



DEPARTMENT OF THE AIR FORCE  
59TH MEDICAL WING (AETC)  
JOINT BASE SAN ANTONIO - LACKLAND TEXAS

17 FEB 2017

MEMORANDUM FOR SGDTR

ATTN: CPT KEVIN MENZIE

FROM: 59 MDW/SGVU

SUBJECT: Professional Presentation Approval

1. Your paper, entitled Accuracy of Various Stereolithographic Materials for Orthodontic Models Printed on the Stratasys Objet Eden260V presented at/published to American Association of Orthodontists 117<sup>th</sup> Annual Session, San Diego, CA, 21-25 April 2017 in accordance with MDWI 41-108, has been approved and assigned local file #17093.
2. Pertinent biographic information (name of author(s), title, etc.) has been entered into our computer file. Please advise us (by phone or mail) that your presentation was given. At that time, we will need the date (month, day and year) along with the location of your presentation. It is important to update this information so that we can provide quality support for you, your department, and the Medical Center commander. This information is used to document the scholarly activities of our professional staff and students, which is an essential component of Wilford Hall Ambulatory Surgical Center (WHASC) internship and residency programs.
3. Please know that if you are a Graduate Health Sciences Education student and your department has told you they cannot fund your publication, the 59th Clinical Research Division may pay for your basic journal publishing charges (to include costs for tables and black and white photos). We cannot pay for reprints. If you are 59 MDW staff member, we can forward your request for funds to the designated wing POC.
4. Congratulations, and thank you for your efforts and time. Your contributions are vital to the medical mission. We look forward to assisting you in your future publication/presentation efforts.

*Linda Steel-Goodwin*

LINDA STEEL-GOODWIN, Col, USAF, BSC  
Director, Clinical Investigations & Research Support

# PROCESSING OF PROFESSIONAL MEDICAL RESEARCH/TECHNICAL PUBLICATIONS/PRESENTATIONS

## INSTRUCTIONS

### USE ONLY THE MOST CURRENT 59 MDW FORM 3039 LOCATED ON AF E-PUBLISHING

1. The author must complete page two of this form:
  - a. In Section 2, add the funding source for your study [ e.g., 59 MDW CRD Graduate Health Sciences Education (GHSE) (SG5 O&M); SG5 R&D; Tri-Service Nursing Research Program (TSNRP); Defense Medical Research & Development Program (DMRDP); NIH; Congressionally Directed Medical Research Program (CDMRP) ; Grants; etc.]
  - b. In Section 2, there may be funding available for journal costs, if your department is not paying for figures, tables or photographs for your publication. Please state "YES" or "NO" in Section 2 of the form, if you need publication funding support.
2. Print your name, rank/grade, sign and date the form in the author's signature block or use an electronic signature.
3. Attach a copy of the 59 MDW IRB or IACUC approval letter for the research related study. If this is a technical publication/presentation, state the type (e.g. case report, QA/QI study, program evaluation study, informational report/briefing, etc.) in the "Protocol Title" box.
4. Attach a copy of your abstract, paper, poster and other supporting documentation.
5. Save and forward, via email, the processing form and all supporting documentation to your unit commander, program director or immediate supervisor for review/approval.
6. On page 2, have either your unit commander, program director or immediate supervisor:
  - a. Print their name, rank/grade, title; sign and date the form in the approving authority's signature block or use an electronic signature.
7. Submit your completed form and all supporting documentation to the CRD for processing (59crdpubspres@us.af.mil). **This should be accomplished no later than 30 days before final clearance is required to publish/present your materials.** If you have any questions or concerns, please contact the 59 CRD/Publications and Presentations Section at 292-7141 for assistance.
8. The 59 CRD/Publications and Presentations Section will route the request form to clinical investigations, 502 ISG/JAC (Ethics Review) and Public Affairs (59 MDW/PA) for review and then forward you a final letter of approval or disapproval.
9. Once your manuscript, poster or presentation has been approved for a one-time public release, you may proceed with your publication or presentation submission activities, as stated on this form. **Note:** For each new release of medical research or technical information as a publication/presentation, a new 59 MDW Form 3039 must be submitted for review and approval.
10. If your manuscript is accepted for scientific publication, please contact the 59 CRD/Publications and Presentations Section at 292-7141. This information is reported to the 59 MDW/CC. All medical research or technical information publications/presentations must be reported to the Defense Technical Information Center (DITC). See 59 MDWI 41-108, *Presentation and Publication of Medical and Technical Papers*, for additional information.
11. The Joint Ethics Regulation (JER) DoD 5500.07-R, *Standards of Conduct*, provides standards of ethical conduct for all DoD personnel and their interactions with other non-DoD entities, organizations, societies, conferences, etc. Part of the Form 3039 review and approval process includes a legal ethics review to address any potential conflicts related to DoD personnel participating in non-DoD sponsored conferences, professional meetings, publication/presentation disclosures to domestic and foreign audiences, DoD personnel accepting non-DoD contributions, awards, honoraria, gifts, etc. The specific circumstances for your presentation will determine whether a legal review is necessary. **If you (as the author) or your supervisor check "NO" in block 17 of the Form 3039, your research or technical documents will not be forwarded to the 502 ISG/JAC legal office for an ethics review.** To assist you in making this decision about whether to request a legal review, the following examples are provided as a guideline:

