-attend occasion. Thank you! To all the residents, I wish you the best of luck today. To all our invited guests, I hope you have a memorable and unique experience in Taiwan.

Richard Chen-Feng Cheng

President, Taiwan Association of Orthodontists

APOS Vice Presidents' Message

Orthodontics is an ever developing and rapidly growing branch of Dentistry.

On behalf of APOS let me congratulate Taiwan Association of Orthodontics (TAO) for hosting the 5th Resident forum at Taipei, Taiwan, Dec 2, 2024, Taipei Nangang Exhibition center, Hall 2 (TaiNEX).

Asia Pacific Orthodontic Congress (APOC) is a biennial academic event hosted by the Asian Pacific Orthodontic Society (APOS). Each host society demonstrates their organizational strength and cultural uniqueness at the APOC.

This book summarizes what APOS (Asia Pacific Orthodontic Society) is, the APOS Residence Forum (RF), and introduces APOS Countries and Participants of this Forum. This book will showcase the young resident orthodontists on orthodontic management in different classes of malocclusion, abnormal tooth jaw relationship that affects aesthetics and functional need. This abnormal occlusion is treated by multidisciplinary approach- by traditional, modernized, to current digital approaches. This includes multiple case reports and current research in this field. Therefore, there is a need for both the resident trainee students and practicing professionals to keep pace with the growth of this specialty.

APOS caters to the orthodontic residents in the Asia-Pacific region and the rest of the World. It brings together younger residents from different regions to share their clinical and research experiences. Participants from different countries benefit from sharing individual experiences. This platform enables sharing and learning at the same time and connecting with fellow professionals to enable a process of continuing learning and practice. Ultimately, we all serve patients who need our services, and excellence in our practice is paramount.

Let us all work together to expand our base and include professionals who can participate in this platform. We hope the proceedings to be made available on our website www.apos.com, and Journal APOS Trends in Orthodontics, benefiting those who serve the orthodontic community worldwide.

Over the years, the RF Platform has continued to inspire practicing professionals to enable subjective experience for objective learning. Sharing our clinical expertise can lead to a deeper understanding on what we practice, often not captured in textbooks. Collective sharing of experiences is the hallmark of this platform.

There are 39 presentations (Clinical and Research) out of 12 countries (10 APOS and 2 non-APOS). The organizing Committee will select the best presenters from both the categories and award them the crest of appreciation and certificates.

This book is dedicated to the participants and audiences, orthodontic residents and practicing teaching faculty from APOS Countries and non-APOS Countries (from ASIA PACIFIC and beyond boundaries).

All practicing professionals present here will find this platform useful in their pursuit for excellence.

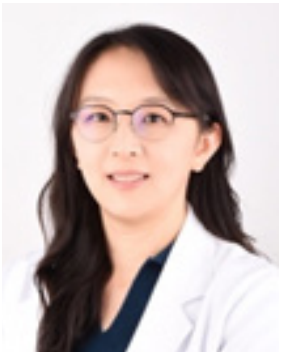
Dr. Mohammed Zakir Hossain, BDS, FCPS, PhD, FDS RCPS (Glasgow)

Vice President, Asian Pacific Orthodontic Society

President, Bangladesh Orthodontic Society

ECM to APOS

Director's Message



It is a great pleasure to host the 5th APOC and 13th TAO Resident Forum here in Taipei this year. Four years ago, the pandemic disrupted our joint APOC meeting, but this year we are thrilled to welcome students from 14 countries. The forum features 25 research topics and 14 case reports from APOC, along with 25 case reports and 9 research presentations from TAO. Our research sessions cover a wide range of topics, including AI/VR, OGS, cleft, growth, airway management, and more. The clinical sessions will focus on topics such as impaction, MAPRE, interdisciplinary approaches, OGS, and cleft surgery. The diversity of topics from different institutions will surely foster greater interaction and communication between students and faculty.

I would like to express my sincere gratitude to Conference President Dr. Ko Wen-Ching, Association President Dr. Cheng Chen-Feng, and Education Committee Chair Dr. Chang Wen-Chung for their full support and authorization. I would also like to extend my heartfelt thanks to all the colleagues from Taipei Veterans General Hospital and TAO Secretariat KAY who have assisted with this event, which has made it possible for us to hold this academic event at this year. Finally, we would like to thank all the participating instructors and resident doctors who have come together from different countries to make this event a success. As we gather here in Taiwan, a country known for its beautiful natural scenery and delicious cuisine, we hope that all participating doctors will leave with a wealth of knowledge and valuable experiences.

Invitation from the Chairperson of the 5th APOC &13th TAO Resident Forum!

Dr. Tzu-Ying Wu

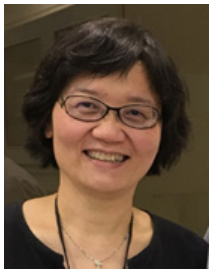
Director, the Residents' Forum

Department of Orthodontics, Taipei Veterans General hospital

Dental School, National Yang-Ming Chiao-tung University

Competition Judges

RESEARCH REPORT



Dr. Chung-Chen Jane Yao

1. Professor, Graduate Institute of Clinical Dentistry, National Taiwan University
2. Visiting Staff, Division of Dentofacial Orthopedics and Orthodontics, Department of Dentistry, National Taiwan University Hospital, Taipei, Taiwan
3. PhD in Oral Biology and Orthodontic Clinical Certificate, University of California San Francisco, San Francisco, CA, USA

Dr. Yu-Fang Liao

1. Attending orthodontist, Department of Craniofacial Orthodontics, Craniofacial Center and Sleep Center, Chang Gung Memorial Hospital, Taiwan
2. Professor and Director, Graduate Institute of Dental and Craniofacial Science, Chang Gung University, Taiwan
3. President, Taiwan Cleft Palate Craniofacial Association

Dr. Kenko Jian-Hong Yu

1. Professor and Head of School of Dentistry, Dean of Department of Orthodontics, China Medical University and Hospital Medical Center (Taiwan)
2. Ph.D. in Orthodontics (Tokyo Medical and Dental University, Japan)
3. Visiting scholar (Harvard) and Advanced study (Tufts and UCSF)

Dr. Pao-Chang Chiang

1. Ph.D., Department of Orthodontics and Dentofacial Orthopedics, Nagasaki University, Nagasaki, Japan
2. Assistant Professor/Director, Division of Orthodontics, School of Dentistry, Taipei Medical University, Taipei, Taiwan
3. Visiting Staff, Orthodontic department, Taipei Municipal Wan Fang Hospital, Taipei, Taiwan

RESEARCH REPORT

Dr. Oyku Dalci

Senior Lecturer and Orthodontic Course Coordinator

Dr. Od Bayarsaikhan

1. Head, Department of Orthodontics, School of Dentistry and Dental Central Hospital, MNUMS
2. Member, Academic Council of School of Dentistry, MNUMS
3. Member, Subcommittee of Postgraduate program, Postgraduate Institute, MNUMS

Dr. Muhammad Sulaiman Kusumah Adiwirya

1. Full time lecturer – Department of Orthodontics, Faculty of Dentistry, Universitas Indonesia
2. Orthodontist – Universitas Indonesia Hospital & Epsylon Dental Specialist

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Dr. Nutthakarn Ratanasereeprasert

1. Faculty instructor of Orthodontic department, Faculty of Dentistry, Chulalongkorn University
2. Assistant dean of Corporate communications department, Faculty of Dentistry, Chulalongkorn University

CLINICAL REPORT

Dr. Yu-Chuan Tseng

1. Director, Department of Orthodontics, Dental clinics, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan
2. Professor, School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan
3. Chairperson, the Financial Committee of the Taiwan Association of Orthodontists

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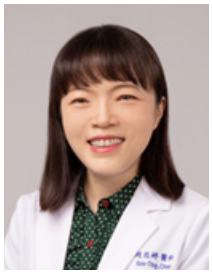

Dr. Szu-Ting Chou

1. PhD, Kaohsiung Medical University, Graduate Institute of Dental Sciences
2. Attending physician, Department of Orthodontics, Kaohsiung Medical University Chung Ho Memorial Hospital
3. Orthodontist approved by the Ministry of Health and Welfare

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Dr. Yu-Jen Chang

1. Chair, Department of Dentistry, Kaohsiung Chang Gung Memorial Hospital
2. Director, Taiwan Association of Orthodontists
3. Chair, Taiwan Cleft Palate-Craniofacial Association

Dr. Heng-Ming Chang

1. Director, Orthodontic and Dental Department, Chang Bing Show Chwan Memorial Hospital
2. Chairman, Scientific committee, Taiwan Association of Orthodontists
3. MOrth., Royal College of Surgeon of Edinburgh

CLINICAL REPORT

Dr. Chooryung J. Chung

Department Orthodontics, Gangnam Severance Hospital, Yonsei University, College of Dentistry

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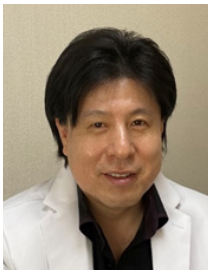

Dr. Kiyoshi Tai

1. Visiting clinical professor, Postgraduate Orthodontic Program, Arizona School of Dentistry & Oral Health, A. T. Still University, AZ
2. BOD of Northern California, Edward H. Angle Orthodontic Society
3. Chairman of the International Affairs Committee (JAAO)

Dr. Maria Lourdes Torres-Garcia

Senior Lecturer at the University of the Philippines Graduate Program in Orthodontics and Orthodontic Consultant at Caparas and Goduco Dental Specialists

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Dr. Viet Hoang

1. Lecturer, Department of Orthodontics and Pedodontics, Faculty of Dentistry, Van Lang University, Ho Chi Minh City, Viet Nam
2. Deputy Head, Orthodontic Department, Saigon Dental Private Hospital, Ho Chi Minh City, Viet Nam
3. Vietnamese Association of Orthodontists

Schedules

Venue/Time	703	701H
08:00-08:40	Registration	
08:40-08:50	**Opening Remarks** (701D)	
08:50-09:20	**Special Lecture** (701D) Dr. Zakir Hossain, Vice President of the APOS	
09:20-09:30	Preparation	
09:30-09:45	TR01-Wasuthorn Poolsin	AR10-Risa Anada
09:45-10:00	TR02-Li-Li Lin	AR11-Tu Manh Nguyen
10:00-10:15	TR03-Doan Thi Phuong Hon	AR12-Nicole Kawakami
10:15-10:30	TR04-I-An Chen	AR13-Budmaa Altangerel
10:30-10:45	AR01-Hayoung Kim	AR14-Li Hanyi
10:45-11:15	Coffee Break	
11:15-11:30	TR05 Yin-Yu Chou	AR15 Yuri Takagiwa
11:30-11:45	AR02 Hasmik Kostandyan	AR16 Nadia Setiawati Widjaja
11:45-12:00	AR03 Madhav Pandey	AR17 Nur Raudhah Ihsaniyah Bialangi
12:00-12:15	TR06 Po-Ju Chiu	AR18 Jonjei Ku
12:15-12:30	TR07 Hung-Jen Wei	AR19 Abigail Heleba
12:30-13:30	Lunch Break	
13:30-13:45	AR04-Riyadh Mohammed Hussein Mohammed	AR20-Thao Ngoc-Phuong Tran
13:45-14:00	AR05-Naomi Low	TR09-Samantha Mao
14:00-14:15	AR06-Cheerana Chotesmithkul	AR21-Pitipat Tunksook
14:15-14:30	AR07-Ashmi Baral	AR22-Yoo Jin Kim
14:30-14:45	AR08-Chia-Yu Hung	AR23-Darien Lam
14:45-15:15	Coffee Break	
15:15-15:30	TR08-Po Ting Chen	AR24-Riyan Adiputra Lukardi
15:30-15:45	AR09-Sandra Chee	AR25-Alma Garay Romero
16:30-16:45	**Special Lecture** (701D) Dr. John D. Callahan, President of the AAO	
16:45-17:00	**Special Lecture** (701D) Dr. Jae Hyun Park, President of the ABO	
17:00-17:15	**Closing Ceremony**	
18:00-21:00	**Residents' Night**	

Venue/Time	702	701D
08:00-08:40	Registration	
08:40-08:50	**Opening Remarks** (701D)	
08:50-09:20	**Special Lecture** Dr. Zakir Hossain, Vice President of the APOS (701D)	
09:20-09:30	Preparation	
09:30-09:45	TC01-Yun-Yu Kuo	AC07-Sarramurti Satshidananda
09:45-10:00	TC02-Heng-Yun Lin	AC08-Mehreen Zakir
10:00-10:15	TC03-Jing-Yi Lin	TC14-Sung-Pu Yang
10:15-10:30	TC04-Juan-Wen Lin	TC15-Yu-Chiang Chen
10:30-10:45	TC05-Pei-Yu Wu	TC16-Yi-Tai Ho
10:45-11:15	Coffee Break	
11:15-11:30	TC06-Hsin-Yu Wang	AC09-Duan Duoni
11:30-11:45	AC01-Attapong Deedklin	AC10-Eunho Kim
11:45-12:00	AC02-Minseok Kim	AC11-Chloe Chan Xiao Wei
12:00-12:15	AC03-Chang Yu Ku	TC17-Yen-Min Huang
12:15-12:30	TC07-Chun-Han Su	TC18-Shan-Wei Chang
12:30-13:30	Lunch Break	
13:30-13:45	TC08-Cheng-Feng Lee	TC19-Yuan Lee
13:45-14:00	AC04-Hyun Ji Lee	AC12-Seungmin Ryu
14:00-14:15	TC09-Jui-Sheng Chang	AC13-Dwayne D. F. Rehatta
14:15-14:30	AC05-Nurul Fatimasari S	TC23-Wei-Chen Chiu
14:30-14:45	AC06-Gema Paramesti Putri	AC15-Hou-Kun Chen
15:15-15:30	TC10-Kah-Ying Yim	TC20-Douglas Hsiao
15:30-15:45	TC11-Yu-Chun Su	TC21-Yao Chen
15:45-16:00	TC12-Cheng-Kai Huang	TC22-Meng-Rong Li
16:00-16:15	TC13-Mei-Hui Cheng	AC16-H. A. S. S Ranasinghe
16:15-16:30		
16:30-16:45	**Special Lecture** (701D) Dr. John D. Callahan, President of the AAO	
16:45-17:00	**Special Lecture** (701D) Dr. Jae Hyun Park, President of the ABO	
17:00-17:15	**Closing Ceremony** (701D)	
18:00-21:00	**Residents' Night**	

ORAL PRESENTATION

RESEARCH REPORT

No.	Presenter	Title
AR01	Hayoung Kim	Orthodontic Considerations in Vertical and Sagittal Nasomaxillary Displacement after Miniscrew-assisted Rapid Palatal Expansion
AR02	Hasmik Kostandyan	Assessment of Stability in Upper Molar Distalization for Class 2 Malocclusion Treatment
AR03	Madhav Pandey	Overall and Anterior Bolton Ratio in Class I, II, and III Nepalese Orthodontic Patients
AR04	Riyadh Mohammed Hussein Mohammed	AI-Driven versus Manual Tracing in Cephalometric Analysis of Orthodontic Patients: Implications to Dental Education and Training
AR05	Naomi Low	Digital Atlas of Human Fetal Development
AR06	Cheerana Chotesmithkul	Zygomaticomaxillary Sutures and Cervical Vertebral Maturation in Growing Patients
AR07	Ashmi Baral	Assessment of Maxillary Central Incisor, Nasal Bone and Anterior Cranial Base Lengths: Comparison Between Cleft and Skeletal Class I Subjects
AR08	Chia-Yu Hung	Craniofacial Morphology in Patients with Cleidocranial Dysplasia
AR09	Sandra Chee	Variations of Craniofacial Structure and the Pediatric Upper Airway
AR10	Risa Anada	A Three-dimensional Analysis of the Initial Stages of Tooth Formation
AR11	Tu Manh Nguyen	Evaluate the Dental Maturity and Morphological Characteristics of Mandibular Third Molars in Skeletal Class III Patients
AR12	Nicole Kawakami	Sexual Differences and the Eruption Timing of the Permanent Dentition in Hispanic Adolescents Compared to the Caucasian Standards
AR13	Budmaa Altangerel	A Study on Delayed Tooth Eruption Among Patients at the Dental Central Hospital, Mongolian National University of Medical Sciences

RESEARCH REPORT

No.	Presenter	Title
AR14	Li Hanyi	An In-vitro Comparison of Thickness Accuracy and Wear Resistance of Three-dimensionally Printed and Conventional Thermoplastic Materials for Clear Orthodontic Retainers
AR15	Yuri Takagiwa	Roles of SETDB1 in Epithelial Cells During Tooth Development
AR16	Nadia Setiawati Widjaja	The Effect of Ethanol on Osteoblast and Osteoclast Expression in Rats During Orthodontic Tooth Movement: An Experimental Study
AR17	Nur Raudhah Ihsaniyah Bialangi	Comparison of the Effect of Caffeine, Ethanol, and Combined Administering on Accelerated Orthodontic Tooth Movements in Rats: An Experimental Study
AR18	Jonjei Ku	Synergistic Effect of Senolytics and Mechanical Loading on TMJ Cartilage
AR19	Abigail Heleba	Digital Atlas of Facial Growth in Macacca Fascicularis Rhesus Monkeys as Defined by Lead Acetate Vital Stains
AR20	Thao Ngoc-Phuong Tran	Predicting Sum Widths of Unerupted Canines and Premolars: A Machine Learning Approach and Web-based Application
AR21	Pitipat Tunksook	Classification of Cervical Vertebral Maturation Stages with Machine Learning Models: Leveraging Datasets with High Inter- and Intra-observer Agreement
AR22	Yoo Jin Kim	Immersive 3-Dimensional Virtual Reality Use In Orthodontic Patient Education
AR23	Darien Lam	A Pilot Study: Examining the Accuracy and Precision of Virtual Study Model Measurements Within a Virtual Reality Environment
AR24	Riyan Adiputra Lukardi	The Relationship Between Social Anxiety Status and Differences in Objective and Subjective Orthodontic Treatment Need Assessment in Indonesian Population
AR25	Alma Garay Romero	Facial Esthetics Assessment

RESEARCH REPORT

No.	Presenter	Title
TR01	Wasuthorn Poolsin	Three-Dimensional Analysis of Surgical Outcomes and Stability in Skeletal Class II Malocclusion Patients with Diverse Vertical Facial Patterns
TR02	Li-Li Lin	Comparative Accuracy and Stability of Two Surgical Approaches for Counterclockwise Mandibular Setback in High-Angle Class III Deformities
TR03	Doan Thi Phuong Hong	Comparison of Stability and Outcomes of Bimaxillary Surgery in Patients with Varying Severity of Craniofacial Microsomia
TR04	I-An Chen	Impact of Intentional Tilt-out of Proximal Segment in Bilateral Sagittal Split Ramus Osteotomy on Facial Asymmetry Correction
TR05	Yin-Yu Chou	The Anatomic Limits in Lower Full-Arch Distalisation in Different Facial Patterns Under Computed Tomography
TR06	Po-Ju Chiu	Study of Influencing Factors and Outcomes of Orthodontic Treatments for Uprighting Impacted Mandibular Second Molars
TR07	Hung-Jen Wei	Comparison of Cone Beam Computed Tomography (CBCT) and Multi-Slice Computed Tomography (MSCT) in the Measurement of Craniofacial Soft and Hard Tissues
TR08	Po Ting Chen	The Correlation Between Craniofacial Structure and Collapse of Upper Airways in OSA Patients
TR09	Samantha Mao	Impacted Mandibular Second Molar Detection Using Deep Learning-Based Detection Tool

