



University of the Pacific Arthur A. Dugoni School of Dentistry
126th Alumni Association Annual Meeting – 2025 Alumni Weekend
Including The 39th Frederick T. West Orthodontics Lectureship and
The 2nd Alan H. Gluskin Endodontics Symposium



Mr. John Morton

Friday, January 31, 2025

– 5 CE units

Subject Area: "Aligner Treatment: Biomechanics & Materials"

Title: "The History and Future of Clear Aligners as a Force Based System"

Course Description:

The biomechanics of clear aligner systems will be presented, covering key topics such as the definition of a force-based system and its application in clear aligner treatment, principles of attachment design, the impact of aligner material composition on performance, and how design considerations differ from fixed appliances. Additionally, the potential role of artificial intelligence in aligner design and its future impact on the orthodontic profession will be discussed.

Objectives:

- 1) The audience will learn the fundamental differences between a force-based system and a displacement-based system in orthodontics.
- 2) Attendees will learn the fundamentals of biomechanics in orthodontics.
- 3) Attendees will be able to explain Newton's Laws and their applicability to orthodontic tooth movement including aligner equilibrium.
- 4) The types of tooth movement and the importance of the Moment/Force ratio in controlling tooth movement is explained.
- 5) Attendees will learn the mechanics of materials, the definition of the stiffness of a material, and equivalent stiffnesses of an aligner in comparison to stainless steel arch wires.
- 6) Two principles of opening a deep bite in aligner treatment will be discussed.
- 7) The use of artificial intelligence in aligner design and the potential application of neural networks to assist in future orthodontic treatments will be discussed.

Short Bio:

John Morton received his degree in Biomedical Engineering from Rensselaer Polytechnic Institute. He obtained a firm foundation in orthodontic biomechanics as Director of Research with colleague Dr. Charles Burstone at the University of Connecticut, Department of Orthodontics researching and developing the principles of Segmented Arch Technique, Variable Modulus Orthodontics, and Differential Moments to name a few. He has been a consultant for the National Institutes of Health, many universities and orthodontic corporations throughout his forty plus year career in orthodontic biomechanics. John joined Align Technology in 2007 and presently holds the position of Vice President, Technical Fellow. John's team at Align is dedicated to improving the predictability of Invisalign treatment.