For presentations before professional societies and like organizations, the 59 MDW Public Affairs Office (PAO) will provide the needed review to ensure proper disclaimers are included and the subject matter of the presentation does not create any cause for DoD concern.

If the sponsor of a conference or meeting is a DoD entity, an ethics review of your presentation is not required, since the DoD entity is responsible to obtain all approvals for the event.

If the sponsor of a conference or meeting is a non-DoD commercial entity or an entity seeking to do business with the government, then your presentation should have an ethics review.

If your travel is being paid for (in whole or in part) by a non-Federal entity (someone other than the government), a legal ethics review is needed. These requests for legal review should come through the 59 MDW Gifts and Grants Office to 502 ISG/JAC.

If you are receiving an honorarium or payment for speaking, a legal ethics review is required.

If you (as the author) or your supervisor check "YES" in block 17 of the Form 3039, your research or technical documents will be forwarded simultaneously to the 502 ISG/JAC legal office and PAO for review to help reduce turn-around time. If you have any questions regarding legal reviews, please contact the legal office at (210) 671-5795/3365, DSN 473.

**NOTE:** All abstracts, papers, posters, etc., should contain the following disclaimer statement:

***"The views expressed are those of the [author(s)] [presenter(s)] and do not reflect the official views or policy of the Department of Defense or its Components"***

**NOTE:** All abstracts, papers, posters, etc., should contain the following disclaimer statement for research involving humans:

***"The voluntary, fully informed consent of the subjects used in this research was obtained as required by 32 CFR 219 and DODI 3216.02\_AFI 40-402."***

**NOTE:** All abstracts, papers, posters, etc., should contain the following disclaimer statement for research involving animals, as required by AFMAN 40-401\_IP :

***"The experiments reported herein were conducted according to the principles set forth in the National Institute of Health Publication No. 80-23, Guide for the Care and Use of Laboratory Animals and the Animal Welfare Act of 1966, as amended."***

