

Approximating Surface Matrix Band for Dentist to Use for Patients

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Date: November 23rd, 2025 - November 28th, 2025

Client: Dr. Donald Tipple

Advisor: Prof. Beth Meyerand

Team:

Roshan Patel - rgpatel3@wisc.edu (Team Leader)

Keleous Lange - krlange@wisc.edu (Communicator & Co-BPAG)

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Problem statement

Surface matrix bands are devices used by dentists to separate adjacent teeth during restorations of interproximal 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 team is looking into alternative fabrication methods and materials. The Design Lab is acquiring a laser cutter that would be ideal for us but will only be available for next semester. Otherwise, we are planning on fabricating a larger scale model for temporary use during the poster presentation.

Summary of weekly team member design accomplishments

- Roshan Patel
 - Met with the team for laser-cutting.
 - Completed the assigned portions of the final poster.
 - Performed MTS data analysis with MATLAB
- Keleous Lange
 - Met with the team for laser-cutting.
 - Completed the assigned portions of the final poster.
- Tanya Predko
 - Met with the team for laser-cutting.
 - Completed the assigned portions of the final poster.
 - Performed an FEA analysis of the design on SOLIDWORKS.
- Joseph Koch
 - Met with the team for laser-cutting.
 - Completed the assigned portions of the final poster.
 - Performed an FEA analysis of the design on SOLIDWORKS.

Difficulties / advice requests

There are no difficulties at this time.

Current design

N/A

Materials and expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Date	#	Cost Each	Total	Link
Category 1: Testing Materials									
Stainless Steel sheet	316 Stainless Steel Shim Stock	McMaster Carr	2317 K51	McMaster Carr	11/07	1	22.55	\$22.55	https://www.mcmaster.com/2317K51/
								\$0.00	
Category 2: Final Prototype									
								\$0.00	
								\$0.00	
							TOTAL	\$22.55	

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Major team goals for the next week

1. Write the final report for the semester

Next week's individual goals

- Roshan Patel
 - Write the report
- Keleous Lange
 - Complete the assigned portions of the final report.
- Tanya Predko
 - Complete the assigned portions of the final report.
- Joseph Koch
 - Complete the assigned portions of the final report.

Timeline

Task	September				October				November					December	
	6	13	20	27	4	11	18	25	1	8	15	22	29	6	13
Project R&D															
Empathize	X														
Background...															
Prototyping															
Testings															
Deliverables															
Progress Reports	X	X	X	X	X	X	X								
Prelim presentation						X									
Final Poster															
Meetings															
Client															
Advisor	X	X	X	X	X	X	X								
Website															
Update	X	X	X	X	X	X	X								

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

- Fabricated first prototype

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Roshan Patel	11/20/2025	<ul style="list-style-type: none">- Met with the team for laser-cutting.- Completed the final poster.- MATLAB data analysis	4	4	30
Keleous Lange	11/20/2025	<ul style="list-style-type: none">- Team meeting- Final poster	2	2	22.5
Tanya Predko	11/20/2025	<ul style="list-style-type: none">- Met with the team for laser-cutting.- Completed the final poster.- Completed the FEA analysis on SOLIDWORKS.	4	4	28.5
Joseph Koch	11/20/2025	<ul style="list-style-type: none">- Team meeting- Final poster- SolidWorks	5	5	29