CLINICAL REPORT

No.	Presenter	Title
AC01	Attapong Deedklin	Overcoming Thin Biotype: A Case Report of Bone Augmentation for Tooth Retraction
AC02	Minseok Kim	A Case Report of a Middle-aged Patient with Deepbite due to Pathological Tooth Movement
AC03	Chang-Yu Ku	Molar Protraction in Subjects with Missing Teeth–A Case Series
AC04	Hyun Ji Lee	Non-surgical Treatment of a Class II Malocclusion with Facial Asymmetry
AC05	Nurul Fatimasari S	Management of Class II Division 1 Subdivision Malocclusion with Severe Deep Bite Using Myofunctional Appliance: A Case Report
AC06	Gema Paramesti Putri	Asymmetric Mechanotherapy of Class III Malocclusion with Unilateral Crossbite
AC07	Sarramurti Satshidananda	Severe Class III Malocclusion on Adolescence Patient: A Combination of Growth Modification Appliances and Passive Self-ligating System
AC08	Mehreen Zakir	Orthodontic Camouflage of Skeletal Class III Malocclusion Using Removable Maxillary Expander and Fixed Mechanotherapy: A Case Report
AC09	Duan Duoni	Surgery-First Orthognathic Approach in Treating Class III Malocclusion with Supraerupted and Non-functional Upper Second Molars
AC10	Eunho Kim	Case Report of a Patient with Skeletal Class II Facial Trauma Using Distraction Osteogenesis of Ankylosed Incisors and Orthognathic Surgery
AC11	Chloe Chan Xiao Wei	Traumatised Maxillary Central Incisor Managed with Extraction and Orthodontic Treatment
AC12	Seungmin Ryu	Strategic Multi-disciplinary Treatment in Adult Cleft Lip and/or Palate Patients Applying Digital Simulation of Virtual Alignment and Smile

CLINICAL REPORT

No.	Presenter	Title
AC13	Dwayne D. F. Rehatta	Multi-disiplinary Orthodontic Treatment in Cleft Lip and Palate Patient: A Case Report
AC15	Hou-Kun Chen	Facial Esthetic Driven Consideration and Treatment of Dentoalveolar Protrusion Patients
AC16	H. A. S. S Ranasinghe (Senani Ranasinghe)	Conventional Orthodontic-Surgical Treatment Approach for Skeletal Class III Correction—A Case Report
TC01	Yun-Yu Kuo	Clear Aligner Treatment for a Child with Mandibular Lateral Incisor Ectopic Eruption: A Case Report
TC02	Heng-Yun Lin	Bilateral Impaction of Second Mandibular Molars with Orthokeratinized Odontogenic Cyst in a Bimaxillary Protrusion: A Case Report
TC03	Jing-Yi Lin	Surgical and Orthodontic Approach for Skeletal Class III Malocclusion with Unilateral Maxillary Canine Impaction and History of Ameloblastoma
TC04	Juan-Wen Lin	Interdisciplinary Management of Non-syndromic Multiple Supernumerary Impacted Teeth
TC05	Pei-Yu Wu	Orthodontics Improves Gingival Recession
TC06	Hsin-Yu Wang	Digital Virtual Setups Assist Treatment Planning for Interdisciplinary Treatment: Two Cases
TC07	Chun-Han Su	A Case of Interdisciplinary Treatment Involving Both Orthodontist and Periodontist in Treating Malocclusions with PAOO Application
TC08	Cheng-Feng Lee	Growth Modification of Class II Malocclusion Case Using Invisalign Mandibular Advancement: A Case Report
TC09	Jui-Sheng Chang	Orthodontic-Orthognathic Retreatment of Mandibular Retrognathism Using a Surgery-First Approach
TC10	Kah-Ying Yim	Treatment Consideration of Unilateral Blocked Out Upper Canine with Severe Dental Midline Deviation
TC11	Yu-Chun Su	Orthodontic Treatments of Bimaxillary Protrusion Patients Among Different Skeletal Anteroposterior Classifications—A Case Series

CLINICAL REPORT

No.	Presenter	Title
TC12	Cheng-Kai Huang	Treatment of Class II Division 2 Severe Deep Bite in Two Adults: Extraction or Not? TAD or Not?
TC13	Mei-Hui Cheng	Treatment of Class II Div. I malocclusion with Severe Deep Overbite: A Case Report with 6 Years Follow Up
TC14	Sung-Pu Yang	Surgical-Orthodontic Treatment in Skeletal Class III Facial Asymmetry with Maxillary Transverse Deficiency Patients– A Case Series
TC15	Yu-Chiang Chen	AI-Assisted MARPE Guide
TC16	Yi-Tai Ho	Class III Treatment by Combining Orthognathic Surgery (OGS) and Maxillary Skeletal Expander (MSE)
TC17	Yen-Min Huang	Surgical-Orthodontic Approach with Double-Jaw Surgery of Skeletal Class III Malocclusion: A Case Report
TC18	Shan-Wei Chang	Asymmetric Mandible Correction with Orthodontic Treatment Combine Orthognathic Surgery via Bilateral Intraoral Vertical Ramus Split Osteotomy, A Case Report
TC19	Yuan Lee	Long-Term Management of Tessier No. 4 Craniofacial Cleft: An Interdisciplinary Approach for Optimal Outcomes
TC20	Douglas Hsiao	Orthodontic Camouflage as an Alternative Treatment for Adult Class III Malocclusions–A Case Series
TC21	Yao Chen	Mandibular Backward Rotation (MBR) Technique: An Innovative Approach for Class III Malocclusion Camouflage Treatment–A Case Series
TC22	Meng-Rong Li	Unlock the Ultimate Smile: Art of Occlusal Plane Rotation in Class III Open Bite Cases
TC23	Wei-Chen Chiu	Skeletal Class III with Bimaxillary Dentoalveolar Protrusion Using Orthodontic Camouflage Treatment: A Case Report

ABSTRACT

RESEARCH REPORT

No. AR01

Orthodontic considerations in vertical and sagittal nasomaxillary displacement after miniscrew-assisted rapid palatal expansion

Presenter: Hayoung Kim

Instructor(s): Hyowon Ahn

Country: South Korea

Kyung Hee University

Objective: Treatments using miniscrew-assisted rapid palatal expansion (MARPE) may induce unanticipated 3-dimensional skeletal changes beyond transverse expansion. This study investigates the vertical and anteroposterior displacement patterns of the nasomaxillary complex (NMC) after MARPE.

Materials and Methods: Cone-beam computed tomography (CBCT) images of 42 patients were analyzed before and after MARPE to evaluate the vertical, anterior displacement, and rotational patterns of the NMC. Changes in gap width of four circum-maxillary sutures (FMS, frontomaxillary suture; ZMS, zygomaticomaxillary suture; ZTS, zygomatictemporal suture; PMS, pterygomaxillary suture) and their directions were assessed for correlation.

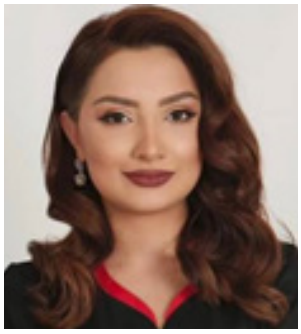
Results: Samples were divided into two groups based on vertical displacement: Group 1 (≥1 mm) and Group 2 (<1 mm). Group 1 showed approximately twice the skeletal expansion and anterior displacement, and three times higher PMS separation success than Group 2. Larger FMS and PMS separations correlated with increased vertical NMC displacement. No significant differences in initial gap width or suture direction were found between groups. When considering the rotational pattern, the parallel displacement group had a greater vertical displacement of the PNS and a higher success rate of PMS separation compared to the clockwise rotation group.

Conclusion: After MARPE, the changes in the gap width of FMS, PMS and successful splits in the PMS may have an impact on the vertical and sagittal NMC displacement pattern. Clinically, it is important to recognize these displacements of the NMC and to appropriately address and consider them during orthodontic treatment after MARPE.

Keywords: MARPE, Nasomaxillary complex, Displacement, Vertical and Sagittal, Circum-maxillary sutures

Ethics: IRB approval

RESEARCH REPORT



No. AR02

Assessment of Stability in Upper Molar Distalization for Class 2 Malocclusion Treatment

Presenter: Hasmik Kostandyan (Armenia)

Instructor(s): Artak Nagdalyan

Country: Armenia

Yerevan State Medical University, Department of orthodontics and pediatric dentistry, Amenia

Objective: The objective of this literature review is to assess the stability of upper molar distalization techniques used for Class 2 malocclusion treatment.

Materials and Methods: A comprehensive search was conducted across databases including PubMed, Scopus, Web of Science, and Google Scholar using keywords such as "upper molar distalization," "Class 2 malocclusion," "stability," and "orthodontic treatment."

Results: Different distalization methods show varied success rates and tendencies for relapse. Techniques using Temporary Anchorage Devices (TADs), like the Modified C-Palatal Plate (MCPP), achieve favorable mean distalization (4.0mm in adults, 3.95mm in adolescents) and distal tipping angles (3.17° in adults, 1.61° in adolescents). Inter-radicular mini-screws show slightly less distalization (2.44mm) but comparable distal tipping angles (2.91°). Reported adverse effects, such as minor soft tissue irritation and temporary discomfort, are infrequent and manageable with proper clinical oversight.

Conclusion: Choice of technique significantly impacts stability and relapse. TAD-based methods, especially MCPP, minimize anchorage loss and enhance predictable molar movement, particularly beneficial for adults. Techniques using Temporary Anchorage Devices (TADs), like the Modified C-Palatal Plate (MCPP), demonstrate effective molar distalization with minimal anchorage loss and favorable long-term stability. Conventional methods without TADs often exhibit higher variability in molar movement and increased relapse rates.

Keywords: Upper molar distalization, Class 2 malocclusion, Stability, Orthodontic treatment

Ethics: IRB approval

RESEARCH REPORT

No. AR03

Overall and anterior Bolton ratio in Class I, II, and III Nepalese orthodontic patients

Presenter: Madhav Pandey

Instructor(s): Dashrath Kafle

Country: Nepal

Department of Orthodontics, Kathmandu University
School of Medical Sciences, Dhulikhel Hospital

Objective: To compare overall and anterior Bolton ratios across different malocclusion groups using Bolton's standards. It also aims to investigate the prevalence of tooth size discrepancies in different malocclusion group.

Materials and Methods: The study analyzed 108 pretreatment dental casts from patients at KUSMS, divided into 36 each for Class I, II, and III malocclusions. Teeth dimensions were measured with digital calipers, and Bolton indices calculated. Statistical analysis was conducted using SPSS.

Results: No significant differences in Bolton anterior ratios between Bolton's standard and Class I groups and class II groups ($p > 0.05$). Significant differences were noted between Class III ($p < 0.001$) groups compared to the Bolton's standard, indicating a greater tooth size discrepancy in III malocclusions. Prevalence of tooth size discrepancy in class III were more than other malocclusion group.

Conclusion: Individuals with Class II and Class III malocclusions exhibit a significantly higher prevalence of overall tooth size discrepancies compared to those with Class I malocclusion and the standard group while the prevalence of anterior tooth size discrepancies found in order of class II< class I< class III.This study aims to fill the information gap by doing the cross sectional comparison between different classes of malocclusion. So, this research study will be the milestone in the field of orthodontics defining anterior and overall ratio in various classes of Angles malocclusion and comparison of those findings with normal occlusion.

Keywords: Bolton's standard, Overall ratio, Anterior ratio, Malocclusion

Ethics: IRB approval

RESEARCH REPORT

No. AR04

AI-Driven versus Manual Tracing in Cephalometric Analysis of Orthodontic Patients: Implications to Dental Education and Training

Presenter: Riyadh Mohammed Hussein Mohammed

Instructor(s): Johnah C. Galicia

Country: Yemen

Manila Central University, Dentistry Department

Objective: This study aimed to compare the measurement mean values of selected orthodontic landmarks obtained from the AI-driven WebCeph software tracing with those from manual tracing using Steiner's analysis. Cephalometric analysis is a crucial tool in orthodontics for diagnosis and treatment planning. It measures diagnostic landmarks in the craniofacial structures by tracing the radiographic image. Two primary approaches to cephalometric analysis exist: manual tracing and AI-driven digital software tracing. By understanding both approaches, clinicians can modify their clinical strategies arriving at the best-case scenario for patients. The hypothesis of this study is that there are no significant differences in the parameter mean values of the Steiner's analysis between WebCeph tracing and manual tracing.

Materials and Methods: Forty pre-treatment cephalometric radiographs underwent both manual and software tracing, focusing on ten parameters of Steiner's analysis.

Results: Shapiro-Wilk Test revealed p-values over 0.05 for all parameters, indicating that data was normally distributed. However, the independent t-test and intra-class correlation analysis yielded p-values less than 0.05, suggesting significant differences between mean values obtained through both tracing methods.

Conclusion: The discrepancies in measurement outcomes between both approaches are crucial to recognize, as they can impact the accuracy of diagnosis and treatment planning. This study highlights the significant differences in the mean values between the two methods. Recognizing these variations is essential to prevent misdiagnosis. To future-proof dental graduates, educators should therefore ensure that dental students learn and apply the basic principles of Dentistry before they can effectively utilize emerging methods like AI-driven technologies.

Keywords: Cephalometric Analysis, Manual tracing, WebCeph Software tracing

Ethics: IRB approval

RESEARCH REPORT

No. AR05

Digital Atlas of Human Fetal Development

Presenter: Naomi Low
Instructor(s): Stephen Yen
Country: USA
University of Southern California

Objective: To collate a collection of photographs, radiographs, and cephalometric tracings of human fetal specimens into an atlas of human development. To evaluate the growth and development of cranial and facial bones during the prenatal period.

Materials and Methods: This collection consists of 445 human fetal specimens collected by Dr. Peter Yen, the orthodontic department chairman at Sun Yat-Sen University of Medical Sciences between 1986-1990. The fetal specimens ranged from 13 weeks to 40 weeks and consisted of 215 males and 230 females. All specimens were from the Sun Yat-Sen University Medical Center (Guangzhou, China).

The specimens were photographed, radiographed in a lateral orientation, and traced. All information was digitized from Ektachrome slides with a Nikon COOLSCAN LS 5000 ED Film scanner. Photographs were digitized with the Plustek Z3000 Photo and Document scanner.

Cephalometric radiographs were hand-traced to evaluate cranial and facial proportions and Bjork's facial polygon.

Results: Specimens showed a downward growth pattern in the anterior cranial base and an upward growth pattern in the posterior cranial base. Soft tissue growth was observed in nearly parallel increments from the frontal region to chin. An increase in facial height was observed.

Conclusion: The information collected was collated into a digital atlas and organized according to chapters describing different anatomic regions of the face.

Keywords: Human fetal development

Ethics: None, not required

RESEARCH REPORT

No. AR06

Zygomaticomaxillary sutures and cervical vertebral maturation in growing patients

Presenter: Cheerana Chotesmithkul

Instructor(s): Buddhathida Wangsrimongkol

Country: Thailand

Khon Kaen University, Thailand

Objective: Patients with cleft lip and palate (CLP) often require maxillary growth modification. Growth assessment methods commonly used are age and cervical maturation (CVM). While these methods have been established, emerging researches suggest zygomaticomaxillary suture (ZMS) is a good indicator of maxillary protraction. Understanding the relationship between ZMS development and other growth predictors can provide better insight into the timing of growth modification. This study aims to assess the maturation stages of CVM and ZMS and their correlation in healthy individuals and those with CLP.

Materials and Methods: A retrospective review was conducted on 391 CBCTs of patients aged 8-18 (78 non-CLP: 37 males, 41 females, and 313 CLP: 152 males, 161 females). The mean ages at each CVM and ZMS stage were analyzed, and correlations between CVM and ZMS maturation stages were assessed.

Results: Individuals with CLP showed earlier development in both skeletal (CS2 and CS4) and sutural maturity (stage E) compared to those without CLP (p-value < 0.05). Females within the CLP group had earlier skeletal development (CS3 and CS4) but not necessarily earlier suture development ($p \leq 0.01$). A strong positive correlation was observed between CVM and ZMS ($r = 0.70$-0.77).

Conclusion: Patients with CLP tend to mature earlier in both CVM and ZMS compared to the healthy group. Notably, females often exhibit more advanced skeletal development but not necessarily more advanced suture development. There is a strong positive correlation between CVM and ZMS stages.

Ethics: IRB approval

RESEARCH REPORT

No. AR07

Assessment of maxillary central incisor, nasal bone and anterior cranial base lengths: comparison between cleft and skeletal class I subjects

Presenter: Ashmi Baral

Instructor(s): Dashrath Kafle

Country: Nepal

Department of Orthodontics, Kathmandu University School of Medical Sciences, Dhulikhel Hospita

Objective: To assess the differences in the lengths of three structures located in the frontonasal field i.e. maxillary central incisor, nasal bone and anterior cranial base between cleft patients and patients with skeletal class I pattern (ANB = 2°±2°).

Materials and Methods: Pre-treatment lateral cephalograms of 68 patients (34 in each cleft group and skeletal Class I group) with equal number of males and females (age = 17 to 45 years) were taken and lengths of the anterior cranial base (M1), nasal bone (M2) and maxillary central incisor (M3) were measured manually after tracing on a matt acetate paper. The differences in the measurements between two groups were evaluated using independent t test.

Results: Descriptive statistics of all measurements in the entire sample for both the groups were computed. All the three measurements were significantly shorter ($P<0.001$) in cleft patients (M1 = 63.65±2.14, M2 = 24.43±2.78, M3 = 19.42±1.63) as compared to the skeletal Class I patients (M1 = 67.16±2.20, M2 = 27.0±1.66, M3 = 24.26±0.87). Weak positive co-relation ($r = 0.39$, $P<0.05$) was observed between M2 and M3 in Skeletal class I patients, whereas it was negative in the cleft patients ($r = -0.18$, $P>0.05$).

Conclusion: The differences in the developmental pattern of anterior cranial base, nasal bone and maxillary central incisor observed between cleft patients and normally growing skeletal class I patients may be due to close embryological relationship in both timing and anatomical position of developing frontonasal field, which originates from the frontonasal neural crest cells.

Keywords: Cleft patients, Maxillary incisor, Nasal bone, Cranial base

Ethics: IRB approval

RESEARCH REPORT

No. AR08

Craniofacial morphology in patients with cleidocranial dysplasia

Presenter: Chia-Yu Hung

Instructor(s): Michiko Tsuji, Hidekazu Matsumoto, Keiji Moriyama

Country: Japan

Department of Maxillofacial Orthognathics, Division of Maxillofacial and Neck Reconstruction, Graduate School of Dental Sciences, Tokyo Medical and Dental University, Tokyo, Japan

Objective: Cleidocranial dysplasia (CCD) is a rare skeletal dysplasia associated with RUNX2 mutations. Patients with CCD feature hypoplastic clavicles, short stature, delayed closure of cranial sutures, characteristic clinical appearance, and malocclusion, such as mandibular prognathism. However, detailed craniofacial morphology in CCD has rarely been reported. This study investigated the distinctive craniofacial morphologies of CCD.

Materials and Methods: The participants were 11 patients with CCD (six men and five women, average age; 19.3 years). Data on the craniofacial region were collected using cephalograms and computed tomography, which were post-processed for three-dimensional visualization using the MIMICS software. The morphological characteristics were qualitatively evaluated in three parts.

Results: In the cranium, Wormian bone (100%), aplasia/hypoplasia of the styloid process (100%), hypoplastic mastoid process (100%), open anterior fontanelle (90.9%), flat articular eminence (81.8%), and persistent metopic suture (75.0%) were observed.

In the nasomaxillary complex, nasal bone hypoplasia (100%), zygomatic bone hypoplasia (90.9%), thin orbital wall (83.3%), low position of orbital floor (83.3%), downward bend of zygomatic arch (72.7%), and discontinued zygomatic arch (63.6%) were recorded.

In the mandible, atypical shape of the coronoid process (72.7%), atypical shape of the sigmoid notch (72.7%), and near-parallel-sided borders of the mandibular ramus (45.5%) were identified.

Conclusion: Various detailed characteristic morphological features were observed in the craniofacial region of patients with CCD. Further information on the quantitative analysis of these morphological characteristics and their interaction with the masticatory muscles is needed to further understand craniofacial morphology and occlusal function in CCD.