PROCESSING OF PROFESSIONAL MEDICAL RESEARCH/TECHNICAL PUBLICATIONS/PRESENTATIONS			
1. TO: CLINICAL RESEARCH	2. FROM: (Author's Name, Rank, Grade, Office Symbol) Menzie, Kevin/CPT/SGDTR	3. GME/GHSE STUDENT: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	4. PROTOCOL NUMBER: FWH20160037N
5. PROTOCOL TITLE: ( <b>NOTE:</b> For each new release of medical research or technical information as a publication/presentation, a new 59 MDW Form 3039 must be submitted for review and approval.) Accuracy of Various Stereolithographic Materials for Orthodontic Models			
6. TITLE OF MATERIAL TO BE PUBLISHED OR PRESENTED: Accuracy of Various Stereolithographic Materials for Orthodontic Models Printed on the Stratasys Objet Eden260V			
7. FUNDING RECEIVED FOR THIS STUDY? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO FUNDING SOURCE: 59 MDW			
8. DO YOU NEED FUNDING SUPPORT FOR PUBLICATION PURPOSES: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
9. IS THIS MATERIAL CLASSIFIED? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
10. IS THIS MATERIAL SUBJECT TO ANY LEGAL RESTRICTIONS FOR PUBLICATION OR PRESENTATION THROUGH A COLLABORATIVE RESEARCH AND DEVELOPMENT AGREEMENT (CRADA), MATERIAL TRANSFER AGREEMENT (MTA), INTELLECTUAL PROPERTY RIGHTS AGREEMENT ETC.? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <b>NOTE:</b> If the answer is YES then attach a copy of the Agreement to the Publications/Presentations Request Form.			
11. MATERIAL IS FOR: <input type="checkbox"/> DOMESTIC RELEASE <input type="checkbox"/> FOREIGN RELEASE CHECK APPROPRIATE BOX OR BOXES FOR APPROVAL WITH THIS REQUEST. ATTACH COPY OF MATERIAL TO BE PUBLISHED/PRESENTED.			
<input type="checkbox"/> 11a. PUBLICATION/JOURNAL (List intended publication/journal.)			
<input type="checkbox"/> 11b. PUBLISHED ABSTRACT (List intended journal.)			
<input checked="" type="checkbox"/> 11c. POSTER (To be demonstrated at meeting: name of meeting, city, state, and date of meeting.) American Association of Orthodontists 117th Annual Session, San Diego, CA, 21Apr-25Apr2017			
<input type="checkbox"/> 11d. PLATFORM PRESENTATION (At civilian institutions: name of meeting, state, and date of meeting.)			
<input type="checkbox"/> 11e. OTHER (Describe: name of meeting, city, state, and date of meeting.)			
12. HAVE YOUR ATTACHED RESEARCH/TECHNICAL MATERIALS BEEN PREVIOUSLY APPROVED TO BE PUBLISHED/PRESENTED? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO ASSIGNED FILE # _____ DATE _____			
13. EXPECTED DATE WHEN YOU WILL NEED THE CRD TO SUBMIT YOUR CLEARED PRESENTATION/PUBLICATION TO DTIC <b>NOTE:</b> All publications/presentations are required to be placed in the Defense Technical Information Center (DTIC).			
DATE 28 March 2017			
14. 59 MDW PRIMARY POINT OF CONTACT (Last Name, First Name, M.I., email) 59DTS/59DG/SGDTR			15. DUTY PHONE/PAGER NUMBER 210-292-9038
16. AUTHORSHIP AND CO-AUTHOR(S) List in the order they will appear in the manuscript.			
LAST NAME, FIRST NAME AND M.I.	GRADE/RANK	SQUADRON/GROUP/OFFICE SYMBOL	INSTITUTION (If not 59 MDW)
a. Primary/Corresponding Author			
b. Menzie, Kevin	O-3/CPT	SGDTR	
c. Johnson, Kelly	O-5/LTC	SGDTR	
d.			
e.			
17. IS A 502 ISG/JAC ETHICS REVIEW REQUIRED (JER DOD 5500.07-R)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
I CERTIFY ANY HUMAN OR ANIMAL RESEARCH RELATED STUDIES WERE APPROVED AND PERFORMED IN STRICT ACCORDANCE WITH 32 CFR 219, AFMAN 40-401_IP, AND 59 MDWI 41-108. I HAVE READ THE FINAL VERSION OF THE ATTACHED MATERIAL AND CERTIFY THAT IT IS AN ACCURATE MANUSCRIPT FOR PUBLICATION AND/OR PRESENTATION.			
18. AUTHOR'S PRINTED NAME, RANK, GRADE Menzie, Kevin/CPT/O-3		19. AUTHOR'S SIGNATURE MENZIE KEVIN LEON 1400499493	20. DATE 2 February 2017
21. APPROVING AUTHORITY'S PRINTED NAME, RANK, TITLE Lee, David/Col/O-6		22. APPROVING AUTHORITY'S SIGNATURE	23. DATE

**PROCESSING OF PROFESSIONAL MEDICAL RESEARCH/TECHNICAL PUBLICATIONS/PRESENTATIONS**

**1st ENDORSEMENT (59 MDW/SGVU Use Only)**

TO: Clinical Research Division 59 MDW/CRD Contact 292-7141 for email instructions.	24. DATE RECEIVED February 10, 2017	25. ASSIGNED PROCESSING REQUEST FILE NUMBER 17093
--	--	--

26. DATE REVIEWED February 13, 2017	27. DATE FORWARDED TO 502 ISG/JAC
--	-----------------------------------

28. AUTHOR CONTACTED FOR RECOMMENDED OR NECESSARY CHANGES:  NO  YES If yes, give date. \_\_\_\_\_  N/A

29. COMMENTS  APPROVED  DISAPPROVED  
 Dental materials research with IRB determination letter. All appropriate disclaimers included. Approved

