Advances in metal additive manufacturing for dentistry

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Abstract

3D printing, or additive manufacturing, has technologically exploded in the last few years. Improved accuracy, increased efficiency, lower cost, smaller units and novel materials have significantly changed the fabrication landscape. Dentistry is currently experiencing a trend toward 3D printing. Implant dentistry was one of the first disciplines to experience 3D printed guides for predictable surgeries. A revolution in materials and technologies have resulted in further evolution, including the printing of prosthodontic frameworks, dentures and implant components. Recent advances in industrial metal printers and materials have resulted in a surge in the applicability of metal additive manufacturing applications for dentistry. This presentation will explore the exciting advancement of metal AM, including the AM process, established and novel workflows, and applications. Specific applications will be presented, including the novel workflow for dental abutment fabrication and reverse engineered onlay restorations. The objectives are for the participant to appreciate fundamentals of 3D printing, understand the workflow and current materials and identify clinical applications of 3D printing.

Image



Recent Publications

1. Kalman, L. Mobile app determines dental shade. *Dentistry Today* Online News. Nov. 4, 2019.
2. Kalman L., Hosein Y. and Chimel T. Workflow development of a 3D printed novel implant abutment. *3D Printing & Additive Manufacturing*: 2019;6(5): 234-237.
3. Kalman L. Preliminary investigation of a novel hand instrument for restorative procedures. (abstract). *J Dent Educ*: 2019; 83(2): 253-255.
4. Kalman L. Testing of a 3D printed titanium dental abutment prototype (abstract). *J Dent Educ*: 2019; 83(2): 253-255.
5. Kalman L. and Vakili E. Assessing students' perspective of an elective digital dentistry course. *IJDR*: 2019; 4(1): 1-4.
6. Kalman L. 3D printing of a novel dental implant abutment. *JODDD*: 2018; 12(4): 299-303.
7. Kalman L. and Vakili E. Exploring an alternative model for the delivery of outreach dentistry to at-risk youth. *Biomed J Sci & Tech Res:* 2018; 5(4).
8. Kalman L. and Quincy Sofowora. A novel technique for the impression, model fabrication and provisionalization of pinlays. *JODDD*: 2018; 12(1): 77-81.
9. Kalman L. Preliminary investigation of a novel mouthguard. *International Journal of Preventive Medicine:* 2018; 9: 60.
10. Kalman L. and Carol Lui. Preliminary investigation of a novel endodontic obturator. *Journal of Research in Dentistry:* 2017; 5(2):46-50.



Biography

Les is a clinician-scientist in restorative dentistry and chair of dental outreach. His research focuses on novel workflows to improve clinical dentistry, including innovative devices & technologies. He has authored over 40 articles, lectured locally, nationally and internationally and has provided numerous CDE courses. He holds two patents and has translated three technologies. Kalman maintains his position as the founder and President of Research Driven, a dental tech corporation. He is an active member of the Academy of Osseointegration, the International Congress of Oral Implantologists, the Standards Council of Canada and serves on the Board of Directors for the University of Western Ontario Faculty Association and the Canadian Association of Public Health Dentistry. He has been recognized as an Academic Associate Fellow (AAID), Fellow, Master and Diplomate (ICOI), Fellow (AO) and has been awarded the Schulich Alumni of Distinction Award and most recently the Merck *Patients First* award.

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Notes/Comments:

-I have just completed a chapter on 3D Printing for an upcoming Springer textbook.