Keywords: Cleidocranial dysplasia, Craniofacial morphology, Computed tomography

Ethics: IRB approval

RESEARCH REPORT

No. AR09

Variations of craniofacial structure and the pediatric upper airway

Presenter: Sandra Chee
Instructor(s): Mimi Yow
Country: Singapore
National University of Singapore

Objective: Constricted upper airway and craniofacial structures are risk factors for sleep-disordered breathing in the pediatric population. Identification of adenotonsillar hypertrophy and associated craniofacial factors require a large cross-sectional sample. Lateral cephalometric radiographs are routinely used in pediatric orthodontic screening. The current study investigates calibre of the upper airway and lymphoid tissue hypertrophy in a large pediatric orthodontic population.

Materials and Methods: Consecutive lateral cephalograms of 203 boys and 201 girls (n=404) between 7.04 to 10.99 years of age were retrieved retrospectively, from a national dental centre. Upper airway, skeletal, dental and soft tissue variables were measured and investigated for differences between groups based on age, gender, antero-posterior and vertical skeletal patterns, and ancestry. Prevalence of adenotonsillar hypertrophy was identified in this population.

Results: Significant differences ($p<0.05$) were noted for thirteen airway variables (Ad, Np (adenoids), Ad/Np, Op (tonsils), PM-U, SPT, NL/PM-U, PM-UPW, U-MPW, PASmin, V-LPW, AH-FH, AH-CV) between groups differentiated by gender and age, six (Np (adenoids), Ad/Np, Tn, Op (tonsils), PM-U, NL/PM-U) and four (Ad, Ad/Np, NP/PM-U, AH-CV) variables between groups of different antero-posterior and vertical skeletal patterns respectively, and one variable (AH-CV) between Chinese and non-Chinese children. The overall prevalence of lymphoid tissue hypertrophy based on the lateral cephalograms was 92.3% (based on $Ad/Np \geq 0.5$ and/or $Tn/Op \geq 0.5$).

Conclusion: Young, male, Chinese boys aged 7 to 8.99 years with Class I, Class II and high maxillomandibular plane angle had upper airway measurements that increased their risk for SDB. Greater mandibular retrusion and downward positioning were associated with adenotonsillar hypertrophy that restricted the pediatric upper airway.

Keywords: Cephalometry, Sleep-disordered breathing, Airway, Pediatric

Ethics: IRB approval

RESEARCH REPORT

No. AR10

A three-dimensional analysis of the initial stages of tooth formation

Presenter: Risa Anada

Instructor(s): Hiroshi Kamioka

Country: Japan

Department of Orthodontics, Okayama University Hospital

Objective: A multidimensional analysis of the initial stages of tooth mineralization can lead to the clarification of the factors initiating tooth formation, and the dynamic changes in the microstructures of the mineralized matrix (dentin, enamel) and cells. The aim of this study was to investigate the factors driving initial tooth formation and clarify the three-dimensional (3D) structure of dentin and odontoblasts at this stage.

Materials and Methods: To identify the initial mineralization site in mouse first molars, calcein was administered intraperitoneally to ICR pregnant mice, and the molars isolated from E18 embryos and new-born mice on postnatal day 0 to 1 (P0-P1) were observed using a fluorescence stereomicroscope. For analysis of the initial mineralization process, the isolated teeth were embedded in resin and observed by field-emission scanning electron microscope (FE-SEM) and scanning transmission electron microscope (STEM). For 3D analysis of the dentin and odontoblast microstructure, resin-embedded teeth were observed by focused ion beam scanning electron microscope (FIB-SEM), and Amira software was used for 3D reconstruction and analysis. (Animal Protocol: OKU-2020242).

Results: The initial mineralization of mouse first molar was identified at P0 at the buccal central cusp, and phospholipids were suggested to be the nucleation site for dentin formation. The 3D analysis revealed that odontoblasts have numerous cellular projections, and some reached the dentin-enamel junction. There was a high degree of mineralization around the odontoblast projections.

Conclusion: Phospholipids were suggested to initiate dentin formation. Odontoblasts exhibited numerous projections, which could be involved in peri-projectional mineralization.

Keywords: Tooth formation, Focused ion beam scanning electron microscope

Ethics: None, not required

RESEARCH REPORT

No. AR11

Evaluate the dental maturity and morphological characteristics of mandibular third molars in skeletal class III patients

Presenter: Tu Manh Nguyen

Instructor(s): Trang Thi Ho Thuy – Loc Minh Lu

Country: Vietnam

Department of Orthodontics, University of Medicine and Pharmacy, Ho Chi Minh City

Objective:

- Evaluate the maturity of mandibular third molars in skeletal Class III patients and compare results with Vietnamese standards.
- Investigate the relationship between tooth maturation and certain morphological characteristics of the third molar region.

Materials and Methods: This cross-sectional study included panoramic and lateral cephalometric radiographs of 234 skeletal Class III patients aged 7-24 (80 males, 154 females) at the Faculty of Odonto-Stomatology, University of Medicine and Pharmacy, Ho Chi Minh City. ANB values were ≤ 0° on lateral cephalograms to confirm Class III skeletal diagnosis. Panoramic radiographs were analyzed for the mandibular third molar's mineralization stage (Demirjian's system), retromolar space, and the beta angle between the third molar and the second molar.

Results:

- Mandibular third molars in skeletal Class III patients exhibit significantly different developmental patterns compared to the general population.
- There is a correlation between developmental progress and certain morphological characteristics in the mandibular third molar region.

Conclusion: The developmental trends and morphological characteristics of the mandibular third molar region can serve as diagnostic aids in skeletal Class III cases. These data also provide additional information for extraction decisions in orthodontic camouflage treatment for skeletal Class III malocclusion.

Ethics: IRB approval

RESEARCH REPORT

No. AR12

Sexual differences and the eruption timing of the permanent dentition in Hispanic adolescents compared to the Caucasian standards

Presenter: Nicole Kawakami

Instructor(s): Glenn Sameshima

Country: USA

Herman Ostrow School of Dentistry of USC Department of Orthodontics

Objective: The purpose of this study was to understand the impact of ethnicity and biologic sex in the eruption timing of permanent dentition as this aids the orthodontist to more effectively time treatment.

Materials and Methods: For this study, the dental records of Hispanic adolescents were compared to Caucasian standards in addition to evaluating for the presence of sexual dimorphism. 257 consecutive records were obtained from a university orthodontic program in Mexico City and 527 records were randomly selected within LA county using established criteria. The eruption of the posterior secondary dentition was recorded for subjects from 8 to 12 years of age and compared between Hispanic and Caucasian ethnicities and male and female sex.

Results: The findings of this study indicate that the permanent dentition studied (i.e. cuspids, bicuspids, and second molars) erupt significantly ($p < 0.05$) earlier in Hispanics than in Caucasians. Significant differences in eruption timing of males compared to females suggest, in general, permanent teeth erupt earlier in females.

Conclusion: In regards to effective diagnosis and treatment planning, patients of Hispanic ethnic background should be evaluated at an earlier age compared to patients of Caucasian ethnicity. Additionally, it was confirmed permanent teeth erupt earlier in females.

Keywords: Sexual dimorphism, Eruption timing, Hispanic, Caucasian

Ethics: IRB approval

RESEARCH REPORT

No. AR13

A study on delayed tooth eruption among patients at the Dental Central Hospital, Mongolian National University of Medical Sciences

Presenter: Budmaa Altangerel

Instructor(s): Od Bayarsaikhan

Country: Mongolia

Department of Orthodontics, School of Dentistry, Mongolian National University of Medical Sciences

Objective: The primary cause of delayed tooth eruption is insufficient space for the emerging tooth. Premature removal of primary teeth disrupts the natural sequence of permanent tooth eruption, allowing lateral teeth to occupy the vacant space and impeding the growth of permanent teeth. Additionally, reduced chewing activity adversely affects the development of both the lower and upper jaws. Although clinical cases of delayed tooth growth are relatively common, research on this issue is scarce. To study on delayed tooth eruption among patients in DCH, MNUMS.

Materials and Methods: The study was conducted using retrospective design. Panoramic dental X-rays and outpatient records of patients visited at DCH, MNUMS for delayed tooth eruption between 2022 and 2023 were utilized.

Results: Total 722 patients were included in the study, and 11.9% exhibited clinical symptoms of delayed tooth eruption. Of these, 36% were male and 64% were female, with no statistically significant difference between genders. Concerning tooth eruption delays, 90.7% involved delayed one tooth, 7% involved delayed two teeth, and 2.3% involved delayed three teeth. Additionally, 88.4% cases were in the upper arch, 10.4% were in the lower arch, and 1.2% cases were in both arches. Types of delayed eruption included 27.9% instances of delayed the molar eruption, 50% cases of delayed the canine eruption, 11.6% cases of delayed the premolar eruption, and 10.5% cases of mixed delayed eruption involving two or three teeth.

Conclusion: Early detection and diagnosis of delayed tooth eruption are crucial for preventing future complications and optimizing treatment outcomes.

Keywords: Delayed tooth eruption, Panoramic dental x-ray, Canines

Ethics: IRB approval

RESEARCH REPORT

No. AR14

An *in-vitro* comparison of thickness accuracy and wear resistance of three-dimensionally printed and conventional thermoplastic materials for clear orthodontic retainers

Presenter: Li Hanyi

Instructor(s): Song Yi Lin

Country: Singapore

National Dental Centre Singapore

Objective: Three-dimensional (3D) printing of clear retainers is of particular interest, as they have been shown to be accurate, fast, and comfortable to the patient. This study aimed to compare the in-vitro thickness accuracy and wear resistance of commercially available 3D printed and conventional thermoplastic materials for clear retainer fabrication.

Materials and Methods: Three thermoplastic materials, Copyplast C (polypropylene), Duran (polyethylene glycol terephthalate), and Essix C+ (polypropylene), and two 3D printed materials, Ortho Clear and Ortho Flex (acrylate-based resins), were tested. Sample sheets of a standard size were fabricated according to manufacturers' instructions. The thickness of each sample was measured using a micrometer screw gauge at 5 different points, and compared for accuracy and consistency. Each sample was then subjected to 1000 cycles of wear in a custom apparatus under 30 N of load with an alumina ball abrader while immersed in a water bath at 37.0 °C to simulate oral conditions. Wear depths were determined by surface profilometry.

Results: Thickness of samples was comparable across all materials. Some thinning of thermoformed samples was consistent with existing literature. The wear depth of Copyplast C was the smallest amongst all materials tested. Ortho Clear experienced greater wear depth than all thermoplastic materials, and is statistically significant when compared to Copyplast C. All Ortho Flex samples perforated during wear testing.

Conclusion: Clinically acceptable accuracy and consistency in thickness were observed in all materials. Under the controlled conditions of this study, 3D printed materials were less resistant to wear than conventional thermoplastic materials.

Keywords: Retainers, 3D printing, Digital orthodontics, Materials

Ethics: None, not required

RESEARCH REPORT

No. AR15

Roles of SETDB1 in epithelial cells during tooth development

Presenter: Yuri Takagiwa

Instructor(s): Keiji Moriyama

Country: Japan

Department of Maxillofacial Orthognathics, Tokyo Medical and Dental University (TMDU)

Objective: Histone modification, one of the epigenetic changes, plays critical roles in craniofacial development. Targeted deletion of histone methyltransferase, Setdb1, in neural crest-derived cells using Wnt1-Cre mice showed cleft palate and enlargement of Meckel's cartilage, which indicated that SETDB1 was crucial for craniofacial development. The aim of this study is to reveal the effects of SETDB1 on epithelial cells during tooth development.

Materials and Methods: Setdb1 was primarily deleted in epithelial-derived cells using K14-Cre mice (Setdb1 CKO mice). To confirm the expression pattern of SETDB1, immunofluorescence staining was performed at embryonic day 14.5 (E14.5). For histological analysis, mouse embryos were harvested after reaching E13.5. To assess tooth morphology, electron microscopy and micro-CT analysis were performed. The epithelial components of the tooth embryos were isolated from postnatal day 7 (P7) mice and examined using quantitative RT-PCR for the gene expression.

Results: SETDB1 was qualitatively absent in the tooth epithelium of Setdb1 CKO mice. Setdb1 CKO mice exhibited enamel hypoplasia and hypomineralization. Histological analysis displayed a slight delay in tooth development after E15.5, and abnormal ameloblast development at P7. Electron microscopic analysis revealed characteristic findings such as an uneven surface and the absence of enamel prisms. The expression of Msx2, Amelogenin, Ameloblastin, and Enamelin was significantly downregulated in the epithelial components of tooth germs in Setdb1 CKO mice.

Conclusion: These results revealed that epigenetic modifications in epithelial cells by Setdb1 deletion may induce enamel hypoplasia and hypomineralization. This might pave the way to a new understanding of the pathogenesis of amelogenesis imperfecta.

Keywords: SET domain bifurcated 1 (SETDB1), Epigenetic, Enamel, Amelogenesis imperfecta, Tooth development

Ethics: None, not required

RESEARCH REPORT

No. AR16

The Effect of Ethanol on Osteoblast and Osteoclast Expression in Rats During Orthodontic Tooth Movement: An Experimental Study

Presenter: Widjaja, Nadia Setiawati

Instructor(s): Pawinru, Ardiansyah S.

Country: Indonesia

Orthodontics Specialist Study Programme, Faculty of Dentistry, Hasanuddin University, Indonesia

Objective: Ethanol is the main component of alcoholic beverages, which are considered toxic for vital organs and affect bone and molecular signaling pathways to periodontium tissue homeostasis during orthodontic tooth movement and alveolar bone remodeling. This research aims to determine the effect of ethanol on osteoblast and osteoclast expression during the alveolar bone remodeling process in orthodontic tooth movement.

Materials and Methods: This laboratory experimental research involved 30 Wistar rats that applied closed coil springs in the maxilla to move incisive palatally. These rats were divided into two groups: group K1, which was subjected to orthodontic force only, and group K2, which was subjected to orthodontic force and ethanol. The experiment was conducted for the respective groups for 0, 3, and 14 days. Histological preparation of Hematoxylin-eosin (HE) was meticulously made and examined to calculate osteoblast and osteoclast expression.

Results: Mean osteoclast expression was significantly higher in group K2 (10 ± 1,58) than in group K1 (6 ± 1) on day 3; changes in osteoclast expression were analyzed using paired T-test with a significant difference of 0.001 ($p<0.05$) meanwhile mean osteoblast expression was significantly higher on group K2 (12,40 ± 1,82) than group K1 (9,20 ± 1,48) on day 14 with T- test analyzation showed significance difference of 0.016 ($p<0.05$).

Conclusion: This current study shows that ethanol significantly affects the expression of osteoclasts on day three and osteoblasts on day fourteen during 14 days of orthodontic tooth movement.

Keywords: Ethanol, Osteoblast, Osteoclast, Orthodontic Tooth Movement

Ethics: IRB approval

RESEARCH REPORT

No. AR17

Comparison of the Effect of Caffeine, Ethanol, and Combined Administering on Accelerated Orthodontic Tooth Movements in Rats: An Experimental Study

Presenter: Nur Raudhah Ihsaniyah Bialangi

Instructor(s): Pawinru, Ardiansyah S.

Country: Indonesia

Orthodontic Department, Hasanuddin University

Objective: Several studies have investigated the effects of various medications on orthodontic tooth movement (OTM). This study aimed to evaluate the effect of Caffeine, Ethanol, and their combined administration on Accelerating OTM in rats.

Materials and Methods: Fifteen male Wistar outbred Rattus novergicus rats were randomly divided into three groups. Nickel- titanium closed coil springs with a 50 g load were attached to their first molars and central incisors. The first group received 32 mg/kg of caffeine dissolved in 3.6 ml of water intraperitoneally for 21 days. The second group received 0.515 ml of ethanol intraperitoneally for 21 days. The third group received both 1 mg of caffeine and 0.515 ml of ethanol intraperitoneally for 21 days. After 21 days, all rats were euthanized with ketamine and xylazine, and their mandibles were collected and decapitated. The mean OTM distance was measured using a dental caliper.

Results: Ethanol administration significantly increased OTM distance compared to control rats, whereas caffeine and the combined caffeine-ethanol treatment did not show significant differences in OTM compared to controls.

Conclusion: Ethanol administration can significantly enhance OTM in rats, suggesting its potential role in influencing orthodontic treatments.

Keywords: Caffeine, Ethanol, OTM

Ethics: IRB approvald

RESEARCH REPORT

No. AR18

Synergistic Effect of Senolytics and Mechanical Loading on TMJ Cartilageretainers

Presenter: Jonjei Ku

Instructor(s): Po-Jung Chen

Country: USA

University of Nebraska Medical Center, Orthodontics Clinic

Objective: The project objective was to determine if intermittent mechanical loading augments the beneficial effects of intermittent senolytics on TMJ cartilage in old age. Our hypothesis was that concurrent administration of senolytics and mechanical loading will have a synergistic anabolic effect on the TMJ cartilage with aging.

Materials and Methods: Using 18 month-old C57B6 mice(10 male and 10 female mice per group) treated for 4 months with either 1) vehicle (60% Phosal 50PG, 30% PEG-400, 10% Ethanol); 2) senolytics combination (Dasatinib: 5mg/kg body weight + Quercetin: 50mg/kg/day); 3) intermittent mechanical loading using the spring applying 50cN of compressive force one hour daily for 5 consecutive days; 4) senolytics treatment with intermittent mechanical loading; 5) D+Q with botox injection(0.3U, volume of 30ul) on the left side of masseter. The condyle samples were harvested after 4 months of treatment and examined with multiple approaches, including micro-CT, histomorphometry, and immunostaining.

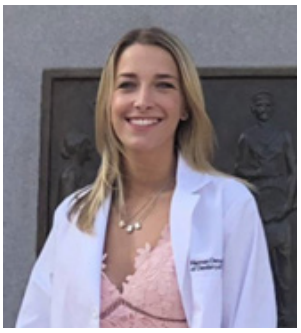
Results: Significant increased Tartrate Resistant Alkaline Phosphatase (TRAP) activity was in D+Q with botox injection group. In Safranin O/Fast Green and Toluidine Blue staining, both intermittent D+Q and mechanical loading group improved cartilage integrity and cartilage thickness. Concurrent administration of D+Q and mechanical loading increased cartilage thickness more than D+Q and mechanical loading alone. There was significant decreased bone volume fraction and increased cortical porosities(Ct.Po) in the D+Q with botox group.

Conclusion: Our results suggest that mechanical loading augments the beneficial effects of senolytics on the cartilage of TMJ in old age while unloading has negative effects on the MCC and subchondral bone of TMJ.

Keywords: TMJ, Cartilage, Senolytics, Aging

Ethics: None, not required

RESEARCH REPORT



No. AR19

Digital Atlas of Facial Growth in Macacca fascicularis Rhesus Monkeys as defined by lead acetate vital stains

Presenter: Abigail Heleba

Instructor(s): Stephen Yen

Country: United States of America

Orthodontics/Herman Ostrow School of Dentistry of USC

Objective: To digitize photomicrographs of osseous samples stained with lead acetate stains and group the digital data into an atlas organized by anatomic parts of the monkey skull.

Materials and Methods: Three rhesus monkeys (mixed dentition, age 8-10 in human years) were injected weekly with lead acetate for a total of four to five injections. The bone samples were fixed in 10% formalin and demineralized in 0,4% HCl with H2S gas. Coronal blocks of bone were embedded in gelatin and immersed in a gold chloride solution to reveal sharp lead sulfite lines. Bone blocks were frozen with liquid nitrogen and sectioned with a Zeiss table cryostat. Bone blocks were separated and sectioned according to the cranium, femur, mid-ramus, supraorbital ridges, nasal septum, and skull base. These slices were then photographed under a Zeiss light photomicroscope. To digitize, the images, each Ektachrome 100 slide was scanned using the Nikon COOLSCAN 5000 ED and organized into corresponding digital folders.

Results: Digitized scans were organized into digital folders corresponding to each bone block origin. Each region was described according to the location and gap distance between incremental lead sulfide lines.

Conclusion: The goal is to make this atlas accessible to researchers and clinicians interested in postnatal skull growth.