30. PRINTED NAME, RANK/GRADE, TITLE OF REVIEWER Kevin Kupferer/GS13/Human Research Subject Protection Expert	31. REVIEWER SIGNATURE KUPFERER KEVIN R. 1086667270 <small>Digitally signed by KUPFERER KEVIN R. 1086667270                  DN: cn=KUPFERER KEVIN R. 1086667270, o=59 MDW/CRD, ou=59 MDW/CRD, email=KUPFERER KEVIN R. 1086667270@59MDW.COM, c=US                  Date: 2017.02.13 13:30:17 -0500</small>	32. DATE February 13, 2017
---	--	-------------------------------

**2nd ENDORSEMENT (502 ISG/JAC Use Only)**

33. DATE RECEIVED	34. DATE FORWARDED TO 59 MDW/PA
-------------------	---------------------------------

35. COMMENTS  APPROVED (In compliance with security and policy review directives.)  DISAPPROVED

36. PRINTED NAME, RANK/GRADE, TITLE OF REVIEWER	37. REVIEWER SIGNATURE	38. DATE
---	------------------------	----------

**3rd ENDORSEMENT (59 MDW/PA Use Only)**

39. DATE RECEIVED February 14, 2017	40. DATE FORWARDED TO 59 MDW/SGVU February 14, 2017
--	--

41. COMMENTS  APPROVED (In compliance with security and policy review directives.)  DISAPPROVED

42. PRINTED NAME, RANK/GRADE, TITLE OF REVIEWER Kevin Iinuma, SSgt/E-5, 59 MDW Public Affairs	43. REVIEWER SIGNATURE IINUMA KEVIN MITSUGU 1296227 <small>Digitally signed by IINUMA KEVIN MITSUGU 1296227                  DN: cn=IINUMA KEVIN MITSUGU 1296227, o=59 MDW/PA, ou=59 MDW/PA, email=IINUMA KEVIN MITSUGU 1296227@59MDW.COM, c=US                  Date: 2017.02.14 09:38:38 -0500</small>	44. DATE February 14, 2017
--	--	-------------------------------

**4th ENDORSEMENT (59 MDW/SGVU Use Only)**

45. DATE RECEIVED	46. SENIOR AUTHOR NOTIFIED BY PHONE OF APPROVAL OR DISAPPROVAL <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> COULD NOT BE REACHED <input type="checkbox"/> LEFT MESSAGE
-------------------	--

47. COMMENTS  APPROVED  DISAPPROVED

48. PRINTED NAME, RANK/GRADE, TITLE OF REVIEWER	49. REVIEWER SIGNATURE	50. DATE
---	------------------------	----------

# **Accuracy of Various Stereolithographic Materials for Orthodontic Models Printed on the Stratasys Objet Eden260V™**

## **ABSTRACT**

### **Purpose**

The Objet Eden260V™ (Stratasys, Ltd.; Eden Prairie, Minn.) was used to compare the accuracy of printed orthodontic models of varying materials, with the objective of determining if a particular material resulted in a product that was more accurate to the original. From an evidence-based approach, this information is useful in understanding which material is most appropriate when writing a lab prescription request for a printed dental model.

### **Methods**

Seven Polyjet materials were selected and eight models of each material were produced. All models of a given material were printed simultaneously, with each material being printed within a three-week time frame. The position of each model on the print table was recorded. Models were labeled according to a pre-defined scheme and digitally scanned. Models were compared to each other by using digital overlays utilizing three-dimensional software (GeoMagic Freeform Plus, 3D Systems, Inc; Valencia, CA). A one-way ANOVA was used to compare the seven groups, and Tukey's post-hoc test was used to determine which groups were statistically different.

### **Results**

Outcome variables determined by GeoMagic overlays were: average differences, average differences positive, average differences negative, maximum differences positive, maximum differences negative, standard deviation, and root mean square

estimate. There were statistically significant differences ( $p < 0.05$ ) for all outcome variables except for maximum differences negative. Group B (670 VeroDent) was printed with the most consistent accuracy, with Group A (MED610) following closely behind. In terms of cost-efficiency, 670 VeroDent was also by far the most economical choice.

### **Conclusions**

Of the materials tested, Group B, 670 VeroDent, is the best choice for printing dental models on the Stratasys Objet Eden260V™. Within this study's limitations, this material is superior to the six others in terms of printing accuracy and economics. The printer struggled to produce a model that would be clinically acceptable for appliance fabrication, as differences in some areas as large as 3.73 millimeters can be expected. Follow-up studies are recommended to corroborate findings and compare accuracy between printers from various manufacturers.

**Disclaimer:** *The views expressed are those of the author(s)/presenter(s) and do not reflect the official views or policy of the Department of Defense or its Components.*