

# Utkarsh Mangal

**B.D.S, M.D.S (Orthodontics), Ph.D**

Assistant Research Professor, Dept. of Oral Biology  
Yonsei University College of Dentistry, Seoul, Republic of Korea

**ORCID: 0000-0002-8323-9812**

SCOPUS: 57201436463 | Researcher ID: E-4803-2018;



## Academic/Education career

- **B.D.S.**, Manipal College of Dental Sciences, Mangalore, India (2013)
- **M.D.S.**(Orthodontics), Manipal College of Dental Sciences, Mangalore, India (2017)
- **Ph.D.** (Dentistry), Department of Orthodontics, Institute of Craniofacial Deformity, Yonsei University College of Dentistry, Seoul, Korea (2022)
- **Post-doctoral research fellow**, Department of Orthodontics, Institute of Craniofacial Deformity, Yonsei University College of Dentistry, Seoul, Korea (2022~2023)
- **Assistant Research Professor**, Department of Applied Life Sciences, Inno-Dent Convergence Academy, Yonsei University College of Dentistry, Seoul, Korea (2024~2025)
- **Assistant Research Professor**, Department of Orthodontics, Institute of Craniofacial Deformity, Yonsei University College of Dentistry, Seoul, Korea (2025~present)

## Research Experience:

Role (duration)	Project name
<b>Principle investigator</b> (06.2023~ present)	<b>Study on application of functionally customizable nanozyme dental polymer system (nDPS)</b>
<b>Senior researcher</b> (01.2022 ~ present)	<ul style="list-style-type: none"><li>• Symbiotic biocompatible medical device material and productization technology development for patient-customized direct printed biliary stent-orthodontic appliance</li><li>• Development of biofilm-repellent dental CAD/CAM block and anti-cariogenic bioactive cement</li><li>• Research center for autonomic nervous system and bone homeostasis project</li></ul>
<b>PhD researcher</b> (06.2019~03.2022)	<ul style="list-style-type: none"><li>• Research of Antifouling and Bioactive Dental Biomaterials Using Zwitterionic Network Modifier</li><li>• AI based autodiagnosis of malocclusion, automatically build guides for calibration and surgery according to diagnosis, Postoperative physiognomy predictable CBCT and Development of Automated Digital Calibration System</li></ul>

## Scientific publications (2019~present)

- [1] Wu C, **Mangal U**, Bai N, Kim H, Hwang G, Cha JY, et al. Effects of printing layer thickness and build orientation on the mechanical properties and color stability of 3D-printed clear aligners. **Angle Orthod.** 2025.
- [2] Wu C, **Mangal U**, Seo JY, Kim H, Bai N, Cha JY, et al. Enhancing biofilm resistance and preserving optical translucency of 3D printed clear aligners through carboxybetaine-copolymer surface treatment. **Dent Mater.** 2024;40:1575-83.
- [3] Ryu JH, **Mangal U**, Yoo J, Youm JH, Kim JY, Seo JY, et al. Low concentration zinc oxide nanoparticles enrichment enhances bacterial and pro-inflammatory resistance of calcium silicate-based cements. **J Mech Behav Biomed Mater.** 2024;151:106399.
- [4] Ryu JH, **Mangal U**, Kwon JS, Seo JY, Byun SY, Lee YH, et al. Integrating Phosphate Enhances Biomineralization Effect of Methacrylate Cement in Vital Pulp Treatment with Improved Human Dental Pulp Stem Cells Stimulation. **Adv Healthc Mater.** 2024;13:e2402397.
- [5] **Mangal U**, Jinn H, Jo H, Choi S-H. Non-Surgical Correction of Collapsed Posterior Occlusion in a Unilateral Cleft Lip and Palate Patient with Multiple Missing Teeth: A Case Report. **J Korean Dent Sci.** 2024;17:151-62.
- [6] Kim MJ, **Mangal U**, Seo JY, Kim JY, Kim JY, Ryu JH, et al. A novel zwitterion incorporated Nano-crystalline ceramic and polymer for bacterial resistant dental CAD-CAM block. **J Dent.** 2024;148:105054.
- [7] Kim JH, Yu JH, **Mangal U**, Liu J, Jung HJ, Cha JY. Evaluation of dental plaque reduction using microcurrent-emitting toothbrushes in orthodontic patients: a randomized, double-blind, crossover clinical trial. **Sci Rep.** 2024;14:12126.
- [8] Kim JE, **Mangal U**, Yu JH, Kim GT, Kim H, Seo JY, et al. Evaluation of the effects of temperature and centrifugation time on elimination of uncured resin from 3D-printed dental aligners. **Sci Rep.** 2024;14:15206.
- [9] Choi W, **Mangal U**, Yu JH, Ryu JH, Kim JY, Jun T, et al. Viscoelastic and antimicrobial dental care bioplastic with recyclable life cycle. **Nat Commun.** 2024;15:9205.
- [10] Bae JH, **Mangal U**, Yu JH, Cha JY, Yu HS, Lee KJ, et al. Retention efficacy and patient experience with customized clear retainer and wrap-around circumferential retainer among non-extraction orthodontic patients: A 12-month follow-up cohort study. **Orthod Craniofac Res.** 2024;27:928-37.
- [11] Yu JH, Kim JH, Liu J, **Mangal U**, Ahn HK, Cha JY. Reliability and time-based efficiency of artificial intelligence-based automatic digital model analysis system. **Eur J Orthod.** 2023;45:712-21.
- [12] Wu C, **Mangal U**, Kim J, Lee KJ, Cha JY, Kwon JS, et al. Quantitative light-induced fluorescence enables effective detection of orthodontic adhesive residues in diverse environments. **Photodiagnosis Photodyn Ther.** 2023;44:103743.
- [13] Wu C, Kim MJ, **Mangal U**, Seo JY, Kim JY, Kim J, et al. Effect of bacterial resistant zwitterionic derivative incorporation on the physical properties of resin-modified glass ionomer luting cement. **Sci Rep.** 2023;13:3589.