Keywords: Lead acetate staining, Facial growth, Postnatal skull growth, Bone

Ethics: IRB approval, Consent of patient photograph approval

RESEARCH REPORT

No. AR20

Predicting sum widths of unerupted canines and premolars: a machine learning approach and web-based application

Presenter: Thao Ngoc-Phuong Tran

Instructor(s): Trang Thi-Thuy Ho

Country: Vietnam

Department of Orthodontics, University of Medicine and Pharmacy, Ho Chi Minh City

Objective: This study aims to apply machine learning (ML) techniques to predict the sum widths of unerupted canines and premolars in the upper (U345) and lower (L345) arches, comparing these predictions with the commonly used Tanaka-Johnston method.

Materials and Methods: Three-dimensional dental casts from 80 male and 80 female subjects were analyzed using 3D Slicer 5.2.2 to measure mesiodistal widths from the central incisor to the first molar. ML techniques were implemented using Scikit-Learn 1.5.0, with LinearRegression serving as the primary predictive model. Data preprocessing and feature engineering were employed. The dataset was split into training and testing sets and underwent rigorous evaluation via cross-validation. The accuracy of LinearRegression was compared to the Tanaka-Johnston method using the coefficient of determination (R^2) on the same testing set. Additionally, a web-based application was developed to facilitate the use of the predictive model in clinical settings.

Results: Higher R^2 values indicate stronger model performance. Among males, LinearRegression achieved R^2 scores of 0.71 (U345) and 0.74 (L345), while the Tanaka-Johnston method produced negative R^2 for U345 and 0.33 for L345. For females, LinearRegression achieved R^2 values of 0.53 for U345 and 0.63 for L345, outperforming the Tanaka-Johnston method, which had R^2 values of 0.31 and 0.48, respectively.

Conclusion: These findings highlight ML's efficacy in tooth size prediction, surpassing the Tanaka-Johnston methods. Studies with larger datasets are needed to validate and refine these models. The web-based application enhances the practical utility of our findings, enabling clinicians to predict tooth size effectively in practice.

Keywords: Machine Learning, LinearRegression, Tooth Size Prediction

Ethics: IRB approval

RESEARCH REPORT

No. AR21

Classification of cervical vertebral maturation stages with machine learning models: leveraging datasets with high inter- and intra-observer agreement

Presenter: Pitipat Tunksook

Instructor(s): Supakit Peanchitlertkajorn

Country: Thailand

Department of Orthodontics, Faculty of Dentistry, Mahidol University, Bangkok, Thailand

Objective: This study aimed to assess the accuracy of machine learning (ML) models with feature selection technique in classifying cervical vertebral maturation stages (CVMS). Consensus-based datasets were used for models training and evaluation for their model generalization capabilities on unseen datasets.

Materials and Methods: Three clinicians independently rated CVMS on 1,380 lateral cephalograms, resulting in the creation of five datasets: two consensus-based datasets (Complete Agreement and Majority Voting), and three datasets based on a single rater's evaluations. Additionally, landmarks annotation of the second to fourth cervical vertebrae and patients' information underwent a feature selection process. These datasets were used to train various ML models and identify the top-performing model for each dataset. These models were subsequently tested on their generalization capabilities.

Results: Features that considered significant in the consensus-based datasets were consistent with a CVMS guideline. The Support Vector Machine (SVM) model on the Complete Agreement dataset achieved the highest accuracy (77.4%), followed by the Multi-Layer Perceptron (MLP) model on the Majority Voting dataset (69.6%). Models from individual ratings showed lower accuracies (60.4%-67.9%). The consensus-based training models also exhibited lower coefficient of variation (CV), indicating superior generalization capability compared to models from single raters.

Conclusion: ML models trained on consensus-based datasets for CVMS classification exhibited the highest accuracy, with significant features consistent with the original CVMS guidelines. These models also showed robust generalization capabilities, underscoring the importance of dataset quality.

Keywords: Cervical vertebral maturation stages, Machine learning, Artificial intelligence, Consensus-based model, Landmark annotation

Ethics: IRB approval

RESEARCH REPORT

No. AR22

Immersive 3-Dimensional Virtual Reality Use In Orthodontic Patient Education

Presenter: Yoo Jin Kim

Instructor(s): Glenn Sameshima

Country: USA

University of Southern California

Objective: Immersive 3-dimensional virtual reality to facilitate education in academic dentistry has gained increasing attention; nevertheless, there remains a dearth of research dedicated to its application in patient education. This study aimed to determine patient receptiveness to immersive 3-dimensional virtual reality as an educational tool and gathered feedback from patients regarding a virtual reality classroom that was developed.

Materials and Methods: 35-40 patients undergoing active orthodontic treatment, who have previously reviewed their malocclusion with 2-dimensional models during their treatment plan presentation, were chosen at random and given a chance to use the Oculus Quest VR headset to learn about their malocclusion in the immersive 3-dimensional virtual reality classroom. A survey was given to each patient at the end of the exercise, which was collected and analyzed to evaluate the patient's perception of utilizing the 3-dimensional virtual reality classroom to learn about their malocclusion.

Results: While majority of the patients had not previously experienced any form of immersive 3-dimensional virtual reality, patients appreciated the learning opportunities it provided to enhance their understanding of their malocclusion and treatment.

Conclusion: This study indicated that patients exhibit enthusiasm and interest in the potential applications of immersive 3-dimensional virtual reality to enhance their orthodontic educational experiences.

Keywords: Immersive virtual reality, Oculus Quest VR headset, 3-Dimensional

Ethics: IRB approval

RESEARCH REPORT

No. AR23

A pilot study: examining the accuracy and precision of virtual study model measurements within a virtual reality environment

Presenter: Darien Lam

Instructor(s): Glenn Sameshima, Glenn Jou

Country: USA

University of Southern California Advanced Orthodontics

Objective: 3D modeling on a computer screen has revolutionized workflow, and its use has increased greatly. Compared with conventional cast analysis, measurement of digital models on a computer screen has its own drawbacks. One of these drawbacks is the inability to manipulate study models in the operator's hands. Previous studies describe the possibility of the loss of haptic feedback as a factor in the difficulties of estimating distances using digital models when compared to actual models. A virtual reality environment grants the operator a more immersive experience whilst using digital models. This pilot study benefits those in an clinical or academic orthodontics setting who may be considering the application of VR into the workflow. This study evaluates the measurement capabilities of a virtual reality environment and its limitations compared with conventional cast analysis and digital model measurements on a computer screen.

Materials and Methods: 10 randomly selected dental casts & 10 extra-oral (ex-vivo) digital scans of respective casts via iTero Scanners were measured by 1-2 operators taught the protocol for measurements (conventional, digital software, and VR using Meta Quest 3) and perform measurements once.

Results: Variables of interest include crowding, overjet, intermolar distance, and curve of spee. Three-way ANOVA and post hoc testing used to analyze accuracy and precision of the results, and their significance.

Conclusion: This pilot study evaluated whether virtual reality measurements can provide accurate and precise enough measurements to warrant further studies and if modifications need to be made.

Keywords: Virtual Reality 3D models measurement

Ethics: None, not required

RESEARCH REPORT

No. AR24

The Relationship between Social Anxiety Status and Differences in Objective and Subjective Orthodontic Treatment Need Assessment in Indonesian Population

Presenter: Riyan Adiputra Lukardi

Instructor(s): Benny M. Soegiharto, Krisnawati

Country: Indonesia

Department of Orthodontics, Faculty of Dentistry, Universitas Indonesia

Objective: Orthodontic treatment need can be assessed subjectively and objectively. Subjective orthodontic treatment need, based on patients' perception, could be affected by psychological factors. Distorted perception will eventually affect patients' satisfaction toward the result of orthodontic treatment. Social anxiety disorder is one of psychological conditions causing distorted perception. Therefore, this research is going to evaluate the relationship between social anxiety status and differences in objective and subjective orthodontic treatment need assessment.

Materials and Methods: A cross-sectional study with 153 students (18-24 yo) using instruments: Liebowitz Social Anxiety Scale-Self Report (LSAS-SR), Oral Aesthetic Subjective Impact Scale (OASIS), Index of Orthodontic Treatment Need-Aesthetic Component (IOTN-AC), Dental Aesthetic Index (DAI). LSAS-SR score will define partisipants' social anxiety status (0-29: healthy group; 30-59: non-generalized social anxiety disorder/NGSAD; ≥60: generalized social anxiety disorder/GSAD). OASIS and IOTN-AC score will represent participants' subjective orthodontic treatment need. DAI score will represent participants' objective orthodontic treatment need.

Results: Percentage of subject with differences in objective and subjective orthodontic treatment need assessment is 24% in healthy group, 57,1 % in NGSAD group, 63% in GSAD group. 98% of the differences are overestimation with positive subjective orthodontic treatment need and negative objective orthodontic treatment need. Chi square's p-value is 0,002 (significant difference).

Conclusion: There is relationship between social anxiety status and differences in objective and subjective orthodontic treatment need assessment in Indonesian population. Most of differences are overestimation, hence psychological evaluation need to be integrated in orthodontic assessment when patients with no objective orthodontic treatment need come for orthodontic treatment.

Keywords: Social anxiety, Orthodontic treatment need, Perception

Ethics: IRB approval

RESEARCH REPORT

No. AR25

Facial Esthetics Assessment

Presenter: Alma Garay Romero
Instructor(s): Stephen Yen
Country: USA
University of Southern California

Objective: To assess perceptions of clinicians and laypersons when evaluating facial esthetics of cleft lip and palate patients with Class III malocclusions treated with LeFort I surgery or late maxillary protraction.

Materials and Methods: Randomized, standardized, deidentified pre- and post-treatment photograph sets were taken of 36 patients (18 corrected by orthognathic surgery and 18 by late maxillary protraction). The photograph sets were presented to 59 clinicians and 59 laypeople though a web-based survey. The subjects rated facial esthetics of the photographs on a 10-point scale (1 being less esthetic and 10 being more esthetic).

Results: The overall mean of clinicians and laypersons showed an improvement between pre- and post-treatment photographs. The mean esthetic values of clinician ratings increased in surgical cases and protraction cases. Laypeople's mean esthetic values increased in surgical cases and in protraction cases. Post-treatment, protraction cases had a higher rating than surgical cases. Overall, the average rating of laypeople was higher than that of the clinicians' average ratings.

Conclusion: Improvement of facial esthetics was perceived by both clinicians and laypeople after both surgery and protraction treatment for class III malocclusions of cleft lip and palate patients. When compared to clinicians, laypeople had higher ratings for pre-treatment and post-treatment photographs. Results post-treatment for both clinicians and laypeople were similar when comparing protraction vs surgery.

Keywords: Cleft lip/palate, Facial esthetics

Ethics: IRB approval, Consent of patient photograph approval

RESEARCH REPORT

No. TR01

Three-Dimensional Analysis of Surgical Outcomes and Stability in Skeletal Class II Malocclusion Patients with Diverse Vertical Facial Patterns Population

Presenter: Wasuthorn Poolsin[a]

Instructor(s): Ellen Wen-Ching Ko[a,b]

Country: Thailand

[a]Graduate Institute of Dental and Craniofacial Science, Chang Gung University, Taoyuan, Taiwan

[b]Department of Craniofacial Dentistry, Chang Gung Memorial Hospital, Taipei, Taiwan

Objective: This study compared surgical changes and postoperative stability in patients with skeletal Class II malocclusion having different vertical patterns after bimaxillary surgery.

Materials and Methods: This retrospective study recruited 52 adults diagnosed with skeletal Class II malocclusion treated with bimaxillary surgery; these adults were divided into two groups according to their vertical facial patterns, Frankfort-mandibular plane angle (FMA). Cone-beam computed tomography images were collected before surgery (T0), after surgery (T1), and after orthodontic treatment (T2). Reconstructed three-dimensional images were used for cephalometric measurements. The predictor variable was presurgical vertical facial patterns; divided into two groups, namely high-angle (HA) and low–medium-angle (LMA) groups.

Results: The HA and LMA groups contained 27 and 25 patients, respectively. From T0 to T1, the FMA decreased in the HA group but increased in the LMA group after surgery. The mandible advanced 9.02 and 6.21 mm in the HA and LMA groups, respectively. From T1 to T2, significant changes were observed in the anterior mandible horizontal movement of the HA group (−1.91 ± 3.63 mm, $P < 0.05$) compared with the LMA group (−0.57 ± 1.04 mm, $P > 0.05$). However, the horizontal clinically significant relapse rate was higher in the HA group (44%) than in the LMA group (20%).

Conclusion: The relapse patterns in the two groups were similarly upward and backward. However, the HA group exhibited greater average postoperative changes. The clinically significant relapse rate was higher in the HA group.

Keywords: Postoperative stability, Vertical facial pattern, Three-dimensional cephalometry, Skeletal Class II malocclusion, Orthognathic surgery

Ethics: IRB approval

RESEARCH REPORT

No. TR02

Comparative Accuracy and Stability of Two Surgical Approaches for Counterclockwise Mandibular Setback in High-Angle Class III Deformities

Presenter: Li-Li Lin[a,b,c]

Instructor(s): Yu-Fang Liao[b,c,d]

Country: Taiwan

[a]Department of Craniofacial Orthodontics, Chang Gung Memorial Hospital, Taipei, Taiwan

[b]Graduate Institute of Dental and Craniofacial science, Chang Gung University, Taoyuan, Taiwan

[c]Craniofacial Research Center, Chang Gung Memorial Hospital, Linkou, Taiwan

[d]Department of Craniofacial Orthodontics, Chang Gung Memorial Hospital, Taoyuan, Taiwan

Objective: This study aimed to compare the accuracy and stability of two approaches for counterclockwise mandibular setback in bimaxillary rotational surgery to correct high-angle Class III deformities.

Materials and Methods: Forty-two adult patients with high-angle Class III deformities who underwent surgery-first bimaxillary rotational surgery with counterclockwise mandibular setback were retrospectively analyzed. They were divided into two groups: posterior-up of the distal segment (PU group, n = 17) and posterior-down of the distal segment (PD group, n = 25). Surgical errors and postsurgical stability were assessed using cone-beam computed tomography at three points: pre-treatment (T0), one-week post-surgery (T1), and post-treatment (T2). Measurements included translation (left/right, posterior/anterior, superior/inferior) and rotation (yaw, roll, pitch). Treatment outcomes such as jaw protrusion and relation, incisor angle, and occlusion were also compared.

Results: At T0, both groups exhibited negative overbite and high angle, with the PD group showing greater mandibular protrusion and overbite. By T1, both groups demonstrated posterior and superior movement with counterclockwise pitch rotation of the mandible. Significant vertical errors were observed in both groups; the PU group had notable sagittal errors, while the PD group showed significant pitch errors. By T2, both groups displayed anterior mandibular movement, with continued superior movement in the PD group. Treatment outcomes were similar, except for the upper incisor angle.

Conclusion: Both PU and PD approaches for counterclockwise mandibular setback in bimaxillary rotational surgery are viable for correcting high-angle Class III deformities, despite notable surgical errors and postsurgical relapse.

Keywords: Accuracy, Bilateral sagittal split osteotomy, Class III malocclusion, Counterclockwise rotation, Stability

Ethics: IRB approval

RESEARCH REPORT

No. TR03

Comparison of Stability and Outcomes of Bimaxillary Surgery in Patients with Varying Severity of Craniofacial MicrosomiaPopulation

Presenter: Doan Thi Phuong Hong[a,b.c]

Instructor(s): Yun-Fang Chen[a,b,c], Yu-Fang Liao[a,b,d]

Country: Vietnam

[a]Graduate Institute of Dental and Craniofacial Science, Chang Gung University, Taoyuan, Taiwan

[b]Craniofacial Research Center, Chang Gung Memorial Hospital, Linkou, Taiwan

[c]Department of Craniofacial Orthodontics, Chang Gung Memorial Hospital, Taipei, Taiwan

[d]Department of Craniofacial Orthodontics, Chang Gung Memorial Hospital, Taoyuan, Taiwan

Objective: This study aimed to compare the stability and outcomes of bimaxillary surgery in patients with varying severities of craniofacial microsomia (CFM).

Materials and Methods: Thirty-seven adult CFM patients who underwent bimaxillary surgery were divided into mild (n = 23) and severe (n = 14) groups. Cone-beam computed tomography scans were performed pre-surgery (T0), 1-week post-surgery (T1), and post-orthodontic debonding (T2) to assess skeletal stability by analyzing the translation and rotation of the maxilla and mandible, as well as skeletal and dental outcomes.

Results: At T1, both groups exhibited forward movement, shifting, and rotation of the maxilla and mandible toward the non-affected side, with the mandible moving downward more in the severe group. In the mild group, the mandible also rotated counterclockwise in pitch. By T2, the maxilla showed minimal relapse, while the mandible had significant relapse, reversing some surgical changes. In the severe group, the mandible relapsed upward by 1.3 mm and counterclockwise by 2.4° in pitch; in the mild group, it relapsed clockwise by 1.7° in pitch. Menton deviation and occlusal cant significantly improved, but notable menton deviation persisted post-treatment, with no significant differences between groups (4.5 mm vs. 5.4 mm for mild and severe groups; $p > 0.05$).

Conclusion: Bimaxillary surgery with orthodontic treatment improved facial asymmetry in CFM patients. However, the severity of CFM influenced mandibular stability, particularly in vertical translation and pitch rotation. Despite similar treatment outcomes across severities, residual mandibular asymmetry remained above national norms.

Keywords: Craniofacial microsomia, Orthognathic surgery, Severity, Stability, 3D imaging

Ethics: IRB approval

RESEARCH REPORT

No. TR04

Impact of intentional tilt-out of proximal segment in bilateral sagittal split ramus osteotomy on facial asymmetry correction

Presenter: I-An Chen[a,b]

Instructor(s): Yu-Fang Liao[b,c,d]

Country: Taiwan

[a]Department of Craniofacial Orthodontics, Chang Gung Memorial Hospital, Taipei, Taiwan

[b]Graduate Institute of Dental and Craniofacial Science, Chang Gung University, Taoyuan, Taiwan

[c]Craniofacial Research Center, Chang Gung Memorial Hospital, Linkou, Taiwan

[d]Department of Craniofacial Orthodontics, Chang Gung Memorial Hospital, Taoyuan, Taiwan

Objective: This study aimed to evaluate the impact of intentional tilt-out of the non-deviated proximal segment during bilateral sagittal split ramus osteotomy (BSSO) on treating facial asymmetry with asymmetric frontal ramus inclination.

Materials and Methods: A retrospective analysis was conducted on 60 patients with skeletal Class III deformity and facial asymmetry who underwent LeFort I osteotomy and BSSO. Patients were divided into two groups: those with intentional tilt-out of the non-deviated proximal segment (Exp, n = 33) and a control group without it (Ctrl, n = 27). Surgical changes and post-surgical stability were assessed using cone-beam computed tomography at pre-treatment (T0), one-week post-surgery (T1), and post-treatment (T2). Measurements included translations (left/right, posterior/anterior, superior/inferior) and rotations (yaw, roll, pitch) of the proximal segments. Facial contour asymmetry outcomes were also compared, accounting for severity of initial asymmetry.

Results: By T1, both groups showed posterior and inferior movements with downward rotation of the bilateral proximal segments, and tilt-in of the deviated segments. The Exp group showed notable tilt-out, while the Ctrl group had significant tilt-in of the non-deviated segments. By T2, both groups exhibited superior movement with upward rotation of the bilateral proximal segments, with the Exp group showing tilt-in of the non-deviated segment. Overall, both groups improved in contour asymmetry, with the Exp group showing the most significant improvement in cases with severe initial asymmetry.

Conclusion: Intentional tilt-out of the non-deviated proximal segment in BSSO can significantly improve facial contour asymmetry, especially in cases with pronounced initial asymmetry.

