

Stanford



HyeRan Choo

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Bio

BIO

Dr. HyeRan Choo is a Clinical Associate Professor of Plastic and Reconstructive Surgery in the Department of Surgery at Stanford University School of Medicine. She is Director of Neonatal and Pediatric Craniofacial Airway Orthodontics and Dental Sleep Medicine at Lucile Packard Children's Hospital Stanford. She also directs the Neonatal and Pediatric Craniofacial Airway Orthodontic Fellowship in the Department of Surgery / Division of Plastic and Reconstructive Surgery. She is a Faculty Fellow of the Stanford Byers Center for Biodesign.

After graduating from Seoul National University with a combined degree in Natural Sciences and Dental Surgery in 2002, Dr. Choo received her Dental Medicine degree from the University of Pennsylvania. She completed her orthodontic residency and Masters in Science degree program at the University of Alabama in Birmingham. Following her Craniofacial Fellowship at the Clinical Center of the National Institutes of Health (NIH) / National Institute of Dental and Craniofacial Research (NIDCR), Dr. Choo was recruited as a full-time faculty member at the University of Pennsylvania and The Children's Hospital of Philadelphia. Dr. Choo joined the faculty of Stanford University School of Medicine in 2016. Dr. Choo is a board-certified craniofacial orthodontist by American Board of Orthodontics since 2008 and became a diplomate of the American Board of Dental Sleep Medicine in 2021.

Dr. Choo's areas of expertise are non-surgical airway management and facial reconstruction for newborns with cleft and/or Robin Sequence in the Neonatal Intensive Care Unit. Her treatments utilize simple custom-fabricated orthodontic devices to establish a healthy environment to correct neonatal orofacial abnormalities with great respect for natural growth potential of each neonate. She also practices the full scope of pediatric obstructive sleep apnea management as well as orthodontics and dentofacial orthopedics for patients with cleft and craniofacial abnormalities in a multi-disciplinary clinical setting.

Dr. Choo's treatment philosophy is based on a fundamental understanding of facial growth and oral functions (Biocreative Orthodontic Strategy). Her research focuses on translation of health innovation technology for the advancement of infant orthodontics. She also pioneers the development of skeletal anchorage-based orthodontic and orthopedic treatment strategies for pediatric sleep apnea patients.

CLINICAL FOCUS

- Neonatal Robin Sequence / Obstructive Sleep Apnea / Small Jaw / Feeding & Breathing Difficulties - Stanford Orthodontic Airway Plate

- Neonatal Cleft Lip and Palate - Biocreative Alveolar Molding Plate
- Infant Orthodontics - Airway, Molding, and Feeding
- Non-surgical and Surgical Orthodontics for Obstructive Sleep Apnea
- Non-surgical and Surgical Orthodontics for Facial Reconstructive Surgery
- 3D Craniofacial Imaging and Airway Analysis
- Orthodontics

ACADEMIC APPOINTMENTS

- Clinical Associate Professor, Surgery - Plastic & Reconstructive Surgery
- Member, Maternal & Child Health Research Institute (MCHRI)

ADMINISTRATIVE APPOINTMENTS

- Director, Stanford Orthodontic Airway Plate Treatment Program (SOAP) for neonatal Robin sequence, (2023- present)
- Director, Stanford Neonatal and Pediatric Craniofacial Airway Orthodontic Fellowship, (2021- present)
- Director, Stanford Neonatal and Pediatric Craniofacial Airway Orthodontics, (2019- present)

HONORS AND AWARDS

- David Precious Memorial Science Award, International Cleft Lip and Palate Foundation (ICPF) (10/8/2023)
- National Dental Honor Society, Omicron-Kappa-Upsilon (OKU) (5/17/2004)

