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2026 Biomedical Research Award
University of Toronto

Are Body Dysmorphic Traits, Orthodontic Modality, and Orofacial Sensory Processing Intertwined?

B.F. Dewel Memorial Biomedical Research Award

1. Short Biography

Dr. Iacopo Cioffi is an Associate Professor, orthodontist, and clinician-scientist at the Faculty of Dentistry, University of Toronto, Canada, where he serves as Co-Director of the Centre for Multimodal Sensorimotor and Pain Research. His research focuses primarily on temporomandibular disorders, orofacial pain, orofacial somatosensory function, and the complex interactions among psychological factors, orofacial sensory and motor function, and orthodontic treatment. His multidisciplinary research program integrates clinical orthodontics, neuroscience, and pain science to advance personalized, evidence-based patient care. Dr. Cioffi serves as Associate Editor of *Orthodontics & Craniofacial Research*, Secretary of the International Association for the Study of Pain (IASP) Special Interest Group on Orofacial and Head Pain, and Vice-President of the Neuroscience Group of the International Association for Dental, Oral, and Craniofacial Research (IADR). His research has been supported by the American Association of Orthodontists Foundation, the Canadian Institutes of Health Research, the Canada Foundation for Innovation, the European Orthodontic Society, and Align Technology.

2. Brief Description of the Project

Body dysmorphic disorder (BDD) is a psychiatric condition characterized by persistent preoccupation with perceived defects in physical appearance that are either unnoticeable or only minimally apparent to others. Individuals with BDD engage in repetitive behaviors, such as mirror checking, excessive grooming, reassurance seeking, or comparing their appearance with others, resulting in substantial psychological distress and functional impairment.

Facial and dental appearance are among the most common areas of concern in BDD, and its prevalence is considerably higher among individuals seeking orthodontic treatment than in the general population. Because orthodontic treatment directly modifies dental and facial esthetics, orthodontists are often the first healthcare professionals to encounter patients exhibiting BDD traits. These individuals may present with excessive concern regarding minor dental irregularities, seek repeated orthodontic consultations or retreatment despite objectively satisfactory outcomes, and remain dissatisfied following treatment completion, increasing the risk of clinician-patient conflict and medico-legal challenges.

Beyond disturbances in body image, emerging evidence suggests that BDD may also involve abnormalities in somatosensory processing and bodily self-awareness. These alterations could extend to the orofacial region, resulting in distorted perceptions of tooth position, occlusal contacts, or other oral sensations. Such perceptual disturbances may influence how patients experience orthodontic treatment and evaluate treatment outcomes.

The orthodontic treatment modality itself may further interact with these processes. Clear aligner therapy incorporates digital technologies that allow patients to repeatedly visualize treatment simulations and monitor treatment progress through virtual models and mobile applications. While these technologies may improve treatment engagement, they may also provide frequent opportunities for appearance monitoring and self-scrutiny, behaviors that overlap with core features

of BDD. Conversely, conventional fixed appliances provide substantially less continuous visual feedback regarding tooth movement, potentially resulting in different behavioral responses among susceptible individuals. Despite these theoretical considerations, no study has systematically investigated the relationship between orthodontic treatment modality, BDD-related traits, and orofacial sensory function. The proposed study seeks to address this important knowledge gap by investigating the association between orthodontic treatment modality, BDD-related characteristics, and orofacial somatosensory function in adults undergoing orthodontic treatment.

Specific Aim 1. Determine whether orthodontic treatment modality (clear aligners versus fixed appliances) is associated with differences in the severity and expression of BDD-related traits and behaviors among adult orthodontic patients.

Hypothesis: Adult patients undergoing treatment with clear aligners will report higher levels of BDD-related traits and appearance-monitoring behaviors than patients treated with conventional fixed appliances.

Specific Aim 2. Determine whether BDD-related traits are associated with alterations in orofacial sensory function and whether these associations differ according to orthodontic treatment modality.

Hypothesis: Higher BDD trait scores will be associated with altered orofacial somatosensory function, with the strongest associations observed among patients treated with clear aligners.

3. How Orthodontic Education Will Benefit from the Award

Orthodontic education has traditionally focused on diagnosis and treatment mechanics. However, contemporary orthodontic practice increasingly requires clinicians to recognize and manage psychological factors that influence treatment expectations, patient satisfaction, and clinical outcomes. Despite the growing prevalence of BDD traits among orthodontic patients, formal education on their recognition and management remains limited within most orthodontic training programs.

This project addresses this important educational gap by generating novel evidence on the relationship between BDD traits, orthodontic treatment modality, and orofacial sensory processing. The findings will provide educators with scientific evidence to integrate psychological considerations into orthodontic curricula and clinical training. By examining whether clear aligners and fixed appliances are associated with different behavioral and sensory responses, the study will encourage future orthodontists to consider psychological and behavioral factors alongside traditional biomechanical principles when selecting treatment approaches and managing patients.

The knowledge generated will be translated into undergraduate and graduate orthodontic curricula, continuing professional development programs, case-based learning activities, and educational resources that promote patient-centered care. Ultimately, this project will help prepare the next generation of orthodontists to integrate psychological and biological factors into clinical decision-making, improve patient selection and expectation management, reduce the risk of treatment dissatisfaction and conflict, and deliver more personalized, evidence-informed orthodontic care.

4. Why the Foundation Is Important to the Project

Support from the American Association of Orthodontists Foundation (AAOF) is essential to the success of this project and to advancing an emerging area of orthodontic research. The proposed study investigates the intersection of orthodontics, behavioral science, and neuroscience—an area with considerable clinical relevance but limited preliminary evidence. As a result, this line of research is not yet well positioned to compete successfully for major national funding opportunities.

AAOF support will provide the critical bridge needed to generate the high-quality data required to establish feasibility, demonstrate scientific merit, and strengthen future applications to major funding agencies. AAOF funding will support graduate trainee involvement, participant recruitment across a network of orthodontic practices, and comprehensive assessment of psychological and orofacial sensory outcomes using advanced quantitative sensory testing.

5. How Foundation Funding Has Benefited and Will Continue to Benefit My Career

Support from the AAOF has been instrumental in the development of my independent academic career. Early AAOF funding enabled me to establish a multidisciplinary research platform and pursue innovative research questions that would otherwise have been difficult to explore. It also facilitated the training and mentorship of graduate students, the development of national and international collaborations, and the establishment of a sustainable research infrastructure.

Importantly, AAOF funding has generated the preliminary data needed to strengthen applications to major funding agencies, contributing to the growth of a competitive and internationally recognized research program. The AAOF's investment has therefore extended well beyond the individual funded projects by fostering new research directions and increasing the competitiveness of future grant applications.

Continued AAOF support will enable me to expand my work into emerging areas at the intersection of orthodontics, psychology, and neuroscience, where important clinical questions remain unanswered and additional preliminary evidence is needed before larger funding agencies will invest. This work will further strengthen my long-term research program, support the training of future clinician-scientists, and provide new knowledge that informs orthodontic education, clinical decision-making, and the delivery of more personalized, evidence-informed patient care.