

UNIVERSITI SAINS ISLAM MALAYSIA DATA MANAGEMENT PLAN (DMP)
Project ID:
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Project Title: Elucidating the Properties of High-Performance Polymers Reinforced on Three-Dimensional Printed Sports Mouthguard
Institute: Universiti Sains Islam Malaysia
Start Date: 1/8/2024
End Date: 31/7/2027
Project Summary: Digital advancements in sports mouthguard fabrication, particularly through three-dimensional (3D) printing, have shown promise but face challenges in maintaining structural integrity. The current use of resin, originally designed for splints and retainers, is a key factor in this issue. This study aims to enhance the strength and durability of 3D-printed mouthguards by incorporating highperformance polymers Polyetherketoneketone (PEKK) and Polyetherimide (PEI) into the commercially available resin. The new material will be evaluated against conventional and other 3D-printed mouthguards in the global market. By blending these two polymers in various ratios, the study will create new materials to be 3D printed using the NextDent® 5100 3D Printer. Mechanical testing will focus on structural integrity, fracture toughness, flexural strength, microhardness, and impact strength. Additionally, physical evaluations using Fourier Transform Infrared Spectroscopy (FTIR) and Field Emission Scanning Electron Microscopy (FESEM) will be conducted to characterize and identify materials. The goal is to develop a 3D-printed resin that is strong, durable, biocompatible, and comfortable for athletes, thereby addressing the structural integrity issues of current 3D-printed materials. This research represents a significant step forward in material science for dental and orofacial injury prevention and will involve collaboration with dental laboratories, distributors, and universities. In line with the United Nations Sustainable Development Goals, this study promotes global health and well-being by providing a better solution for sports mouthguards.
Grant number (if any): FRGS/1/2024/STG05/USIM/03/1
Funders (if any): Ministry of Higher Education of Malaysia
DMP Version Number: 1
1. Data summary:
• "Will you reuse any existing research data? (please select either NO or YES and answer the following questions) " (please select either NO or YES and answer the questions below) ▪ No ☐

▪ Yes ☐

Please provide link to repository (if any).

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2. FAIR data

2.1 Making data FINDABLE, including provisions for metadata

- The data will be deposited to the university repository (<https://oarep.usim.edu.my/home>)
- Dublin Core Metadata Standard

- Please state the keywords that will be provided in the metadata for discovery and potential reuse.

[Ortho flex resin](#), [Ethylene vinyl acetate](#)

2.2 Making data openly accessible

- The data will be deposited to the university repository (<https://oarep.usim.edu.my/home>)

- Will all data be made openly available?

☐ No

Why can't all the datasets be shared? (Explain clearly separating legal and contractual reasons from intentional restrictions)

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Is an embargo applied to give time to publish or seek protection of the intellectual property (e.g. patents)? If Yes, specify why and how long the embargo will be applied?

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If there are restrictions on use, please explain how will access be provided to the data, both during and after the end of the project.

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Will metadata be made openly available and licenced under a public domain?

.....

☒ Yes

Will metadata be made openly available and licenced under a public domain?

[Yes](#)

- How long will the data remain available and findable?

[Abiding to the rules and regulations of the utilized platform](#)

2.3 Making data INTEROPERABLE

- Specify what data and metadata vocabularies, standards or methodologies you will follow to facilitate interoperability.

Standards: [.xlsx](#)

Methodologies: [Microsoft excel](#)

2.4 Increase data RE-USE

- **Specify how the data will be licenced to permit the widest reuse possible.**
The data will be licenced with Creative Common Licensing:
CC BY-NC
(BY: credit must be given to the creator)
(NC: Only non-commercial uses of the work are permitted)
- **Will the data produced in the project be useable by third parties, in particular, after the end of the project?**
Yes
- **Will some data produced be restricted for reuse? If Yes, explain why.**
No
- **Specify the length of time for which the data will remain re-usable.**
☒ In accordance with USIM RDM Policy
☐ In accordance with funder's requirements (Please specify)

3. Allocation of resources

- **Clearly identify responsibilities for data management in your project.**
Data management will be overseen by the principal investigator, who is responsible for ensuring proper data collection, storage, documentation, and compliance with institutional guidelines, while research team members assist with data recording, organization, and processing under supervision.
- **Describe costs and potential value of long-term preservation. (if any)**
Not applicable

4. Data security

- **Where will the data be stored during the project?**
Personal laptop
- **How will you ensure that the data are securely stored (not accessed or modified by unauthorised persons), especially for sensitive data?**
Password encrypted - laptops/ folders/ files
- **What is the backup strategy?**
Google drive

5. Ethical aspects

- **Consider whether there are any ethical or legal issues than can have an impact on data sharing. For example, is informed consent for data sharing and long-term preservation included in questionnaires dealing with personal data?**
Not applicable

6. Other issues

- **Do you, or will you, make use of other national/funder/sectorial/departmental procedures for data management? If yes, which ones (please list and briefly describe them)?**

No other departmental procedures for data management are used.

Copyright information:

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Should you have any enquiries, please contact USIM Data Stewards:

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