Keywords: Facial contour asymmetry, Frontal ramus inclination, Intentional proximal segment rotation, Orthognathic surgery, Skeletal Class III

Ethics: IRB approval

RESEARCH REPORT

No. TR05

The anatomic limits in lower full-arch distalisation in different facial patterns under computed tomography

Presenter: Yin-Yu Chou

Instructor(s): Te-Ju Wu

Country: Taiwan

Department of Craniofacial Orthodontics, Kaohsiung Chang Gung Memorial Hospital, Taiwan

Objective: Mandibular full-arch distalisation is a popular approach particularly in non-extraction cases. However, we still cannot confirm would facial patterns affect the amount of limits. This study aimed to determine the anatomical limit of mandibular full-arch distalisation in patients with different facial patterns.

Materials and Methods: Using computed tomography, the shortest linear distances from the mandibular second molar to the inner cortex of the mandibular lingual surface and from the lower central incisor to the inner cortex of the lingual mandibular symphysis were measured in 60 samples (30 patients). The available distalisation space in both the retromolar area and mandibular symphysis was compared between groups with different facial patterns.

Results: The available space in symphysis is more critical than that in retromolar area: the shortest distances to the inner cortex of the lingual mandibular symphysis at root levels 8 mm apical to the cementoenamel junction (CEJ) of the incisor were 1.28, 1.60 and 3.48 mm in the high-, normal- and low-angle groups, respectively.

Conclusion: Facial patterns did affect the distalisation capacity, and the thickness of the lingual mandibular symphysis is the true anatomic limit encountered. It is suggested that practitioners should always pay attention to the possible impacts from facial pattern, especially in treatment of high- angle cases.

Keywords: Anatomic limit, Computed tomography, Lower full-arch distalisation, Facial pattern

Ethics: IRB approval

RESEARCH REPORT

No. TR06

Study of Influencing Factors and Outcomes of Orthodontic Treatments for Uprighting Impacted Mandibular Second Molars

Presenter: Po-Ju Chiu

Instructor(s): Hsin-Chung Cheng

Country: Taiwan

[a]Orthodontic Division of Dental department / Taipei Medical University Hospital

[b]School of Dentistry/ College of Oral Medicine / Taipei Medical University

Objective: To investigate the influencing factors and outcomes of orthodontic treatment for uprighting impacted mandibular second molars (MM2).

Materials and Methods: This study analyzes radiographic data collected from one hospital and three major clinics for patients who underwent treatment for MM2 impaction between 2009 and 2018. We created operational definitions based on vertical height and horizontal angulation for grouping purposes and devised a method for measuring periodontal bone attachment. By using of t-test and ANOVA to check the significant difference of treatment time and mechanism among the groups, as well as the changes in periodontal condition before and after treatment.

Results: The sample included 50 impacted MM2s from 31 patients (18 males, 13 females) with an average age of 16.58 ± 4.6 years. After treatment, the mean angle decreased from 47.8 degrees to 0.3 degrees, and the depth was restored to the occlusal plane. Changes in periodontal attachment improved from 78% to 94%, showing a significant difference ($p < 0.001$, paired t-test). Vertical groups showed significant differences in treatment mechanisms ($p = 0.001$, Fisher Exact test), as did horizontal angulation groups ($p = 0.008$, Fisher Exact test). There was no significant difference in treatment time between the vertical and horizontal angulation groups.

Conclusion: The depth of MM2 impaction is more significant than the angle, with various mechanisms achieving good results across different angles. Tilt depth and height do not impact uprighting time, while upright MM2 impaction effectively improves the periodontal condition of the first molar.

Keywords: Mandibular second molar impaction, Uprighting, Mechanism

Ethics: IRB approval

RESEARCH REPORT

No. TR07

Comparison of cone beam computed tomography (CBCT) and multi-slice computed tomography (MSCT) in the measurement of craniofacial soft and hard tissues

Presenter: Hung-Jen Wei

Instructor(s): Hsin-Fu Chang, Chen-Ming Lin, Jenny Zwei-Chieng Chang

Country: Taiwan

Division of Orthodontics and Dentofacial Orthopedics, Department of Dentistry, National Taiwan University Hospital

Objective: This study evaluated the accuracy and reliability of craniofacial measurements using cone-beam computed tomography (CBCT) and multi-slice computed tomography (MSCT), analyzed with Amira and Dolphin software, to address measurement discrepancies across different CT technologies in orthodontics.

Materials and Methods: Retrospective data from 2016 to 2021 at National Taiwan University Hospital included 20 adult subjects (10 CBCT and 10 MSCT). DICOM files were analyzed using Amira and Dolphin software. Intra- and inter-examiner reliability was assessed using the intraclass correlation coefficient (ICC), and measurement errors across scans and software were compared.

Results: Most variables demonstrated high ICC consistency (0.81-0.99). However, significant discrepancies were observed between CBCT and MSCT, particularly in soft tissue assessments. Dolphin exhibited greater measurement errors than Amira, with eight measurements exceeding one unit of measurement (millimeter or degree). Dolphin's errors on CBCT images were over three times those on MSCT images.

Conclusion: While both CBCT and MSCT are valuable for clinical evaluations, this study found significant measurement errors, particularly in airway volume assessments. Amira software is recommended for more reliable measurements in preoperative evaluations for orthodontic and maxillofacial surgery.

Keywords: Cone-beam computed tomography (CBCT), Multi-slice computed tomography (MSCT), Amira software, Dolphin software, Intraclass correlation coefficient

Ethics: IRB approval

RESEARCH REPORT

No. TR08

The Correlation between Craniofacial Structure and Collapse of Upper Airways in OSA Patients

Presenter: Po-Ting Chen[a]

Instructor(s): Yu-Chuan Tseng[a,b]

Country: Taiwan

[a]Department of Orthodontics, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

[b]School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

Objective: This study aimed to investigate the relationship between craniofacial skeletal anatomy, airway dimensions, and the severity of pharyngeal collapse observed during drug-induced sleep endoscopy (DISE) in Obstructive Sleep Apnea (OSA) patients. We hypothesized that skeletal deficiencies and a narrowed airway would correlate with increased airway collapsibility.

Materials and Methods: A retrospective study was conducted on OSA patients from August 1, 2018, to July 1, 2024. We analyzed measurements from cone-beam computed tomography (CBCT) and polysomnography (PSG). The Kruskal-Wallis test and Spearman's correlation were used to assess the relationship between DISE collapse severity and key craniofacial and airway measurements.

Results: Twenty eight patients were included in the study. At the tongue level, the vertical position of the hyoid bone varied significantly with the degree of collapse ($p = 0.006$), and a positive correlation was found ($\rho = 0.63$). Additionally, the minimum axial area of the retro-palatal region varied significantly with the degree of collapse ($p = 0.007$), and a negative correlation was found ($\rho = -0.41$). At the epiglottis level, significant differences were observed in mandible basal bone width ($p = 0.038$) and mandible width at the first molar position ($p = 0.031$), with a negative correlation between epiglottis collapse severity and both measurements ($\rho = -0.47$ and -0.51, respectively).

Conclusion: Our results indicate that a narrow airway, limited transverse mandible dimension, and hyoid descent are associated with increased airway collapsibility during sleep, highlighting the role of craniofacial structural deficiencies in the pathogenesis of airway obstruction.

Keywords: DISE, OSA, CBCT, Craniofacial structures

Ethics: IRB approval

RESEARCH REPORT

No. TR09

Impacted mandibular second molar detection using deep learning-based detection tool

Presenter: Samantha Mao

Instructor(s): Te-Ju Wu

Country: Taiwan

Kaohsiung Chang Gung Memorial Hospital

Objective: Failure to recognize impacted mandibular second molar (IMSM) due to its location in the mandible may cause delayed treatment, leading to malocclusion, caries, periodontal issues, root resorption or cystic change. Quantitative research on mandibular second molar impaction have been difficult due to the low occurrence rate. Recent progress of artificial intelligence (AI) has lighted up the possibilities to use AI as a tool to detect this relative rare but important issue in larger scale. Our aim is to investigate the concept using AI as the survey tool in the detection of mandibular second molar impaction from the perspective of public health.

Materials and Methods: The AI was trained to identify impacted mandibular second molar by 4049 panoramic radiographs which were taken between 2019 and 2021 from the Chang Gung research Database (CGRD). The tool was tested on 4026 panoramic radiographs taken between 2001 and 2019 at Kaohsiung Chang Gung Memorial Hospital from CGRD. A senior dentist examined the model's result.

Results: The current results revealed the ability to use AI as a tool for the prevalence study of mandibular second molar impaction. Our results revealed higher incidence rate in patients who came to our hospital for radiographic examinations compared to previous studies. Bilateral mandibular second molar impaction showed higher incidence rate than unilateral impaction.

Conclusion: The AI could be a reliable tool for the IMSM detection. With such a help, large scale research with similar interests on medical image identification could be performed in a more efficient way.

Keywords: Second molar impaction

Ethics: IRB approval

ABSTRACT

CLINICAL REPORT

No. AC01

Overcoming Thin Biotype: A Case Report of Bone Augmentation for Tooth Retraction

Presenter: Attapong Deedklin

Instructor(s): Poonsak Pisek

Country: Thailand

Division of Orthodontics, Department of Preventive Dentistry,
Faculty of Dentistry, Khon Kaen University, Thailand

Introduction: Tooth movement outside the alveolus, particularly the retraction of lower anterior teeth in patients with thin biotype, significantly increases tooth and periodontium complications, including root resorption, increased tooth sensitivity, reduced bone support, and gingival recession. Since bone remodeling allows tooth movement within the alveolus, bone augmentation can be an intervention to facilitate tooth movement within its proper alveolar housing.

Diagnosis: A 26-year-old Thai woman presented for orthodontic treatment again due to persistent protrusion of her upper and lower lips. The patient presented with Class I malocclusion and previous extraction of all first premolars. Additionally, she exhibited a skeletal Class I, hyperdivergent pattern with a thin gingival biotype and protrusive upper and lower lips.

Treatment Overview: First, a consultation with an oral-maxillofacial surgeon was held before starting orthodontic treatment to discuss bone augmentation on the lingual side of the lower incisors. Distalization of the upper and lower arches was achieved by using temporary anchorage devices (TADs). Before retracting the lower anterior teeth, bone augmentation was performed using synthetic bone grafts. The post-treatment results were excellent, with good occlusion, an acceptable facial profile, and the lower incisors remaining stable within the alveolar bone housing without complications. Moreover, the results remained stable five years after treatment.

Conclusion: Comprehensive diagnosis and treatment planning are crucial for patients with a thin biotype. Bone augmentation techniques prior to retraction can significantly reduce the risk of tooth and periodontal complications. This approach facilitates successful tooth movement within the proper alveolar housing, leading to long-term stability.

Keywords: Thin biotype, Anterior retraction, Bone grafts, Bone Augmentation

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. AC02

A Case Report of a Middle-aged Patient with Deepbite due to Pathological Tooth Movement

Presenter: Minseok Kim

Instructor(s): Minseok Kim, Sung-kwon Choi, Kyung-hwa Kang

Country: South Korea

Department of orthodontic, Wonkwang Dental Hospital

Introduction: Pathological tooth movement is reported in 55.8% of patients with moderate to severe chronic periodontitis, which leads to diastema and deep bite in anterior teeth, causing aesthetic and functional problems. Orthodontic treatment for patients with deepbite caused by periodontal problems should be planned considering the altered center of resistance to avoid stress on the periodontal tissues.

Diagnosis: A 54-year-old female patient presented with a chief complaint of midline diastema and exhibited a skeletal Class I relationship with a convex profile. Radiographic examination revealed four implants and generalized alveolar bone loss, particularly severe in the maxillary left anterior region. There were excessive overjet and overbite due to differing inclinations of the maxillary anterior teeth and extrusion of both maxillary and mandibular anterior teeth.

Treatment Overview: To avoid occlusal trauma during treatment, resin stops were placed on the maxillary premolars, and continuous periodontal management was provided. Using auxiliary wires and lever jig, the anterior teeth were intruded and inclinations were corrected with continuous and mild intrusive force. After 19 months of treatment, a normal overjet and overbite were achieved, along with an increase in the residual bone height. Vertical dimension was maintained, considering the presence and potential difficulty in maintaining implants.

Conclusion: In a patient with excessive overbite due to severe alveolar bone resorption and pathological tooth movement caused by periodontitis, stable occlusion and an increase in residual bone height were achieved by controlling the anterior teeth using auxiliary wires and lever jig.

Keywords: Periodontal disease, Pathological tooth movement, Deepbite, Axis control

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. AC03

Molar protraction in subjects with missing teeth-a case series

Presenter: Chang-Yu Ku

Instructor(s): Meng-Yun Tsai, Li-Fan Hsu, Jenny Zwei-Chieng Chang

Country: Taiwan

Division of Orthodontics and Dentofacial Orthopedics, Department of Dentistry, National Taiwan University Hospital

Introduction: Dealing with the protraction and mesial substitution of molars poses challenges for orthodontists. This case series outlines the approach to treat the missing teeth by using the substitution involving the molars.

Diagnosis:
Case 1 : Skeletal Class I with average MPA
Case 2 : Skeletal Class III with average MPA
Case 3 : Skeletal class I with high MPA

Treatment Overview: The first case was a male patient asking for treatment of his malaligned teeth. Two of his first molars were previously endodontic treated. Through the help of mini-screws, we successfully protract molars into extraction area.

The second case was a male patient with severely resorbed alveolar ridge at right maxillary second premolar site. He received interdisciplinary treatment including orthodontics and periodontology. Successful root movement of upper right first molar into the originally severely resorbed ridge without obvious root damage was done. This case demonstrated the feasibility of moving tooth and root into severe bony destruction site.

The third case was a female patient who suffered from missing tooth 36 and crown fracture of tooth 46.

To avoid dental implantation for reconstruction in her early twenties, we offered treatment plan including molar protraction and substitution. Eventually, good occlusion and esthetic profile was achieved.

Conclusion: In this series of cases, choosing to preserve teeth with structural integrity may lead to a longer treatment duration and increased technical difficulty compared to not closing the extraction space. However, it presents a practicable alternative that orthodontists and patients can take it into consideration.

Keywords: Molar protraction, Substitution, Missing teeth, Extraction

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. AC04

Non-surgical treatment of a class II malocclusion with facial asymmetry

Presenter: Hyun Ji Lee

Instructor(s): Kyung-Ho Kim

Country: Republic of Korea

Department of Orthodontics, Gangnam Severance Hospital, Yonsei University

Introduction: Facial asymmetry is caused by a combination of factors such as skeletal, functional, and soft tissue discrepancy, and a precise diagnosis of the etiology is important for the prognosis of orthodontic treatment. Nevertheless, the functional factor is often overlooked at the initial visit despite its importance in that the true asymmetry is disguised due to the interference. This case illustrates how the facial asymmetry was relieved by the correction of the CR-CO discrepancy in a skeletal Class II with a displaced condyle position.

Diagnosis: A 19-year-old female was referred from OMFS after a year of stabilization splint treatment. She presented skeletal Class II, hyperdivergent profile with a 10mm Menton deviation and lip protrusion. Also, she showed anterior openbite, a missing #26, and a fully erupted #28. Interference on the #28 caused functional shift to the right, and the anteriorly displaced left condyle position on the CBCT coincided with the direction of the CR-CO discrepancy.

Treatment Overview: To correct her anterior openbite and improve the hyperdivergent profile, maxillary molars were intruded using TADs, which resulted in mandibular autorotation. Subsequently, both arches were distalized to improve the protrusion. Special concern was given for the #28 control to relieve the CR-CO discrepancy. Stable occlusion and improved profile were achieved, along with a slight relief of the asymmetry and a more stable condyle position.

Conclusion: Meticulous detection of the CR-CO discrepancy and the condyle displacement at diagnosis led to a successful nonsurgical treatment outcome in a skeletal Class II malocclusion with facial asymmetry.

Keywords: Facial asymmetry, CR-CO discrepancy, Temporomandibular disorders, Vertical control, Openbite

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. AC05

Management of Class II Division 1 Subdivision Malocclusion with Severe Deep Bite using Myofunctional Appliance: A Case Report

Presenter: Nurul Fatimasari S

Instructor(s): Pawinru, Ardiansyah S.

Country: Indonesia

Orthodontic Department, Hasanuddin University

Introduction: Malocclusion is a condition that often occurs in children's teeth, both during the primary teeth, mixed dentition and permanent teeth. Interceptive orthodontic treatment effectively reduces the severity of class II malocclusion accompanied by bad habits in children.

Diagnosis: A 10-year-old girl complained of her upper front teeth, difficulty closing her mouth and a disturbing appearance. Convex profile, mesoprosopic, mesocephaly, asymmetrical face, hypotonic lips, incompetent lip relationship, class II division 1 subdivision, overbite 5 mm and overjet 11.5 mm. Cephalometric analysis showed class II skeletal relationships.

Treatment Overview: Interceptive orthodontic treatment in this case uses a myobrace appliance. Treatment begins with stage 1 Myobrace K1 (flexible appliance) to correct bad habits for ± 4-6 months. Then go to stage 2 Myobrace K2 for jaw development for ± 4-6 months and stage 3 Myobrace T3 for dental alignment and retention for ± 4-6 months. Patients also do nose breathing exercises, correct tongue resting positions, correct swallowing exercises and lip position exercises during treatment. After 17 months of treatment, an overjet of 4.5 mm and an overbite of 3 mm were obtained as well as class I molar and canine relations.

Conclusion: Interceptive orthodontic treatment with a myobrace appliance can be used to correct cases of class II division 1 subdivision malocclusion with a bad habit of mouth breathing. The final results of the treatment showed a class I molar and canine relationship and the patient was satisfied with the facial aesthetics achieved.

Keywords: Class II, Deep bite, Myofunctional appliance

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. AC06

Asymmetric mechanotherapy of class III malocclusion with unilateral crossbite

Presenter: Gema Paramesti Putri

Instructor(s): Maria Purbiat

Country: Indonesia

Orthodontics, Universitas Indonesia

Introduction: Patients with dentocraniofacial asymmetry in class III skeletal discrepancy is the most complex malocclusion to diagnose and treat because it affects not only the skeletal but the entire craniofacial complex.

Diagnosis: A male patient of 26 years and 3 months came to UI with a chief complaint of crowding teeth and feeling uncomfortable because the bite was not parallel between the upper and lower jaw so oral mucosa was bitten. Extraoral patient's showed facial type was dolicofacial, asymmetrical, and balanced with a concave facial profile (forward slanting interface). Intraoral examination showed a class II ½ unit on the right canine and a class III full unit on the left canine relationship. Class III full unit on the left molar and Class I on the right molar relationship. The patient's overjet of +2 mm and overbite of +1 mm (14,3%) with a deep curve of spee. Pre-treatment cephalometric analysis showed skeletal class III relationship (ANB: -1^{o}), with prognathic maxilla and mandible (SNA:86^{o}, SNB: 87^{o}). Patient has high proportion lower facial height (LAFH: 58%) with protrusion inclination of upper and normal lower incisors (UI-PP: 124^{o}, LI-MP: 91^{o}).

Treatment Overview: Patient was treated using active transpalatal arch for expansion, elastic, and extraction one tooth. Good result was achieved after 19 months of treatment.

Conclusion: Dentocraniofacial asymmetry cases with class III skeletal patterns and unilateral crossbite can be corrected with orthodontic camouflage using active TPA, asymmetric extraction, cross, box, class 2 & 3 elastic.

Keywords: Dentokraniofacial asymmetry, Class III, Crossbite

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. AC07

Severe class III malocclusion on adolescence patient: a combination of growth modification appliances and passive self-ligating system

Presenter: Sarramurti Satshidananda

Instructor(s): Benny M. Soegiharto

Country: Indonesia

Orthodontics, Universitas Indonesia

Introduction: Patients with severe class III skeletal discrepancy often need orthognathic surgery to correct their malocclusion. If diagnosed early, especially in their growing phases, patients may not need further treatment as growth modification can be done to lessen the severity of the discrepancies.