PROFESSIONAL EDUCATION

- Diplomate, American Board of Dental Sleep Medicine (2021)
- Fellowship, Biodesign Faculty Fellowship, Stanford Byers Center for Biodesign , Biodesign (2021)
- Board Certification, American Board of Orthodontics (2008)
- Fellowship, Clinical Center, National Institutes of Health (NIH) / National Institute of Dental and Craniofacial Research (NIDCR) , Bethesda, MD (2008)
- MS, Post-Graduate Residency, Orthodontics and Dentofacial Orthopedics, University of Alabama in Birmingham , Birmingham, AL (2007)
- DMD, Graduate School of Dental Medicine, University of Pennsylvania , Philadelphia, PA (2004)
- DDS, Undergraduate School of Natural Sciences & Graduate School of Dental Surgery, Seoul National University , Seoul, South Korea (2002)

Publications

PUBLICATIONS

- **Nonsurgical improvement of severe upper airway obstruction in infants with Robin sequence and cleft palate using Stanford Orthodontic Airway Plate treatment.** *Journal of clinical sleep medicine : JCSM : official publication of the American Academy of Sleep Medicine*
Choo, H., Sidell, D. R., Kim, J. W., Ahn, H. W., Day, H. S., Sullivan, S. S.
2024
- **Presurgical Reduction of the Cleft Palate: Serendipitous Benefit of the Stanford Orthodontic Airway Plate Treatment (SOAP) for Infants with Robin Sequence.** *The Cleft palate-craniofacial journal : official publication of the American Cleft Palate-Craniofacial Association*
Kim, J. W., Wan, A., Kim, J. Y., Choo, H.
2024: 10556656241261846
- **Weight Gain of Infants with Robin Sequence Treated Nonsurgically Using the Stanford Orthodontic Airway Plate (SOAP): 1-Year Follow-Up.** *The Cleft palate-craniofacial journal : official publication of the American Cleft Palate-Craniofacial Association*
Choo, H., Davis, A. S., Bain, L. C., Ahn, H.
2024: 10556656241233239
- **Biocreative Alveolar Molding Plate Treatment (BioAMP) for neonatal unilateral cleft lip and palate with excessively wide alveolar cleft and maxillary arch width.** *Korean journal of orthodontics*