- [14] Ryu JH, **Mangal U**, Lee MJ, Seo JY, Jeong IJ, Park JY, et al. Effect of strontium substitution on functional activity of phosphate-based glass. **Biomater Sci.** **2023**;11:6299-310.
- [15] **Mangal U**, Seo JY, Ryu JH, Jin J, Wu C, Cha JY, et al. Changes in mechanical and bacterial properties of denture base resin following nanoceria incorporation with and without SBA-15 carriers. **J Mech Behav Biomed Mater.** **2023**;138:105634.
- [16] **Mangal U**, Noh K, Lee S, Cha JK, Song JS, Cha JY, et al. Multistability and hysteresis in states of oral microbiota: Is it impacting the dental clinical cohort studies? **J Periodontal Res.** **2023**;58:381-91.
- [17] **Mangal U**, Lee SM, Lee S, Cha JY, Lee KJ, Yu HS, et al. Reorientation methodology for reproducible head posture in serial cone beam computed tomography images. **Sci Rep.** **2023**;13:3220.
- [18] **Mangal U**, Kang TY, Jung JW, Kim JY, Seo JY, Cha JY, et al. Polybetaine-enhanced hybrid ionomer cement shows improved total biological effect with bacterial resistance and cellular stimulation. **Biomater Sci.** **2023**;11:554-66.
- [19] Kim MJ, Seo JY, Jung IJ, **Mangal U**, Kim HJ, Lee KJ, et al. A novel orthodontic adhesive containing zinc-doped phosphate-based glass for preventing white spot lesions. **J Dent.** **2023**;137:104689.
- [20] Jin J, **Mangal U**, Seo JY, Kim JY, Ryu JH, Lee YH, et al. Cerium oxide nanozymes confer a cytoprotective and bio-friendly surface micro-environment to methacrylate based oro-facial prostheses. **Biomaterials.** **2023**;296:122063.
- [21] Choi W, **Mangal U**, Park JY, Kim JY, Jun T, Jung JW, et al. Occlusive membranes for guided regeneration of inflamed tissue defects. **Nat Commun.** **2023**;14:7687.
- [22] Ryu JH, Roh J, **Mangal U**, Kim KM, Choi SH, Kwon JS. Novel Osteogenic and Easily Handled Endodontic Calcium Silicate Cement Using Pluronic F127 Hydrogel. **Materials (Basel).** **2022**;15:6919.
- [23] Lee MJ, Kim MJ, **Mangal U**, Seo JY, Kwon JS, Choi SH. Zinc-modified phosphate-based glass micro-filler improves *Candida albicans* resistance of auto-polymerized acrylic resin without altering mechanical performance. **Sci Rep.** **2022**;12:19456.
- [24] Kim JY, Choi W, **Mangal U**, Seo JY, Kang TY, Lee J, et al. Multivalent network modifier upregulates bioactivity of multispecies biofilm-resistant polyalkenoate cement. **Bioact Mater.** **2022**;14:219-33.
- [25] Jin J, Bhat R, **Mangal U**, Seo JY, Min Y, Yu J, et al. Molecular weight tuning optimizes poly(2-methoxyethyl acrylate) dispersion to enhance the aging resistance and anti-fouling behavior of denture base resin. **Biomater Sci.** **2022**;10:2224-36.
- [26] **Mangal U**, Park JH, Lim S-H, Choi S-K, Sung J-H, Chae J-M. Control of the occlusal plane in orthognathic surgery. **AJO-DO Clinical Companion.** **2021**;1:43-54.
- [27] **Mangal U**, Arum H, Huisoo K, Jung YH, Lee KJ, Yu HS, et al. Tomographic similarity scan with a computed modified absolute mandibular midsagittal plane for precise and objective localization of mandibular asymmetry. **Comput Biol Med.** **2021**;134:104465.