Diagnosis: 13 years old girl came with chief complaint of reverse bite, causing her to have difficulty upon biting. Extraoral examination shows concave profile with short lower face. Intraoral examination shows anterior crossbite (-5 mm) and deep overbite (7 mm). Patient has retained upper left deciduous canine. Right permanent canine relationship were ½ unit class III. Both molar relationships were in full unit class III. Pre-treatment cephalometric analysis shows severe skeletal class III relationship (ANB: -11^{o}), with prognathic mandible (SNB: 90^{o}). Patient has short lower facial height (MMPA: 18^{o}) with normal inclination of upper and lower incisors (UI-PP: 110^{o}, LI-MP: 86^{o}). According to Baccetti method, the patient is on CS4.

Treatment Overview: Patient were treated using growth modification approach using facemask and rapid palatal expander to protract the maxilla. Patient were instructed to use facemask every night for a minimum of 10 hours. Positive overjet was achieved after 14 months of treatment. Patient then underwent phase-2 treatment using passive self-ligating system with .022 slot to correct the alignment and settle the occlusion.

Conclusion: Prompt diagnosis and early correction of malocclusion of patient with skeletal discrepancies is beneficial to reduce the possibility of the need of surgical intervention.

Keywords: growth modification, class III, self-ligating

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. AC08

Orthodontic camouflage of skeletal class III malocclusion using removable maxillary expander and fixed mechanotherapy: a case report

Presenter: Mehreen Zakir

Instructor(s): Mohammad Muklesur Rahman, Layla Rahman Leena

Country: Bangladesh

Department of Orthodontics and Dentofacial Orthopedics, Dhaka Dental College and Hospital

Introduction: Skeletal class III malocclusion may be characterized either by a prognathic mandible, a retrusive maxilla or a combination of both. Treatment options may consist of surgical orthodontics or orthodontic camouflage utilizing growth modification, or fixed mechanotherapy. The treatment planning of Class III malocclusion relies on factors such as the patient's age and growth potential, the severity of jaw discrepancy, as well as pre-existing soft tissue features such as the facial profile, and chin prominence.

Diagnosis: A thirteen years old female patient was referred to the Department of Orthodontics at Dhaka Dental College and Hospital with the chief complaint of a forwardly positioned lower jaw. On extra-oral examination, a prognathic mandible was found contributing to a concave profile, and a prominent chin. Intra-oral features revealed Angle's Class III molar relationship, with presence of bilateral posterior cross-bite and a buccally erupting maxillary right permanent canine.

Treatment Overview: The case was treated by orthodontic camouflage in two stages. At first, a removable maxillary expander corrected the posterior cross-bite within two months. Afterwards, treatment with fixed mechanotherapy resolved the crowding, simultaneously bringing the buccally erupting canine in its normal position. Class III elastics were utilized for the correction of class III molar relationship. Treatment aims were achieved within a period of 20 months.

Conclusion: In this case, treatment utilizing both the maxillary expander and fixed orthodontics caused maxillary arch expansion. This lead to a timely correction of a skeletal class III malocclusion, which otherwise would have required surgery at a more advanced age.

Keywords: Class III malocclusion, Orthodontic camouflage, Removable maxillary expander, Fixed mechanotherapy

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. AC09

Surgery-First Orthognathic Approach in Treating Class III Malocclusion with Supraerupted and Non-Functional Upper Second Molars

Presenter: Duan Duoni

Instructor(s): Mimi Yow

Country: Singapore

Disciplines of Orthodontics and Paediatric Dentistry/ National University of Singapore

Introduction: A major challenge of surgery-first orthognathic approach (SFOA) is predicting final occlusion. Malocclusions that are unfavourable for SFOA include mandibular retrognathism with deep bite, asymmetric dentoalveolar compensation, and excessively extruded second molars.

This case report describes the treatment considerations and management of a patient with Class III skeletal deformity with supra-erupted, non-functional upper second molars using the SFOA.

Diagnosis: A 17-year 10-month-old Chinese female presented with a Class III incisor relationship on an average angle Class III skeletal base due to hypoplastic maxilla, prognathic mandible and mild mandibular asymmetry with chin point deviation to the left.

The malocclusion consisted of mild crowding in both arches, with anterior and posterior crossbites. Her upper second molars were supra-erupted and non-functional. Her lower dental midline was deviated to the left of her facial midline, coincident with the chin point. She had a concave profile, acute nasolabial angle and an average labio-mental fold.

Treatment Overview: Her treatment comprised combined orthognathic and orthodontic management, with a surgery-first orthognathic approach involving two jaws, non-extraction using upper and lower pre-adjusted edgewise appliances (0.022'' x 0.028'' slot) with Roth prescription.

Treatment duration was 11 months. Retention was provided with upper and lower vacuum formed retainers.

Conclusion: With the aid of virtual treatment planning and 3D printing technology, a Class III Skeletal malocclusion with supraerupted upper second molars that was successfully managed with SFOA without compromising the final outcome of the treatment.

Keywords: Orthognathic Surgery, Surgery-first orthognathic approach

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. AC10

Case Report of a Patient with Skeletal Class II Facial Trauma using Distraction Osteogenesis of Ankylosed Incisors and Orthognathic Surgery

Presenter: Eunho Kim

Instructor(s): Tae-Woo Kim

Country: South Korea

Department of Orthodontics / Seoul National University Dental Hospital

Introduction: Intruded teeth due to trauma may develop ankylosis and orthodontic or surgical treatment may be required. Distraction Osteogenesis of ankylosed teeth can solve vertical problems by moving alveolar bone segments. In this case, surgical orthodontic treatment including distraction osteogenesis was performed on a trauma patient, and good result was obtained.

Diagnosis: The patient was a 15-year-old female with intruded and ankylosed maxillary anterior teeth (#21,22) and mandibular condyle fracture due to trauma. She was diagnosed with skeletal Class II malocclusion and facial asymmetry. Distraction osteogenesis was necessary to correct open bite caused by the intrusion of the maxillary anterior teeth, and orthognathic surgery was planned to resolve retrognathism and facial asymmetry.

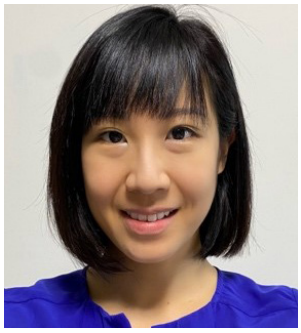
Treatment Overview: Preoperative orthodontic treatment was performed excluding ankylosed teeth, and subapical osteotomy for osteogenesis and orthognathic surgery were performed simultaneously. After surgery, the dentoalveolar segment including ankylosed incisors was pulled down, and post-operative orthodontic treatment was performed. A good occlusal relationship was achieved through orthodontic treatment, and esthetics were improved through prosthetic treatment. Through distraction osteogenesis, alveolar bone augmentation was achieved and natural emergence profile was secured by prosthetic treatment using natural teeth. In this case, relapse prevention is particularly important considering traumatic condyle fracture and distraction osteogenesis. Regular check-ups were conducted for two years for stable results, and no significant relapse have been observed to date.

Conclusion: Treatment of ankylosed teeth through distraction osteogenesis requires multidisciplinary approach, and patient cooperation and relapse must be considered. Nevertheless, if done successfully, aesthetic and functional results will be obtained.

Keywords: Trauma, Distraction Osteogenesis (DO), Orthognathic surgery, Ankylosis

Ethics: Consent of patient photograph approval

CLINICAL REPORT



No. AC11

Traumatised maxillary central incisor managed with extraction and orthodontic treatment

Presenter: Chloe Chan Xiao Wei

Instructor(s): Johanna Choo

Country: Singapore

National University of Singapore

Introduction: A 29-year 5-month old Chinese male presents with a missing #12 and a #21 with a complicated crown fracture.

Diagnosis: He has a Class II Division 1 incisor relationship on a Class II skeletal base due to a retrognathic mandible. He has a deep and traumatic overbite with an accentuated curve of Spee. He has moderate maxillary and severe mandibular crowding. Both upper and lower arches are omega-shaped. He has non-coincident midlines with his upper dental midline deviated 2.5 mm to the right, and his lower dental midline deviated 2 mm to the left of the facial midline.

Treatment Overview: His orthodontic treatment consisted of upper and lower pre-adjusted edgewise appliances (0.022 x 0.028") with Roth prescription, a Nance appliance with an anterior bite plane with extraction of #21, #35 and #45. Restorative treatment involved composite resin build ups of #11 and #22.

The treatment duration was 23.5 months. Retention is ongoing with upper (#12-#22) and lower (#33-#43) bonded retainers, upper Hawley with anterior bite plane and a lower soldered Hawley retainer.

Conclusion: A well-interdigitated occlusion with normal overjet and overbite was achieved. Good alignment with development of the upper and lower archforms was achieved with coincident upper and lower dental midlines. More palatal root torque of #13 and #23 would help to reduce canine eminence. Both #13 and #23 could have benefitted from more mesial root tip. The periodontal condition at #11 and #41 were maintained.

Keywords: Trauma, Multidisciplinary treatment, Orthodontic substitution

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. AC12

Strategic multi-disciplinary treatment in adult cleft lip and/or palate patients applying digital simulation of virtual alignment and smile

Presenter: Seungmin Ryu

Instructor(s): Jung-Yul Cha

Country: Republic of Korea

Department of Orthodontics, The institute of Craniofacial Deformity, Yonsei University College of Dentistry

Introduction: Cleft lip and/or palate is the most common congenital craniofacial anomaly, characterized by complex features such as maxillary constriction, congenital missing teeth, and the impact of scar tissue post-palatal surgery, necessitating extensive and long-term treatment. In this presentation, we report two cases of cleft lip and/or palate patients where accurate diagnosis of transverse discrepancies and strategic prosthetic restoration of missing teeth were achieved using digital simulation.

Diagnosis: Case 1 - Skeletal Class III with maxillary constriction with congenital missing of #12,15,22,25 with unilateral incomplete cleft lip and palate.

Case 2 - Skeletal Class I with maxillary constriction with congenital missing teeth of #11,21 with incomplete cleft palate

Treatment Overview: Case 1 - Through 3D simulations using initial digital model alignment and CBCT images, it was confirmed that resolving the transverse discrepancy was necessary, and canine substitution treatment plan of maxillary anterior teeth was established. After orthognathic surgery, the missing maxillary left second premolar was restored with an implant.

Case 2 - Using virtual treatment objectives, the necessary amount of transverse expansion in the posterior region was determined, and space distribution for prosthetics was planned to establish treatment goals. Accordingly, miniscrew-assisted rapid palatal expansion(MARPE) was performed, and the treatment was completed by restoring the maxillary four anterior teeth with a bridge.

Conclusion: In these two cases, utilizing individualized digital simulation methods in cleft lip and/or palate patients with severe skeletal and dento-alveolar discrepancy can enable predictable, aesthetic, and functional orthodontic treatment.

Keywords: Dentofacial deformity, Congenital missing teeth, Orthodontic treatment using digital technology

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. AC13

Multi-disiplinary Orthodontic Treatment in Cleft Lip and Palate Patient: A Case Report

Presenter: Dwayne D. F. Rehatta

Instructor(s): Ardiansyah S. Pawinru

Country: Indonesia

Orthodontic Department, Hasanuddin University, Indonesia

Introduction: Cleft lip and palate is one of the most common congenital abnormalities in the world and worsen as the individual grows older. They often require complex long-term of orthodontic treatment and collaboration with maxillofacial surgeons, endodontist, even prosthodontists to achieve a good facial esthetic, functional, and stable occlusion.

Diagnosis: A 19-years-old female patient came with complaint that her lower teeth were more forward than upper teeth. Previously, she had undergone surgery for cleft lip and palate. Clinically, there were cleft palate on midpalatal to anterior region, 11 missing, anterior crossbite and openbite, overjet -4mm, overbite -2mm, concave profile, and midline upper shift 5 mm and lower 1 mm, respectively to the right. Diagnosis was class III skeletal, class I type 1,3,5 dental malocclusion with retrognathic maxilla, cleft palate, openbite, and midline shift upper and lower.

Treatment Overview: Treatment includes inserting standard edgewise 0.022 brackets with SS 0.014 multiple loop wires with distal stops to leveling and aligning, as well as crossbite correction. Anterior box elastics were used to correct the openbite. Afterwards, palatoplasty and gnatoplasty were performed to close the fistula, followed by re-leveling and aligning, artistic positioning, and stabilization. Then, four units of zirconia bridge on upper anterior teeth were fabricated for prosthetic needs and prior endodontically performed. After 32 months of treatment, improved profile and dental midline, anterior cross bite and open bite were corrected, and patient was satisfied with the result.

Conclusion: Multi-disciplinary orthodontic treatment can provide acceptable results. Patients were satisfied with the outcomes.

Keywords: Cleft lip and palate, Edgewise, Orthodontic treatment

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. AC14

Facial esthetic driven consideration and treatment of dentoalveolar protrusion patients

Presenter: Hou-Kun Chen

Instructor(s): Yi-Jane Chen

Country: Taiwan

Division of Orthodontics and Dentofacial Orthopedics, Department of Dentistry, National Taiwan University Hospital

Introduction: Dentoalveolar protrusion, accompanied by excessive facial convexity and lip incompetence, is a common chief complaint among orthodontic patients. These malocclusion features not only impact the patient's facial aesthetics but can also potentially affect their social interactions. As orthodontists, we are accustomed to correcting malocclusions. However, for most orthodontic patients, the primary concern often revolves around improving their facial aesthetics.

In this report, we present two patients with severe perioral protrusion, both of whom expressed similar concerns. Premolar extraction was necessary to achieve improvements in occlusion and facial appearance. However, the treatment approaches for these two cases differed significantly.

Diagnosis:
Case 1: dental Class I malocclusion with dentoalveolar protrusion
Case 2: dental Class I malocclusion, skeletal Class II relationship with high MPA

Treatment Overview: In the first case, we utilized fixed orthodontic appliances in conjunction with temporary anchorage devices in both arches. In contrast, the second case necessitated a collaborative effort between the orthodontist and an oral surgeon. This was because the required amount of anterior teeth retraction exceeded the limits of tooth movement achievable through orthodontic treatment alone. Consequently, we opted for maxillary and mandibular anterior segmental osteotomy to correct the dentoalveolar protrusion.

Conclusion: The treatment for both patients resulted in successful outcomes. Both patients expressed satisfaction with the results. This case series displays diverse strategies for addressing dentoalveolar protrusion and excessive facial convexity.

Keywords: Dentoalveolar protrusion, Anterior segmental osteotomy, Macro- esthetics, Envelop of tooth movement, Temporary anchorage devices

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. AC15

Conventional orthodontic-surgical treatment approach for skeletal class III correction- A case report

Presenter: H. A. S. S Ranasinghe

Instructor(s): Sumith Loku Pathirage, Consultant Orthodontist

Country: Sri Lanka

Orthodontic unit, National hospital, Galle, Sri Lanka

Introduction: Skeletal class III malocclusion or mandibular prognathism is a dentofacial deformity which can have significant aesthetic, functional and psychosocial implications on affected individuals. Management of mandibular prognathism depends on factors such as age, severity and skeletal maturation. Combined surgical-orthodontic treatment is often necessary for correction of skeletal class III cases. This case report elaborates the management of a 20 year old male presented to our orthodontic unit complaining of forward placement of his lower jaw.

Diagnosis: A 20 year old male with class III malocclusion on severe class III skeletal base with facial asymmetry with increased vertical proportions in permanent dentition.

Treatment Overview: Following proper history taking and comprehensive clinical and radiological assessment, main problems of the malocclusion were identified and treatment goals were setup. Definitive treatment plan was made after discussion with surgical specialists. It was planned to perform treatment in three phases; presurgical orthodontic phase, surgical phase consists with lefort I maxillary advancement and bi lateral sagittal split mandibular setback and finally a short phase of post surgical orthodontics. Treatment was successfully completed within 22 months.

Conclusion: Combined orthodontic-surgical approach is an effective method for treating severe skeletal class III malocclusion in adults, with promising results. Presurgical orthodontic decompensation is very helpful in unmasking the actual discrepancy and allow maximum repositioning of the jaws, whereas the postsurgical orthodontic treatment facilitates normal occlusal rehabilitation by correcting any minor dental discrepancy. This leads to maximum esthetics, functionality and stability of the final occlusion.

Keywords: Skeletal class III, Mandibular prognathism, Conventional orthognathic surgery

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC01

Clear aligner treatment for a child with mandibular lateral incisor ectopic eruption: A case report

Presenter: Yun-Yu Kuo

Instructor(s): Hui-Ling Chen

Country: Taiwan

Department of orthodontics, Chang Gung Memorial Hospital, Linkou branch

Introduction: Ectopically erupting mandibular lateral incisors tend to become transposed with the adjacent teeth and thus seem to warrant early orthodontic intervention. This presentation aims to report the successful aligner treatment of a mandibular lateral incisor ectopic eruption done at a young female patient.

Diagnosis: Skeletal Class II jaw relationship. Dental Angle's Class I malocclusion with 42 ectopic eruption.

Treatment Overview: A 10-year-old female patient came with chief complaint of tooth 42 ectopic eruption. The intra-oral and X-ray examination revealed a Class-I molar relation, crowded anterior dentition, and 42 crown distally erupted at the position of 44 in contact with 85 while the root positioned at 43 lingual side. The upper incisors were upright with a 100% deep overbite. Treatment options included interceptive correction before 43 eruption, alignment without repositioning, and extraction or recontouring after 43 eruption. Treatment limitations due to difficulty in controlling root interference in dense cortical bone, root resorption, demanding biomechanics and prolonged treatment time were informed to them. The total treatment time was 1 year and 6 months with a satisfactory result of normalized overbite, overjet, and 42,43 both resulted in ideal positioning of the crowns and roots without transposition.

Conclusion: Ectopic eruption can be successfully treated by aligner mechanics upon contemplating several factors into account. Alignment in transposed position could affect the aesthetics as well as the equilibration during protrusive and lateral excursions. Each patient deserves an appropriate treatment to achieve rewarding results from aesthetic, functional and periodontal aspects.

Keywords: Transposition, Mandibular lateral incisor, Ectopic eruption, Aligner, Invisalign

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC02

Bilateral Impaction of Second Mandibular Molars with Orthokeratinized Odontogenic Cyst in a Bimaxillary Protrusion: A Case Report

Presenter: Heng-Yun Lin[a]

Instructor(s): Ting-Fen Chang[a], Szu-Ching Lee[a], Tzu-Ying Wu[a,b,*]

Country: Taiwan

[a]Division of Orthodontics, Department of Stomatology, Taipei Veterans General Hospital, Taipei, Taiwan

[b]College of Dentistry, National Yang Ming Chiao Tung University, Taipei, Taiwan

Introduction: Mandibular second molar (MM2) impaction is often associated with crowding and arch length deficiency, posing significant clinical challenges. Orthokeratinized odontogenic cysts (OOC), although rare, exhibit distinct histopathological features and less aggressive behavior compared to other cysts. This case report presents a unique instance of bilateral MM2 impaction with an OOC in a patient with bimaxillary protrusion, highlighting clinical management.

Diagnosis: An 18-year-old male presented with dental crowding and protrusive lips. Clinical examination showed a convex profile with limited incisal show. Cone-beam computed tomography revealed bilateral MM2 impaction combined a radiolucent unilocular lesion located in the left mandible, measuring 2.8 x 2.6 x 1.8 cm, suspected to be an odontogenic cyst. Histopathological examination confirmed the orthokeratinized odontogenic cyst.

Treatment Overview: Cyst enucleation and marsupialization with extraction of tooth 37 under general anesthesia were performed. A temporary anchorage device (TAD) was placed in the right ramus to assist forced eruption of tooth 47. Tooth 38 was aligned into arch to substitute tooth 37. Four bimaxillary premolars were extracted to facilitate anterior teeth retraction and profile improvement.

Conclusion: This case report highlights the successful treatment protocol on managing case with cyst and orthodontic need. Also, it emphasizes the challenges and skills during deep impacted molar management.