- Choo, H., Ahn, H.
2024; 54 (1): 69-73
- **Effects of daily versus weekly teriparatide for medication-related osteonecrosis of the jaw: A case-control study.** *Oral diseases*
Kim, K. M., Kim, S., Hwang, H., Kim, H. Y., Kim, D., Park, J. H., Choo, H., Kim, J. W.
2023
 - **Miniscrews position for a tissue bone borne palatal C-expander affects the displacement pattern of nasomaxillary complex: a finite element study.** *Scientific reports*
Choi, J., Choo, H., Kim, M., Chung, K., Kim, S.
2023; 13 (1): 17135
 - **Development and systematic characterization of GelMA/alginate/PEGDMA/xanthan gum hydrogel bioink system for extrusion bioprinting.** *Biomaterials*
Li, J., Moeinzadeh, S., Kim, C., Pan, C. C., Weale, G., Kim, S., Abrams, G., James, A. W., Choo, H., Chan, C., Yang, Y. P.
2022; 293: 121969
 - **Split orthodontic airway plate: An innovation to the utilization method of conventional orthodontic airway plate for neonates with Robin sequence** *KOREAN JOURNAL OF ORTHODONTICS*
Choo, H., Kim, S., Ahn, H., Poets, C. F., Chung, K.
2022; 52 (4): 308-312
 - **New Frontier in Advanced Dentistry: CBCT, Intraoral Scanner, Sensors, and Artificial Intelligence in Dentistry.** *Sensors (Basel, Switzerland)*
Kim, S., Kim, K. B., Choo, H.
2022; 22 (8)
 - **Bio-Exercise (BioEx) - A biocreative orofacial myofunctional therapy: preliminary cephalometric study and clinical application.** *Dental press journal of orthodontics*
Lim, L., Choo, H., Eto, L. F., Chung, K., Kim, S.
2022; 27 (2): e2220367
 - **Cross-species comparisons reveal resistance of human skeletal stem cells to inhibition by non-steroidal anti-inflammatory drugs.** *Frontiers in endocrinology*
Goodnough, L. H., Ambrosi, T. H., Steininger, H. M., Butler, M. G., Hoover, M. Y., Choo, H., Van Rysselberghe, N. L., Bellino, M. J., Bishop, J. A., Gardner, M. J., Chan, C. K.
2022; 13: 924927
 - **Disruptive Therapy Using a Nonsurgical Orthodontic Airway Plate for the Management of Neonatal Robin Sequence: 1-Year Follow-up.** *The Cleft palate-craniofacial journal : official publication of the American Cleft Palate-Craniofacial Association*
Choo, H., Galera, R. I., Balakrishnan, K., Lin, H. C., Ahn, H., Lorenz, P., Khosla, R. K., Profit, J., Poets, C. F., Lee, J. S.
2022: 10556656221076980
 - **Root proximity of the anchoring miniscrews of orthodontic miniplates in the mandibular incisal area: Cone-beam computed tomographic analysis.** *Korean journal of orthodontics*
Jeong, D., Oh, S. H., Choo, H., Choi, Y., Kim, S., Lee, J., Hwang, E.
2021; 51 (4): 231-240
 - **A Systematic Review of Mandibular Distraction Osteogenesis Versus Orthodontic Airway Plate for Airway Obstruction Treatment in Pierre Robin Sequence.** *The Cleft palate-craniofacial journal : official publication of the American Cleft Palate-Craniofacial Association*
Abbas, D. B., Lavin, C., Fahy, E. J., Choo, H., Truong, M. T., Bruckman, K. C., Khosla, R. K., Lorenz, H. P., Momeni, A., Wan, D. C.
2021: 10556656211011886
 - **Evaluation of strategic uprighting of the mandibular molars using an orthodontic miniplate and a nickel-titanium reverse curve arch wire: Preliminary cephalometric study.** *Korean journal of orthodontics*
Park, J., Choo, H., Choi, J., Chung, K., Kim, S.
2021; 51 (3): 179-188
 - **Nonsurgical Orthodontic Airway Plate Treatment for Newborns With Robin Sequence.** *The Cleft palate-craniofacial journal : official publication of the American Cleft Palate-Craniofacial Association*
Choo, H., Khosla, R. K., Meister, K. D., Wan, D. C., Lin, H. C., Feczko, R., Bruckman, K., Hopkins, E., Truong, M. T., Lorenz, H. P.
2021: 10556656211007689
 - **Finite element analysis of C-expanders with different vertical vectors of anchor screws.** *American journal of orthodontics and dentofacial orthopedics : official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*