- [28] Lim JH, **Mangal U**, Nam NE, Choi SH, Shim JS, Kim JE. A Comparison of Accuracy of Different Dental Restorative Materials between Intraoral Scanning and Conventional Impression-Taking: An In Vitro Study. **Materials (Basel)**. **2021**;14.
- [29] Kwon JS, Kim JY, **Mangal U**, Seo JY, Lee MJ, Jin J, et al. Durable Oral Biofilm Resistance of 3D-Printed Dental Base Polymers Containing Zwitterionic Materials. **Int J Mol Sci**. **2021**;22.
- [30] **Mangal U**, Seo JY, Yu J, Kwon JS, Choi SH. Incorporating Aminated Nanodiamonds to Improve the Mechanical Properties of 3D-Printed Resin-Based Biomedical Appliances. **Nanomaterials (Basel)**. **2020**;10:827-.
- [31] **Mangal U**, Min YJ, Seo JY, Kim DE, Cha JY, Lee KJ, et al. Changes in tribological and antibacterial properties of poly(methyl methacrylate)-based 3D-printed intra-oral appliances by incorporating nanodiamonds. **J Mech Behav Biomed Mater**. **2020**;110:103992.
- [32] **Mangal U**, Kwon JS, Choi SH. Bio-Interactive Zwitterionic Dental Biomaterials for Improving Biofilm Resistance: Characteristics and Applications. **Int J Mol Sci**. **2020**;21:9087.
- [33] **Mangal U**, Hwang JJ, Jo H, Lee SM, Jung Y-H, Cho B-H, et al. Effects of Changes in the Frankfort Horizontal Plane Definition on the Three-Dimensional Cephalometric Evaluation of Symmetry. **Appl Sci-Basel**. **2020**;10.
- [34] Lee Y, Park JH, Chang NY, Lee MY, Kim BC, Seo HY, et al. Assessment of bone density changes following two-jaw surgery using multidetector computed tomography: A pilot study. **Korean J Orthod**. **2020**;50:157-69.
- [35] Lee MJ, **Mangal U**, Kim SJ, Yoon YP, Ahn ES, Jang ES, et al. Improvement in the Microbial Resistance of Resin-Based Dental Sealant by Sulfo betaine Methacrylate Incorporation. **Polymers (Basel)**. **2020**;12.
- [36] Lee MJ, Kim JY, Seo JY, **Mangal U**, Cha JY, Kwon JS, et al. Resin-Based Sealant with Bioactive Glass and Zwitterionic Material for Remineralisation and Multi-Species Biofilm Inhibition. **Nanomaterials (Basel)**. **2020**;10.
- [37] Kim GT, Jin J, **Mangal U**, Lee KJ, Kim KM, Choi SH, et al. Primary Stability of Orthodontic Titanium Miniscrews due to Cortical Bone Density and Re-Insertion. **Materials (Basel)**. **2020**;13.
- [38] Chae JM, Park JH, Kim SH, **Mangal U**, Seo HY. Prognostic Indicators for Anterior Mandibular Repositioning in Adolescents with Class II Malocclusion: A Cross-Sectional Cephalometric Study. **J Clin Pediatr Dent**. **2020**;44:274-82.
- [39] **Mangal U**, Kim JY, Seo JY, Kwon JS, Choi SH. Novel Poly(Methyl Methacrylate) Containing Nanodiamond to Improve the Mechanical Properties and Fungal Resistance. **Materials (Basel)**. **2019**;12:3438-.
- [40] Ashith MV, **Mangal U**, Lohia A, Mithun K. Role of an Orthodontist in the Management of Cleft Maxilla With Anterior Maxillary Segmental Distraction (AMD)- A Clinical overview. **Biomed Pharmacol J**. **2019**;12:1899-906.
- [41] Ashith MV, Khader M, **Mangal U**, Mithun K. Enhancement of Facial Aesthetics and Function in Posteriorly Edentulous Mouth: An Orthognathic Surgical Case Report. **Indian J Public Health Res Dev**. **2019**;10.

## Research Awards and Honors:

- **Marshall's award finalist** (2023.10) at Academy of Dental Materials Conference, San Diego, USA
- **Excellent Poster Presentation Award** (2023.10) at 56th Annual Congress of the Korean Association of Orthodontists and Asia pacific Orthodontic Conference
- **Excellent Poster Presentation Award** (2022.10) at 55th Annual Congress of the Korean Association of Orthodontists and Asia pacific Orthodontic Conference
- Young researcher **JADR travel award** (2022.09) at 41<sup>st</sup> Annual meeting of The Korean Association for Dental Research (KADR), IADR-Korean Division
- **Excellent Poster Presentation Award** (2021.10) at 54th Annual Congress of the Korean Association of Orthodontists
- **Best poster award** (2021.09) at 40<sup>th</sup> Annual meeting of The Korean Association for Dental Research (KADR), IADR-Korean Division
- **Merit Academic Paper award** (2020.12) by Yonsei University College of Dentistry
- **KAUF-HUBIT Scholarship award** (2020)