Keywords: Impaction, Cyst

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC03

Surgical and Orthodontic Approach for Skeletal Class III Malocclusion with Unilateral Maxillary Canine Impaction and History of Ameloblastoma

Presenter: Jing-Yi Lin

Instructor(s): Ellen Wen-Ching Ko

Country: Taiwan

[a]Department of Craniofacial Orthodontic, Chang Gung Memorial Hospital, Taoyuan, Taiwan

[b]Graduate institute of Craniofacial and Dental Science, Chang Gung University, Taoyuan, Taiwan

[c]Department of Craniofacial Orthodontic, Chang Gung Memorial Hospital, Taipei, Taiwan

Introduction: Ameloblastoma is benign odontogenic tumor; 91% locates in the mandible. The case report presented the treatment in a case skeletal Class III malocclusion with unilateral maxillary canine impaction and history of ameloblastoma.

Diagnosis: This 30-year-old male came for correction of facial asymmetry with prognathic mandible. He lost tooth 37 and 38 since ameloblastoma resection and allograft bone fill at lower left mandible in 2017. Tooth 23 impacted canine and anterior cross bite in a severe crowded dentition were noted. The treatment goal was to align dental arch and the impacted canine, improve facial profile and asymmetry.

Treatment Overview: The pre-surgical orthodontic treatment including tooth 14, 25, 44 extraction and leveling, tooth 23 space regain and traction, and lower left dentition distalization. However, the temporary anchorage device (TAD) in the lower left retromolar region failed. The surgical plan consisted of LeFort I 3-pieces clockwise, mandibular bilateral sagittal split differential setback and genioplasty. The occlusion set up was Class I molar relationship at right and full Class II molar relationship at left with coordinated dental midline. After post-operative orthodontic treatment, the patient had harmonized symmetrical facial appearance. Tooth 27 had occlusal contact with distal surface of tooth 36. The occlusion was stable in 6 months follow up after debond.

Conclusion: The treatment for ameloblastoma is aggressive resection of the affected area combined with simultaneous reconstruction. The reconstructed mandible could bear the osteotomy fixation but not TADs. Since the high recurrence of ameloblastoma, long-term observation is required.

Keywords: Ameloblastoma, Maxillary canine impaction, Skeletal Class III malocclusion, Orthognathic surgery

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC04

Interdisciplinary Management of Non-syndromic Multiple Supernumerary Impacted Teeth

Presenter: Juan-Wen Lin

Instructor(s): Ya-Ying Teng

Country: Taiwan

Department of Craniofacial Orthodontics, Chang Gung Memorial Hospital, Linkou branch

Introduction: Multiple supernumerary teeth are often associated with systemic syndromes such as Gardner syndrome, Fabry-Anderson syndrome, Ehlers-Danlos syndrome, or cleidocranial dysplasia. In contrast, non-syndromic multiple supernumerary teeth is a rare condition. This case report presents a non-syndromic case of bilateral multiple supernumerary impacted teeth in both the maxilla and mandible, managed through surgical extraction and orthodontic forced eruption.

Diagnosis: The 26-year-old female was a referral case and was diagnosed with Skeletal Class I malocclusion, anterior crowding, multiple impacted teeth, and over-retained deciduous teeth. Cone Beam Computed Tomography examination confirmed the presence of 5 over-retained deciduous teeth and 25 impacted teeth, 16 of which were supernumerary.

Treatment Overview: Our treatment plan involved the extraction of all over-retained deciduous teeth and the surgical removal of all supernumerary teeth, followed by the surgical exposure and orthodontic traction of the impacted bilateral upper canines, lower left canine and first premolar, and lower right second premolar. After 10 months of orthodontic traction, the upper canines and lower right second premolar were pulled into occlusion. A second surgical exposure was performed in the lower left area due to the deeply impacted canine. The double wire technique and miniscrew were then used to facilitate the tooth movement and angulation. Solid occlusion and good root parallelism was achieved after thirty-four months of treatment.

Conclusion: The case demonstrates the effectiveness of using CBCT for precise position detection. Successful results can be attained through interdisciplinary treatment and orthodontic traction using appropriate mechanics, even in cases with multiple supernumerary impacted teeth.

Keywords: non-syndromic, supernumerary teeth, multiple impacted teeth

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC05

Orthodontics Improves Gingival Recession

Presenter: Pei-Yu Wu[a,b]

Instructor(s): Yu-Chih Wang[a,b,c]

Country: Taiwan

[a]Graduate Institute of Dental and Craniofacial Science, Chang Gung University, Taoyuan, Taiwan

[b]Department of Craniofacial Orthodontics, Chang Gung Memorial Hospital, Taoyuan, Taiwan

[c]Craniofacial Research Center, Chang Gung Memorial Hospital, Linkou, Taiwan

Introduction: In adult patients with compromised periodontal support, meticulous orthodontic management is essential to prevent further deterioration and benefits subsequent periodontal surgery. This case report underscores the potential collaborative advantages of incorporating orthodontic treatment in managing adult patients with gingival recession.

Diagnosis: A 35-year-old female presented with a skeletal Class III malocclusion, characterized by a protrusive mandible, anterior crossbite, and missing teeth at positions 15, 36, and 46. Despite the absence of active periodontitis, reduced alveolar bone height and gingival recession was evident.

Treatment Overview: Following comprehensive periodontal therapy, a non-extraction orthodontic approach using fixed appliances was implemented as an alternative to surgical orthodontic intervention. To address the anterior crossbite, a sliding mechanism, in conjunction with interarch elastics, was utilized. The lingual root torque bend was incorporated to the lower arch wire to achieve lingual root displacement of the lower incisors. Segmental mechanics, incorporating a cantilever spring, were applied for anterior vertical control, molar uprighting and mesialization. A ligature wire was applied to anchor the tilted molar to the anterior unit, preventing distal crown tipping and promoting mesial root movement. After 30 months of treatment, all spaces were closed except for the lower left first molar. Notably, gingival recession improved, and the patient achieved favorable dental and facial aesthetics.

Conclusion: Controlled orthodontic forces in teeth with a healthy periodontium do not exacerbate periodontal deterioration. Integrating orthodontic treatment into periodontal care yields substantial synergistic advantages, enhancing functional and aesthetic outcomes, and optimizing conditions for further periodontal plastic surgery.

Keywords: Orthodontic tooth movement, Molar mesialization, Gingival recession, Periodontal support, Dental aesthetics

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC06

Digital virtual setups assist treatment planning for interdisciplinary treatment: two cases

Presenter: Hsin-Yu Wang

Instructor(s): Min-Chih Hung, Yi-Jen Liu, Jenny Zwei-Chieng Chang*

Country: Taiwan

Division of Orthodontics and Dentofacial Orthopedics, Department of Dentistry, National Taiwan University Hospital

Introduction: Two cases were treated using digital virtual setups before the commencement of orthodontic treatment, allowing for precise prediction of outcomes and smoother treatment processes.

Diagnosis:

Case 1: Class I malocclusion with high mandibular plane angle and multiple missing teeth

Case 2: Class II malocclusion with low mandibular plane angle and multiple missing teeth

Treatment Overview: Case 1: The patient, with an upper left posterior bridge prosthesis, chose to retain the bridge. Digital virtual setups confirmed its feasibility. Removal of upper anterior implant was recommended due to peri-implantitis and its interference with midline correction. To correct the upper midline while maintaining excellent posterior occlusion on the left without replacing the bridge prosthesis, one lower incisor was extracted and upper anterior prosthetic teeth were reduced in size to achieve a balanced Bolton's ratio. Miniscrews were placed in the upper right area for mesialization and in lower right to upright and intrude the second molar, resulting in a well-aligned dental arches with normal overjet and overbite.

Case 2: The patient sought relief from lower anterior crowding and reconstruction of left side occlusal function. A digital setup was used to plan the implant site at lower left first molar as anchorage before orthodontic treatment. Clear aligners relieved the lower anterior crowding and closed the space of lower left second premolar.

Conclusion: Digital virtual setups enhance treatment outcomes and assist in implant planning in complex interdisciplinary orthodontic cases.

Keywords: Digital virtual setup, Interdisciplinary

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC07

A case of interdisciplinary treatment involving both orthodontist and periodontist in treating malocclusions with PAOO application

Presenter: Chun-Han Su

Instructor(s): Huei-Mei Tsai, Yu-Ling Cheng

Country: Taiwan

Dr. Su's Orthodontics Clinic

Introduction: The patient was a 33-year-old male with concerns about his crooked anterior teeth and severe periodontal bony defects. After extraction of his upper left premolar, PAOO and bone grafting with DFDBA (demineralized freeze-dried bone allograft) were adapted at the upper left canine area where the extraction space closure had been detained.

Diagnosis: Angle's Class II malocclusion, normal mandibular plane angle with periodontitis.

Treatment Overview: Initial periodontal care was provided for 2 years first; which was followed by hopeless-teeth extraction and correction of tooth inclination and torque by using a preadjusted bracket and archwire system. PAOO plus DFDBA bone grafts were performed to address the problem of difficulty in space closure. The treatment resulted in achievement of stable occlusion with no space reopen and improved alveolar bone levels compared to pre-treatment periodontal records. The occlusion was found stable, ten years follow-up records showed satisfactory outcomes.

Conclusion: This case highlights the successful collaboration between orthodontists and periodontists in managing complex malocclusions and periodontal bony deficiency issues.

Keywords: PAOO with DFDBA bone grafting

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC08

Growth modification of Class II malocclusion case using Invisalign Mandibular Advancement: a case report

Presenter: Cheng-Feng Lee

Instructor(s): Hui-Lin Chen

Country: Taiwan

[a]Department of Craniofacial Orthodontics, Chang Gung Memorial Hospital, Linkou, Taiwan

[b]Graduate Institute of Dental and Craniofacial Science, Chang Gung University, Taoyuan, Taiwan

Introduction: Angle Class II malocclusions are common scenario in clinical practice. Traditionally, for young patients with Class II malocclusion and mandible retrognathism, we may use functional appliances like activators or twin blocks for growth modification. Treatment with Invisalign Mandibular advancement is a novel way for adolescence Class II cases.

Diagnosis: This 13-year-old male complained about flared front teeth with large overjet. He was diagnosed with a skeletal Class II jaw relationship with retrusive mandible. Intraorally, his teeth condition was an Angle class II malocclusion subdivision left with deep bite, proclined upper incisors, and anterior teeth crowding.

Treatment Overview: The treatment was treated with clear aligners by Invisalign and initiated with leveling and alignment. Pre-MA stage we expanded both arches and corrected the flared front teeth. After fifteen sets of aligners, we started mandibular advancement. After MA treatment, we achieved proper overbite and overjet. Ideal facial esthetic was achieved with consonant smile arc.

Conclusion: Invisalign Mandibular advancement can be a great treatment alternative for adolescence Class II growth modification. The Invisalign MA acts as functional appliances without adjunctive Class II elastics. Furthermore, with Invisalign MA, we can align the teeth even during the mandible advancement process, not like traditional functional appliance. However, it requires good patient compliance. If patients wear the aligners for enough time, it can achieve proper occlusion and advance the mandible while making oral hygiene easy.

Keywords: Class II growth modification, Invisalign, Invisalign MA, Clear aligner

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC09

Orthodontic-Orthognathic Retreatment of Mandibular Retrognathism Using a Surgery-First Approach

Presenter: Jui-Sheng Chang

Instructor(s): Yun-Fang Chen

Country: Taiwan

[a]Graduate Institute of Dental and Craniofacial Science, Taoyuan, Taiwan.

[b]Department of Craniofacial Orthodontics, Chang Gung Memorial Hospital, Taipei, Taiwan

Introduction: This 18-year-old female patient, who previously received full-mouth orthodontic treatment with 14 and 24 extractions, came seeking retreatment due to retrusive mandible and protrusive lips.

Diagnosis: The patient had a skeletal Class II jaw relationship with retrognathic mandible and hyperdivergent facial type. Dentally, she had an Angle's Class II malocclusion with excessive overjet and proclined lower incisors.

Treatment Overview: Prior to orthodontic retreatment, polysomnography was conducted due to narrow airway concerns, poor sleep quality, and snoring. The patient had normal apnea-hypopnea index and did not suffer from obstructive sleep apnea. She opted for orthognathic surgery as she was unsatisfied with her current facial appearance and wanted to improve her profile and chin projection. Surgery-first approach was planned for early correction of the profile. Bilateral sagittal split osteotomy advancement surgery combined with advancement genioplasty was performed. Occlusal setup during orthognathic surgery was in Angle's Class III relationship with anterior crossbite to attain skeletal Class I relationship. #34 and #44 were extracted during surgery, and postsurgically the spaces were used to retract proclined lower incisors and relieve lower crowding with the aid of two mandibular miniscrews. After 27 months of orthodontics, Class I canine and molar relationships were achieved and patient was satisfied with her facial profile.

Conclusion: Orthognathic surgery can be beneficial to retreatment cases of mandibular retrognathism with airway concerns, and using a surgery-first approach greatly improves patient's quality of life regarding facial esthetics in the early stage of treatment.

Keywords: Class II malocclusion, Mandibular retrognathism, Orthognathic surgery, Surgery-first approach, One-jaw surgery

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC10

Treatment Consideration of Unilateral Blocked Out Upper Canine with Severe Dental Midline Deviation

Presenter: Kah-Ying Yim

Instructor(s): Huei-Mei Tsai, Chia-Yi Pan, Yuen-Yung Tsang, Yi-Min Liu

Country: Taiwan

Dr. Su's Teamwork Orthodontic Center, Taipei, Taiwan

Introduction: 25-year-old female complained about protrusive lower jaw and malalignment of upper teeth. Her facial index was 92%, leptoprosopic. Orthognathic surgery was denied.

Diagnosis: Facial asymmetry was mild. Infraorbital depression, upturned nose and retrusive upper lip were noted. The lower lip was beyond the E-line. Mandibular length (Ar-B) longer than that of the maxilla (Ar-A) was known, while both close to norm; vertical growth of the upper jaw was deficient. Tooth 13 was labial positioned. Upper dental midline deviation was 2.5mm to right side referred to facial midline. Upper right molars were Class-II-ish and Class I molar on the left were seen. Tooth 18 was the only presented wisdom tooth.

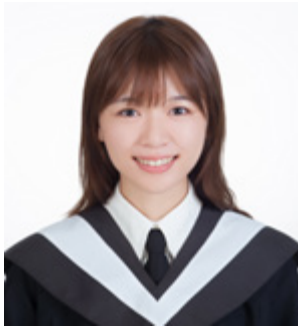
Treatment Overview: Wisdom tooth extraction was followed by using preadjusted fixed appliances. With the assist of IZC screws, tooth 17,16,15 and 14 were leveled consequently from posterior toward anterior, whereas dental midline correction was obtained by distalization of left-side teeth including teeth 12 and 11. Light force facilitating the eruption of tooth 13 into the arch was essential. Palatal root torque was also needed. After 33 months, tooth 13 was in Class I canine relationship and good gingival contour. The upper right first molar became super Class I. The profile was improved through clockwise rotation of the mandible by 1°.

Conclusion: Dental midline correction is crucial and premolar extraction in this case ought to be avoided. Instead, using bilateral TADs to prevent the side effects of long-distance tooth movement is highly suggested.

Keywords: Unilateral blocked out upper canine

Ethics: Consent of patient photograph approval

CLINICAL REPORT



No. TC11

Orthodontic Treatments of Bimaxillary Protrusion Patients among Different Skeletal Anteroposterior Classifications—A Case Series

Presenter: Yu-Chun Su

Instructor(s): Heng-Ming Chang

Country: Taiwan

Department of Orthodontics/ Chang Bing Show Chwan Memorial Hospital

Introduction: Bimaxillary protrusion, characterized by protrusive incisors and lips, can occur in Class I, II, and III skeletal patterns. Effective treatment depends on a comprehensive evaluation of facial dimensions from sagittal, vertical, and frontal perspectives. We introduce the Goal-Oriented Aesthetic Treatment (GOAT) system to analyze cases and guide treatment planning.

Diagnosis: This case series includes three patients with bimaxillary protrusion, each with different skeletal patterns. The first case involves a female with bimaxillary protrusion and a gummy smile on a skeletal Class I base. The second case features a convex profile and lip incompetency on a skeletal Class II base with a high mandibular plane angle. The third case presents bimaxillary protrusion on a skeletal Class III base with a relatively straight profile.

Treatment Overview: All three cases achieved favorable results and improved facial aesthetics following treatment. The GOAT system was applied to assess each case across three dimensions and establish targeted treatment goals. Key factors identified for success included maxillary incisor position, labiomental fold contour, and chin projection. Temporary anchorage devices (TADs) were utilized to help achieve treatment objectives.

Conclusion: Facial aesthetics is a primary concern for patients seeking orthodontic treatment, particularly in cases of bimaxillary protrusion. Our literature review identified crucial factors for achieving satisfactory aesthetic outcomes. These have been integrated into the GOAT system, emphasizing maxillary incisor positioning, labiomental fold contour, and chin projection morphology in the sagittal plane for achieving both pleasing facial aesthetics and stable occlusion.

Keywords: Bimaxillary protrusion, Skeletal malocclusion, Miniscrew

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC12

Treatment of Class II Division 2 Severe Deep Bite in Two Adults: Extraction or Not? TAD or Not?

Presenter: Cheng-Kai Huang[a]

Instructor(s): Chun-Liang Kuo,[a,b], Chun-Hsiu Yang[a],Yuan-I Wang[a], Jian-Hong Lin[a]

Country: Taiwan

[a]Department of Orthodontics, Chi Mei Medical Center, Tainan City, Taiwan

[b]Center for General Education, Southern Taiwan University of Science and Technology

Introduction: This presentation explores the orthodontic treatment of Class II Division 2 malocclusion using Tip-Edge brackets in two patients, focusing on differences in facial profile outcomes. Both patients had the typical deep overbite and retroclined front teeth associated with Class II Division 2 malocclusion. One patient had upper first premolars extracted, while the other was treated without extractions. Neither patient used temporary anchorage devices(TADs).

Diagnosis: The 34-year-old female(case 1) and the 22-year-old male(case 2) were both diagnosed as skeletal class II, normal mandibular plane angle; Angle's class II malocclusion with deep overbite(100%).

Treatment Overview: Both patients were treated with the Tip-Edge Plus bracket system. For Case 1, treatment was planned as a non-extraction case, while Case 2 involved extraction of upper first premolars on both sides. Initially, both patients were treated with Ni-Ti wire, followed by Australian wire with curve of Spee for bite opening. Case 2 also used an anterior bite plate to assist with bite opening. With the use of elastics, both cases achieved a normal overjet and overbite, and a Class I canine relationship. Notably, neither patient used TADs. Both patients expressed satisfaction with the final treatment outcomes.

Conclusion: This comparison highlights how Tip-Edge brackets can effectively manage Class II Division 2 malocclusion and influence facial profiles without the need for extra anchorage devices. The study emphasizes the importance of selecting the right treatment plan based on each patient's facial structure, demonstrating that both extraction and non-extraction approaches can achieve favorable results when tailored to the individual.

Keywords: Class II Division 2 malocclusion, Deep overbite, Tip-Edge Plus

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC13

Treatment of Class II Div. I malocclusion with severe deep overbite: A case report with 6 years follow up

Presenter: Mei-Hui Cheng

Instructor(s): Ming-Lun Hong, Ying-Hsin Lee, Yu-Lian Lin, Hsin-Yi Lo

Country: Taiwan

Division of Orthodontics, Veteran General Hospital, Taichung

Introduction: This case report describes the treatment of a 21 year-old female who had buccal crossbite in premolar area and severe deep overbite. Maxillary incisor protrusion and large overjet often result in lip incompetency and increased exposure of the anterior gingiva. A buccal crossbite affect the arches form and the masticatory efficiency. The periodontal tissue of the maxillary anterior teeth may be damaged due to gum impingement. The main issue to treat this case is to identify the final position of the maxillary incisors, as well as the anchorage preparation.

Diagnosis: Skeletal class II, dental class II div.I malocclusion with low MPA. Lip protrusion and incompetence, gummy smile.

Treatment Overview: The chief complaint of this patient were protruding upper front teeth and gummy smile. The treatment plan included maxillary first premolars extraction and placement of anterior TADs to intrude maxillary incisors in the beginning. Then, bonding mandibular teeth to correct skewed arch form and level the Spee curve. Efficient retraction of maxillary anterior teeth necessitates the bilateral IZC TADs. The total treatment time is about 3 years, a stable occlusion was present at 6-year follow-up.

