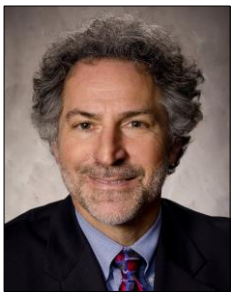

Light Curing Complexities. Clinical Simplicity

Joe D. Oxman, Ph.D.
3M Oral Care Solutions Division

Several concurrent light curing trends intended to reduce steps and save time in the restorative procedure have been rapidly evolving. The simultaneous development of bulk curing restorative materials with reduced shrinkage stress and recent advances in high intensity LED curing lights has created an expectation of single-increment composite placement requiring significantly reduced curing times. Photo-curing of dental composites is governed by an array of complex interactions such as light intensity, exposure time, photoinitiator system, initiator/light source spectral overlap and the collective material optical properties. As a consequence, light curing of today's dental materials may not be as simple as light on and light off. This presentation will attempt to provide some insights into the complexities of photopolymerization and establish if these recent trends are realistic expectations or dreams that are too good to be true.

<Biography>

Joe Oxman received his Ph.D. in organic photochemistry from Northwestern University (1983). He has been employed by 3M for 38 years and is currently a Corporate Scientist. A developer of many dental and non-dental technologies and is considered a global expert in photocurable systems, nanotechnology, structural composites, hard tissue adhesives, glass ionomer materials, orthogonal smart-materials, bioactives and technologies to minimize polymerization shrinkage stress. He has 114 issued US patents, more than 100 publications/abstracts in peer reviewed journals and has been an invited global lecturer for more than 350 keynotes, presentations, and dental school curricula. He has received many international recognitions including induction into the prestigious 3M Carlton Society (2003), two American Chemical Society (ACS) Cooperative Research Awards (2007 and 2020), the University of Colorado Engineering & Applied Science Corporate Advocate Award (2007), the IADR Peyton Skinner Award for Innovation in Dental Materials (2013), ACS Industrial Polymer Science Award (2016) and induction as an ACS Polymer Fellow (2017). He was instrumental in co-establishing the NSF Cooperative Research Center on “Fundamentals & Applications of Photopolymerization” (Universities of Iowa and Colorado). He currently serves on the Board of Directors of the AADOCR, the MinnCResT External Review Board and previously served as the 3M Director of Research for University of Minnesota Dental Research Center for Biomaterials and Biomechanics and as a coach and judge for the Discovery Education/3M Young Scientist Challenge.