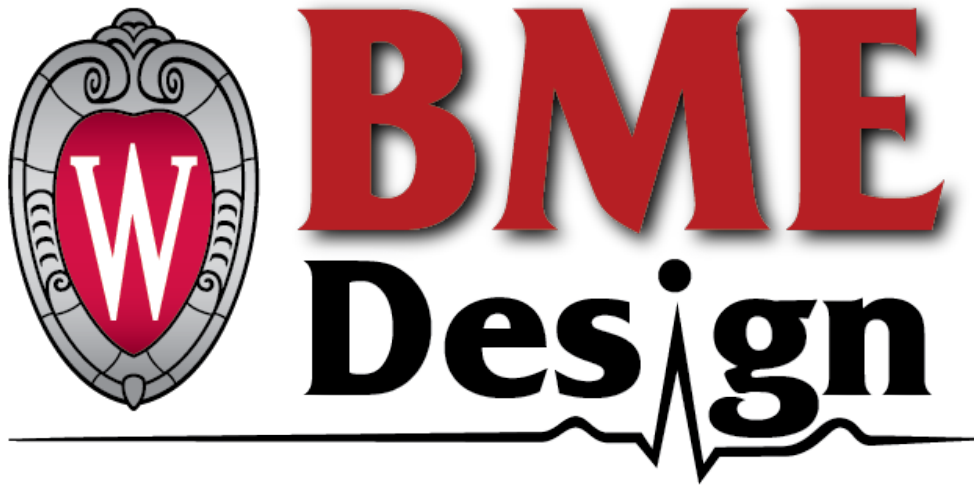




**Approximating Surface Matrix Band
Progress report #1**

BME 200/300

Team Name: TBD

Fall 2026

09/11/2026

Client: Dr. Donald Tipple

Advisor: John Puccinelli

Team Members:

Leader: May Kennelly

Communicator: Olivia Kallas

BSAC: Nicholas Miles

BPAG: Luca Benedetto

BWIG: Samuel Zakaib

BWIG: Justin Schwartz

Problem statement

Surface matrix bands are devices used by dentists to separate adjacent teeth during restorations of inter-proximal cavities (cavities found in-between two teeth). The matrix band serves to support the restoration material, to provide shape and contour to the tooth being restored, and to protect the adjacent tooth. Ideally, the width of the space between the two adjacent teeth is just large enough to fit one matrix band in order to ensure close proximal contact area, which prevents food impaction and decay. In the case of two cavities on two adjacent teeth, this process is tedious, as the dentist must complete the process from start to finish for each adjacent tooth individually. The goal of this project is to create a dental matrix band that effectively partitions adjacent teeth for more efficient tooth restoration procedures on interproximal cavities by making it possible to complete two adjacent restorations simultaneously.

Brief status update

The Fall 2026 team is working to review past work and research the topic of dental matrices to understand the project and points of improvement. Additionally, the team is compiling information to come up with a product design specification document.

Current design

The current design is from spring semester 2026. It successfully reduces procedure time, but the manufacturing methods and testing need to be improved and expanded upon to increase quality and ease of use. The current design is 0.0254 mm thick fully annealed 316 SS with a hole for tight proximal contact and a tab for easy handling. To cut the flats a template was used and then the flat was molded with a 3D printed mold.



Figure 1. SolidWorks model of Dual Matrix courtesy of the Spring 2026 team.

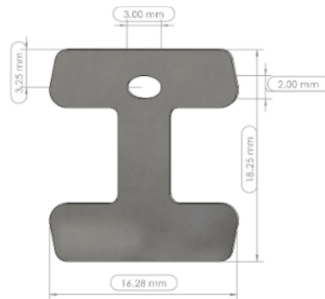


Figure 2. Flat cutout of matrix courtesy of the Spring 2026 Team.

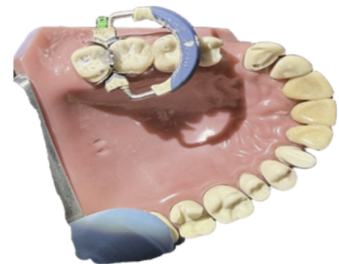


Figure 3. Dual Matrix with filling in tooth model courtesy of the Spring 2026 team.

