

Approximating Surface Matrix Band for Dentist to Use for Patients

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Date: November 16th, 2025 - November 21st, 2025

Client: Dr. Donald Tipple

Advisor: Prof. Beth Meyerand

Team:

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

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Joseph Koch - jmkoch7@wisc.edu (BSAC)

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
 - Research into metal laser cutting
 - Research into SolidWorks modeling
- Keleous Lange
 - Met with the team to discuss outreach and end of semester deliverables.
- Tanya Predko
 - Met with the team to discuss outreach and end of semester deliverables.
- Joseph Koch
 - Met with the team to discuss outreach and end of semester deliverables.

Difficulties / advice requests

There are no difficulties at this time.

Current design

N/A

Materials and expenses

Item	Description	Manufac-turer	Mft Pt#	Vendor	Date	#	Cost Each	Total	Link
Category 1: Testing Materials									
Stainless Steel sheet	316 Stainless Steel Shim Stock	McMaster Carr	2317 K51	McMas ter 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	

Major team goals for the next week

1. Look into other fabrication and material options

2. Larger scale model development
3. Testing plan

Next week's individual goals

- Roshan Patel
 - Solidworks modeling
- Keleous Lange
 - Meet with the team to laser cut the templates.
- Tanya Predko
 - Perform FEA analysis on the SOLIDWORKS models.
 - Meet with the team to laser cut the templates.
- Joseph Koch
 - Meet with the team to laser cut the templates.

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	- Research into laser cutting metal and solidworks modeling	2	2	26
Keleous Lange	11/20/2025	- Meeting	1	1	20.5
Tanya Predko	11/20/2025	- Met as a team to discuss final deliverables and outreach.	1	1	24.5
Joseph Koch	11/20/2025	- Meeting	1	1	24