Conclusion: Utilizing absolute anchorage can effectuate the correction of severe overbite, overjet, and the gummy smile. Not only the tooth intercuspation but also the arch coordination should be considered. Finally, a long term retention may avoid relapse.

Keywords: Gum impingement deep over bite, Gummy smile, Class II div. I malocclusion

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC14

Surgical-orthodontic treatment in skeletal Class III facial asymmetry with maxillary transverse deficiency patients–A case series

Presenter: Sung-Pu Yang

Instructor(s): Shih-Jaw Tsai, Ming-Yuan Tian, Yi-Jane Chen

Country: Taiwan

Division of Orthodontics and Dentofacial Orthopedics, Department of Dentistry, National Taiwan University Hospital

Introduction: Given the importance of facial aesthetics in modern society, patients with skeletal Class III malocclusion often consider surgical-orthodontic treatment to improve occlusal function and facial appearance. Nearly half of these patients exhibit maxillary skeletal retrusion, leading to transverse discrepancies between the maxilla and mandible. Identifying these issues is crucial for treatment success and long-term stability after treatment.

In this case series, we present two patients with skeletal Class III malocclusion and maxillary transverse deficiency. However, the treatment approaches differed between the cases.

Diagnosis: These two cases were both diagnosed as skeletal Class III malocclusion with maxilla deficiency, mandible prognathism, and deviation. Transverse maxillary width discrepancy was also noted.

Treatment Overview: In case 1, we utilized a MARPE to increase the maxillary arch width. Afterward, the double jaw surgery including the maxillary 1-piece Le Fort I osteotomy and the mandibular bilateral sagittal split osteotomy (BSSO) successfully improved the sagittal and transverse jaw-base discrepancy. In case 2, the maxilla was characterized by insufficient arch width and asymmetric arch form, possibly associated with canine impactions. Therefore, the 3-piece segmental Le Fort I osteotomy and the BSSO were the surgery options to correct skeletal deformity. After maxilla segmentation, the bony segments individually moved to establish the symmetry of the arch form. Thus, the chin deviation was amended by surgical movement of the mandible without genioplasty.

Conclusion: This case series illustrates treatment strategies based on correct diagnosis and appropriate treatment objectives. The treatment for both patients resulted in successful outcomes and high-level patient satisfaction.

Keywords: Skeletal Class III, Facial asymmetry, Maxillary transverse deficiency, Surgical-orthodontic approach

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC15

AI-Assisted MARPE Guide

Presenter: Yu-Chiang Chen

Instructor(s): Tzu-Ying Wu, Szu-Ching Lee, Yu-Ming Liang, Ting-Feng Chang

Country: Taiwan

[a]Orthodontic section, Department of Stomatology, Taipei Veterans General Hospital, Taipei, Taiwan

[b]National Yang Ming Chiao Tung University, Taipei, Taiwan

Introduction: Microimplant-assisted rapid palatal expanders (MARPE) were introduced as an effective device for correcting transverse deficiencies, particularly in adult cases involving skeletal maturity. Preoperative preparation for MARPE often takes a significant amount of time and cannot precisely target the ideal location. Our goal is to design a MARPE guide that can simultaneously reduce clinical chair time and improve accuracy.

Diagnosis: A 21-year-old male with a chief complaint of posterior crossbite and mandibular prognathism. Clinical data showed a concave profile, skeletal class III, bilateral posterior crossbite with a Yonsei index of -4.4 mm, and a class III molar relationship with the lower dental midline shifted 1 mm to the right side.

Treatment Overview: The total treatment time was 20 months. MARPE was used to improve posterior crossbite and crowding. Class III correction was achieved using class III elastics and vertical facial height increment.

Conclusion: Precision placement of the MARPE is one of the keys to achieve successful skeletal expansion. The following factors should be considered: bicortical engagement, the resistance of the zygomatic buttresses, the bone quality, the morphology of the midpalatal suture, and nasal septum, and the palatal vault contour, expansion protocol. Therefore, pretreatment evaluation and monitoring during expansion are essential for the success of MARPE treatment.

Keywords: MARPE, AI, CAD, Guide

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC16

Class III treatment by combining orthognathic surgery (OGS) and maxillary skeletal expander (MSE)

Presenter: Yi-Tai Ho

Instructor(s): Heng-Ming Chang[a], Ching-Yi Tsai[a], Po-Yu Yang[a,b], Chia-Tze Kao[a,b]

Country: Taiwan

[a]Orthodontic Department, Chung Shan Medical University Hospital, Taichung, Taiwan

[b]School of Dentistry, College of Oral Medicine, Chung Shan Medical University, Taichung, Taiwan

Introduction: Common findings of Class III malocclusion are retrognathic and narrow maxilla, prognathic and wider mandible, and often a combination of both.The purpose of this case report is to show the effective treatment approach in the orthognathic surgery (OGS) patient with narrow maxilla problem resolved by using maxillary skeletal expander (MSE).

Diagnosis: A 19-year-old female, came for orthodontic evaluation with chief compliant of anterior crossbite. The patient was diagnosed as skeletal Class III facial pattern, Angle's Class III molar relationship with prognathic jaw, anterior crossbite (overjet = -1mm), and narrow maxillary arch form with upper lateral incisors palatally displaced.

Treatment Overview: The treatment goal was to correct the prognathic mandible and the transverse maxillary deficiency. The patient only accepted one jaw surgery on mandible; therefore, MSE was placed to resolve discrepancy between maxilla and mandible. Treatment plan was decided to extract right maxillary 1st premolar, and left maxillary lateral incisor. After orthodontic decompensation, OGS with mandible bilateral vertical ramus osteotomy was done to setback the mandible. Finally, the result showed anterior crossbite was corrected, and the patient was satisfied with the pleasing facial profile.

Conclusion: There are two common types of orthognathic surgery to correct skeletal Class III malocclusions: one-jaw orthognathic surgery, and two-jaw orthognathic surgery. With the aid of MSE, skeletal class III patients with maxillary transverse problems have an additional treatment option, which is less invasive and requires a lower cost than the two-jaw orthognathic surgery.

Keywords: Class III Maloclussion, MSE, One-jaw OGS

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC17

Surgical-orthodontic approach with double-jaw surgery of skeletal Class III malocclusion: A case report

Presenter: Yen-Min Huang

Instructor(s): Yu-Chuan Tseng

Country: Taiwan

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

Introduction: Skeletal Class III jaw relation has a higher incidence in Asians, compared with Europeans or Americans. The interdisciplinary treatment of orthodontic treatment combined with orthognathic surgery maybe needed. The most commonly performed surgeries are intraoral vertical ramus osteotomy (IVRO) and sagittal split ramus osteotomy (SSRO) over the mandible and Le Fort I osteotomy over the maxilla. This report describes a case of a 29-year-old female having skeletal and dental Class III malocclusion with anterior crossbite. She is treated by orthodontic treatment combined with two-jaw orthognathic surgery.

Diagnosis: Skeletal Class III jaw relation and Angle's Class III malocclusion with anterior crossbite.

Treatment Overview: A 29-year-old female patient with chief complaint of concave facial profile and mandibular prognathism seeked for orthodontic treatment. In the presugical phase, dental decompensation was done. Tooth 24 was extracted for midline correction due to her early missing tooth 13. Maxilla advancement via Le Fort I osteotomy and mandibular setback via IVRO were performed in the surgical phase. Finishing and detailing of the occlusion are still ongoing in the postsurgical phase.A harmonious facial profile and molar Class I relationship with positive overbite and overjet were achieved. The treatment time was 2 years and 2 months up to now.

Conclusion: A significant improvement of facial aesthetics and oral function in patients with skeletal Class III jaw relation can be achieved by orthodontic-surgical treatment. Precise analysis before the treatment is important and the post-surgery relapse should be concerned by orthodontists and surgeons.

Keywords: Skeletal Class III, Anterior crossbite, Orthodontics, Orthognathic surgery

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC18

Asymmetric mandible correction with orthodontic treatment combine orthognathic surgery via bilateral intraoral vertical ramus split osteotomy, a case report

Presenter: Shan-Wei Chang

Instructor(s): Ying, Hsu[a], Han-Jen Hsu[c], Szu-Ting Chou[a,b,*]

Country: Taiwan

[a]Department of Orthodontics, Kaohsiung Medical University Chung-Ho Memorial Hospital, Kaohsiung city, Taiwan

[b]School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung city, Taiwan

[c]Department of Oral and maxillofacial surgery, Kaohsiung Medical University Chung-Ho Memorial Hospital, Kaohsiung City, Taiwan

Introduction: Facial asymmetry is important for facial aesthetics. According to Haraguchi et al, skeletal chin deviation larger than 4 millimeters would be considered noticeable. Treatment with severe asymmetry would need the aid of orthognathic surgery. In this case, we combined orthodontic treatment with bilateral intraoral vertical ramus split osteotomy to correct skeletal class III jaw relation and asymmetry.

Diagnosis:
- Skeletal Class III jaw relationship with normodivergent facial pattern
- Facial asymmetry with mandible shift to right side
- Angle's Class III malocclusion with anterior crossbite
- Concave facial profile

Treatment Overview: This 22 y/o female patient came to our outpatient department with chief complaint of prominent and deviated lower jaw. According to the diagnosis, the treatment plan, orthodontic treatment combined with one-jaw surgery, has been chosen by the patient after discussion. Presurgical orthodontic treatment was conducted for decompensation, leveling, and alignment for about five months. After presurgical preparation was done, bilateral intraoral vertical ramus osteotomy was performed. After the outcome of surgery was stable, the post-surgical orthodontic treatment was started. For four years and a month, Class I molar relationship, coincident midline, harmonious profile and stable occlusion was established.

Conclusion: Intraoral vertical ramus split osteotomy (IVRO) is suitable techniques to correct severe asymmetry. When it is compared with bilateral sagittal split osteotomy (BSSO), IVRO may produce less gap between proximal segment and distal segment than BSSO. In this case, we used orthodontic treatment with orthognathic surgery to correct facial asymmetry. Treatment outcome is corresponding with proper diagnosis and such treatment plan.

Keywords: Skeletal class III, Asymmetry, IVRO

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC19

Long-Term Management of Tessier No. 4 Craniofacial Cleft: An Interdisciplinary Approach for Optimal Outcomes

Presenter: Yuan Lee[a,b]

Instructor(s): Yuh-Jia Hsieh[c,d], Yu-Fang Liao[b,c,d]

Country: Taiwan

[a]Department of Craniofacial Orthodontics, Chang Gung Memorial Hospital, Taipei, Taiwan

[b]Graduate Institute of Dental and Craniofacial Science, Chang Gung University, Taoyuan, Taiwan

[c]Craniofacial Research Center, Chang Gung Memorial Hospital, Linkou, Taiwan

[d]Department of Craniofacial Orthodontics, Chang Gung Memorial Hospital, Taoyuan, Taiwan

Introduction: Tessier cleft number 4 is a rare congenital craniofacial malformation involving defects in the skin, muscle, and bone. Effective management requires a multidisciplinary approach with staged surgical and orthodontic interventions.

Diagnosis: We present the case of an 18-year-old male with right Tessier cleft number 4 and secondary facial cleft deformity. Clinical and radiographic evaluations revealed a concave profile, skeletal Class I relationship, marked facial asymmetry with orbital dystopia, a retrusive right midface, and severe occlusal cant and commissural cant exceeding 10 mm but no mandibular border cant. Additional findings included a hypoplastic right zygoma and maxilla, missing teeth (13, 15, 22), a retained tooth 55, dental midline discrepancy, anterior and right posterior crossbite, and severe upper arch crowding.

Treatment Overview: The patient underwent multiple early surgical interventions: facial cleft repair (at 5 months), palatal cleft repair (at 10 months), right Le Fort III and vertical plus left Le Fort I distraction osteogenesis (at 8 years), and right eyelid reconstruction (at 9 and 10 years). Following skeletal maturity, a surgery-first orthognathic approach was employed, including Le Fort I osteotomy rotation, bilateral sagittal split osteotomy setback and rotation, right maxillary and zygoma bone grafting, genioplasty, and right mandibular border contouring. A 2.5-year orthodontic treatment improved facial symmetry, profile, and functional occlusion, resulting in high patient satisfaction.

Conclusion: Surgery-first orthognathic surgery, combined with computer-assisted planning, provides an effective strategy for managing complex craniofacial deformities. This approach ensures precise craniofacial orientation, optimal outcomes, and high patient satisfaction through a customized and interdisciplinary plan.

Keywords: Facial asymmetry, Interdisciplinary approach, Orthognathic surgery, Surgery-first, Tessier cleft number 4

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC20

Orthodontic camouflage as an alternative treatment for adult class III malocclusions–a case series

Presenter: Douglas Hsiao

Instructor(s): Li-Fan Hsu, Zwei-Chieng Chang, Chung-Chen Jane Yao

Country: Taiwan

[a]Division of Orthodontics and Dentofacial Orthopedics, Department of Dentistry, National Taiwan University Hospital

[b]Graduate Institute of Clinical Dentistry, School of Dentistry, College of Medicine, National Taiwan University

Introduction: Skeletal Class III malocclusion presents a challenging treatment, particularly in non-growing patients, often requiring orthognathic surgery. However, we will discuss three cases treated successfully with camouflage methods while maintaining acceptable facial aesthetics.

Diagnosis: Three cases were selected to illustrate different approaches to Class III camouflage treatment, all involving patients with both skeletal and dental Class III relationships.

Treatment Overview: The first case involved addressing functional and aesthetic concerns through the extraction of specific teeth (15, 25, 71, 81, 34, 44) and using posterior bite turbos and Class III elastics to correct the anterior-posterior discrepancy and increase the mandibular plane angle.

In the second case, a maxillary skeletal expander corrected a bilateral palatal crossbite and transverse discrepancy, resulting in a mini-orthognathic effect on the maxilla.

The third case, involving a patient with a high mandibular plane angle, was treated non-extraction. Lower right and lower TADs were used to retract the lower dentition, achieving a Class I canine and molar relationship.

Conclusion: For Class III camouflage treatment, the strategy typically involves proclining the maxillary incisors and retroclining the lower incisors. Ideally, orthognathic surgery should be performed to optimize the facial profile. However, it is essential to carefully assess the facial profile with a non-surgical approach and have a thorough discussion with the patient. The comprehensive evaluations include the severity of anteroposterior discrepancy, CO-CR discrepancy, the thickness of the mandibular symphysis, and the inclination of the upper and lower incisors, which are all keys to the success of this treatment.

Keywords: Orthodontic camouflage, Skeletal class III malocclusion, Class III elastics, Temporary anchorage device

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC21

Mandibular Backward Rotation (MBR) Technique: An Innovative Approach for Class III Malocclusion Camouflage Treatment–A Case Series

Presenter: Yao Chen

Instructor(s): Heng-Ming Chang

Country: Taiwan

Department of orthodontics, Chang Bing Show Chwan Memorial Hospital

Introduction: This case series explores the application of mandibular backward rotation (MBR) in the treatment of Class III malocclusion, particularly in non-growing patients with a hypodivergent facial pattern, reduced lower anterior facial height, and deep overbite. Backward mandibular rotation can effectively camouflage anteroposterior discrepancies and improve facial esthetics in these cases.

Diagnosis: Four female patients, aged 15 to 26 years, presented to our department for orthodontic consultation. All exhibited a Class III skeletal pattern with chin prominence. Intraoral examinations revealed proclined upper incisors and a bilateral Class III molar relationship. Two patients also exhibited maxillo-mandibular transverse discrepancies and anterior crossbite.

Treatment Overview: For the two patients without transverse discrepancies, treatment began with fixed appliance therapy for initial leveling and alignment. The other two patients underwent micro-implant-assisted rapid palatal expansion (MARPE) followed by fixed appliance treatment three months later. All patients received temporary anchorage devices (TADs) in the lower arch for whole-arch distalization. Once a positive overjet was achieved, Class II elastics were used to rotate the occlusal plane backward, promoting mandibular backward rotation.

Conclusion: At the conclusion of treatment, all patients achieved a well-aligned dentition and an improved facial profile. This case series demonstrates that MBR is a viable treatment option for borderline Class III patients with either hypo- or hyperdivergent facial patterns. The technique, when applied with careful case selection and thorough examination, offers a stable and effective solution for camouflage orthodontic treatment in Class III malocclusion.

Keywords: Mandible backward rotation, Class III malocclusion, Orthodontic camouflage

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC22

Unlock the Ultimate Smile: Art of Occlusal Plane Rotation in Class III Open Bite Cases

Presenter: Meng-Rong Li

Instructor(s): Meng-Rong Li, Ke-Chun Liu, Hsuan-Yi Hsiao, Shu-Mei Kang, Chung-Chen Jane Yao

Country: Taiwan

Division of Orthodontics and Dentofacial Orthopedics, Department of Dentistry, National Taiwan University Hospital

Introduction: Open bite can be categorized into two types. The dental type is associated with lack of eruption of the anterior teeth and tongue habits. The skeletal type presents downward rotation of the mandible and excessive eruption of the posterior teeth. Combined with skeletal Class III malocclusion has been considered one of the most difficult problems to treat. The intrusion of the posterior teeth induces a counterclockwise autorotation of the mandible, which can improve the open bite but degrade a patient's profile to a more concave pattern.

We present the two case of a skeletal class III patient with two types of anterior open bite. The two patients were treated non-surgically camouflage treatment with mini-screws for better occlusal plane control.

Diagnosis:
A 18-year-old female patient was diagnosed of Class III malocclusion with anterior open-bite and tongue malposition.

A 24-year-old female patient was diagnosed of Class III malocclusion with anterior open-bite and a TMJ degeneration.

Treatment Overview: In one case, tongue training with tongue crib was performed, and anterior open bite was corrected by extrusion of the maxillary anterior teeth. In the other case, we combined with TMJ dept. for splint therapy, and anterior open-bite was corrected by intrusion of the maxillary posterior teeth. Class III dental relationships were both corrected via occlusal plane clockwise rotation to achieve better smile arc.

Conclusion: Orthodontists should consider changes in the anteroposterior relationship as a result of vertical movement of dentition when treating cases with combination of open bite and Class III malocclusion.

Keywords: Class III malocclusion, Open bite, Smile arc

Ethics: Consent of patient photograph approval

CLINICAL REPORT

No. TC23

Skeletal Class III with bimaxillary dentoalveolar protrusion using orthodontic camouflage treatment: A Case Report

Presenter: Wei-Chen Chiu

Instructor(s): Yu-Chuan Tseng

Country: Taiwan

[a]Department of Orthodontics, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

[b]School of Dentistry, College of Dental Medicine, Kaohsiung Medical University, Kaohsiung City, Taiwan

Introduction: Patients with Class III malocclusion often combine skeletal and dentoalveolar components. Poor facial profile is one of the main complaints from patients. This clinical report presents a case of skeletal Class III jaw relation with bimaxillary dentoalveolar protrusion treated by non- surgical orthodontic treatment.

Diagnosis: Skeletal Class III jaw relation & Angle's Class III malocclusion with bimaxillary dentoalveolar protrusion.

Treatment Overview: The patient chose orthodontic camouflage treatment. After extracting four bicuspids, the fixed appliance was bonded. After 15 months of treatment, the lower lip was retracted with a harmonious facial profile, and ideal occlusion was almost achieved.

Conclusion: We use extracted spaces to relieve crowding and correct incisor protrusion under orthodontic force. A harmonious facial profile was achieved with proper cooperation of orthodontic interventions, and the patient was satisfied with the treatment result. According to Tseng et al., 2011 treatment of adult Class III malocclusions with or without orthognathic surgery, there are 6 measurement criteria. If any 4 of 6 measurements meet the criteria, the patient will need surgical treatment. Only 1 criterion is met in our case, so we can use nonsurgical orthodontic treatment.

Keywords: Class III, Non-surgical, Bimaxillary dentoalveolar protrusion

Ethics: Consent of patient photograph approval

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