Materials and expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
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Category 1										
									\$0.00	
									\$0.00	
Category 2										
									\$0.00	
									\$0.00	
								TOTAL:	\$0.00	

Goals

Major team goals for the next week

1. Continue researching background information.
2. Brainstorm design ideas and formulate design matrix.

Next week's individual goals

- May...
 - Communicate with team about design matrix and importance of individually brainstorming ideas
 - Continue researching machining methods as waterjet and laser cutting will not work
 - Put progress reports into labarchive
- Olivia...
 - Get in touch with the client about getting previous semester's materials (set up a post-vacation meeting)
 - Research material properties of the metal alloy we are using and how it can be machined.
- Nicholas...
 - Complete more focused research now that we have met with the client and better understand the project goals and requirements
 - Think about things to bring to the next BSAC meeting for discussion
- Sam... Research more about biocompatible materials
 - Find 2 more meaningful sources
 - Touch base with team and finalize materials/specs
 -
- Justin...
 - More research entries
- Luca...
 - Research more about competing designs.
 - Brainstorm possible changes to the prototype to solve previous design flaws.

Timeline

Task	September				October					Nove mber	December		
	10	11	18	25	2	7	9	16	23	6	4	9	11
Project R&D													

Empathize													
Background...													
Prototyping													
Testings													
Deliverables													
Progress Reports	X	X	X	X	X	X	X	X	X	X	X	X	
PDS			X										
Design				X			X						
Presentations					X						X		
Report						X						X	
Final Poster												X	
Meetings													
Client		X											
Advisor													
Website													
Update	X	X	X	X	X	X	X	X	X	X	X	X	
Course Requirements													
								LDR	Training Show + tell	Tong			Schedule advisor meeting

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's individual goals

- May...
 - Learn more about different filling tools and materials
 - Meet with client, ask about what filling material he most commonly uses (porcelain, composite resin)
- Olivia...
 - Meet with client and establish a connection
 - Reach out to advisor and client
 - 2 Research entries
- Nicholas...
 - Find more sources for research entries
 - Meet with client to understand user needs and develop project goals from there
- Sam...
 - Continue to study Sectional Matrix systems
 - Material(s)
 - Size
 - Procedure usage
 - Continue to research - 1 more competing design and 1 more bio/phys source
- Justin...
 - Get a deeper understanding of the project we were assigned
 - Complete 2 more competing design entries

-
- Luca...
 - Meet with the client in order to get a better understanding of the project
 - Find 2 additional sources for research for general understanding

The team successfully met with the client and had several questions answered. They continued researching and learned more about the project. The PDS was completed and submitted on 9/17/20.

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
May Kennelly	2026/09/07	Did general research about cavities and their causes/treatments Organized team materials and inputted future assignments into group calendar Created the team notebook and added several required documents for upcoming meetings Messaged group members to coordinate work	3.5	3.5	3.5
May Kennelly	09/16/2026 09/17/2026	• Completed function, performance requirements, and safety portions of the PDS ○ Researched across standards and articles for pertinent information • Messaged 200 students with specific feedback on their completed sections which they edited • Completed final edits on the overall PDS, compiled sources, and formatted the PDS	2 2	4	7.5
Olivia Kallas	09/11/2026 09/20/2026	-Completed lab archives research entries. - Completed personal sections of the PDS -Client meeting	2 1	3	6
Sam Zakaib	09/10/2026	• Researched different types of matrices ○ Sectional	2	2	2

		○ Tofflemire ● Researched 2 different research articles about class II cavities and how they form ○ Current treatments ● Completed 4 research entries in LabArchives (2 competing, 2 Bio/Phys sources) ● Updated team website to display group picture, names, roles			
Sam Zakaib	09/16/2026	● Worked on sections of PDS ○ Materials ○ Accuracy and Reliability ○ Operating Environment ● Found 2 new sources	3	3	5
Nicholas Miles	09/15/2026	-Completed lab archives research to learn more about the topic -Attended the first BSAC meeting to learn more about my role and started thinking about ways to improve the course and the overall BME program -Met with the client to learn more about the project and the project requirements -Completed personal sections of the PDS	4	4	6
Justin Schwartz	9/07/2026	● Did research on competing designs ● Watched a video on one way to do back-to-back class II fillings ● Worked on PDS\ ○ Shelf life ○ Appearance and aesthetics ○ Competing design	2 1	3	5
Luca Benedetto	09/07/2026	● Completed research entries to better understand the subject matter of the project	2	2	2
Luca Benedetto	09/16/2026	● Found sources for research ● Worked on PDS sections ○ Life in Service ○ Production Characteristics	2	2	4