Choi, J., Choo, H., Oh, S. H., Park, J., Chung, K., Kim, S.
2021

- **Use of C-Tube Microplates for Controlling the Vertical Dimension During Maxillary Incisor Intrusion.** *Journal of clinical orthodontics : JCO*
Noh, M. K., Seo, K. W., Choo, H. n., Chung, K. R., Kim, S. H.
2019; 53 (7): 414–25
- **The biocreative strategy. Part 4: Molar distalization in nonextraction treatment.** *Journal of clinical orthodontics : JCO*
Chung, K. R., Kim, Y., Choo, H., Kim, S. H., Nelson, G.
2018; 52 (9): 462-475
- **Non-extraction correction of Class II malocclusion using Biocreative Therapy** *Skeletal Anchorage in Orthodontic Treatment of Class II Malocclusion*
Chung, K., Choo, H., Kim, S.
Mosby Elsevier.2014; 1: 239–243
- **Modified Technique of Presurgical Infant Maxillary Orthopedics for Complete Bilateral Cleft Lip and Palate** *PLASTIC AND RECONSTRUCTIVE SURGERY*
Choo, H., Maguire, M., Low, D. W.
2012; 129 (1): 244–48
- **Modified Technique of Presurgical Infant Maxillary Orthopedics for Complete Unilateral Cleft Lip and Palate** *PLASTIC AND RECONSTRUCTIVE SURGERY*
Choo, H., Maguire, M., Low, D. W.
2012; 129 (1): 249–52
- **Treatment outcome analysis of speedy surgical orthodontics for adults with maxillary protrusion** *AMERICAN JOURNAL OF ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS*
Choo, H., Heo, H., Yoon, H., Chung, K., Kim, S.
2011; 140 (6): E251–E262
- **Novel application of the 2-piece orthodontic C-implant for temporary crown restoration after orthodontic treatment.** *American journal of orthodontics and dentofacial orthopedics : official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*
Jeong, D. M., Choi, B., Choo, H., Kim, J. H., Chung, K. R., Kim, S. H.
2011; 140 (4): 569-79
- **Histologic assessment of the biological effects after speedy surgical orthodontics in a beagle animal model: a preliminary study** *KOREAN JOURNAL OF ORTHODONTICS*
Kim, H., Lee, Y., Park, Y., Chung, K., Kang, Y., Choo, H., Kim, S.
2011; 41 (5): 361–70
- **The effects of different pilot-drilling methods on the mechanical stability of a mini-implant system at placement and removal: a preliminary study** *KOREAN JOURNAL OF ORTHODONTICS*
Cho, I., Choo, H., Kim, S., Shin, Y., Kim, D., Kim, S., Chung, K., Huang, J. C.
2011; 41 (5): 354–60
- **Atypical orthodontic extraction pattern managed by differential en-masse retraction against a temporary skeletal anchorage device in the treatment of bimaxillary protrusion** *AMERICAN JOURNAL OF ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS*
Chung, K., Choo, H., Lee, J., Kim, S.
2011; 140 (3): 423–32
- **Replacing a failed mini-implant with a miniplate to prevent interruption during orthodontic treatment.** *American journal of orthodontics and dentofacial orthopedics : official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*
Lee, J. H., Choo, H., Kim, S. H., Chung, K. R., Giannuzzi, L. A., Ngan, P.
2011; 139 (6): 849-57
- **Advanced Applications of Cone Beam Computed Tomography in Orthodontics** *Seminars in Orthodontics*
Mah, J. K., Liu, Y., Huang, J. C., Choo, H.
2011; 17 (1): 57-71
- **Class III Correction Using Biocreative Therapy (C-Therapy)** *Seminars in Orthodontics*
Chung, K., Kim, S., Choo, H.

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- **Timely relocation of mini-implants for uninterrupted full-arch distalization** *AMERICAN JOURNAL OF ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS*
Chung, K., Choo, H., Kim, S., Ngan, P.
2010; 138 (6): 839-49
- **Practical applications of cone-beam computed tomography in orthodontics** *JOURNAL OF THE AMERICAN DENTAL ASSOCIATION*
Mah, J. K., Huang, J. C., Choo, H.
2010; 141 (10): 7S-13S
- **Distalization of the mandibular dentition with mini-implants to correct a Class III malocclusion with a midline deviation** *AMERICAN JOURNAL OF ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS*
Chung, K., Kim, S., Choo, H., Kook, Y., Cope, J. B.
2010; 137 (1): 135-46
- **Cone-beam computed tomography evaluation of orthodontic miniplate anchoring screws in the posterior maxilla.** *American journal of orthodontics and dentofacial orthopedics : official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*
Kim, G. T., Kim, S. H., Choi, Y. S., Park, Y. J., Chung, K. R., Suk, K. E., Choo, H., Huang, J. C.
2009; 136 (5): 628.e1-10; discussion 628-9
- **Double-archwire mechanics using temporary anchorage devices to relocate ectopically impacted maxillary canines.** *World journal of orthodontics*
Kim, S. H., Choo, H., Hwang, Y. S., Chung, K. R.
2008; 9 (3): 255-66
- **Anterior torque control using partial-osseointegrated mini-implants: biocreative therapy type II technique.** *World journal of orthodontics*
Chung, K. R., Kim, S. H., Kook, Y. A., Choo, H.
2008; 9 (2): 105-13
- **Cone-beam computed tomography (CBCT) in clinical practice** *Pacific Coast Society of Orthodontists Bulletin*
Huang, J. C., Choo, H., Mah, J. K.
2008: 18-22