Approximating Surface Matrix Band for Dentist to Use for Patients

Project Page

Date: January 25th, 2025 - January 29th, 2026

Client: Dr. Donald Tipple
Advisor: Prof. Beth Meyerand
Team:

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

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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 has contacted Dr. Williams, who offered to help with the fabrication of the device using his own laser cutter. We will be giving him the remainder of our stock stainless steel and updated design files so that he can attempt to cut them. After this, we

will assess the success of the fabrication and either move on to testing or rework our fabrication protocol again.

Summary of weekly team member design accomplishments

- Roshan Patel
    - Initial team meeting
    - Preformed background research
- Anya Hadim
    - Initial team meeting
    - Communicated with client, advisor, and professor helping us with laser cutting on setting up meeting times
    - Performed background research on dental surface matrices
- Keleous Lange
    - Initial team meeting
    - Researched cavity filling techniques
- Tanya Predko
    - Met with the team over Zoom
    - Began the client meeting notes in LabArchives; brainstormed questions to ask Dr. Tipple
- Joseph Koch
    - Revised models and brainstormed new design ideas
    - Researched existing procedures and filling techniques

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	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**	

Major team goals for the next week

1. Look into other fabrication and material options

Next week's individual goals

- Roshan Patel
  - Attend client meeting
  - Conduct research based on client's recommendations
  - Follow up with the laser cutting procedure
- Anya Hadim
  - Attend client meeting
  - Conduct research based on client's recommendations
  - Follow up with the laser cutting procedure
- Keleous Lange
  - Attend client meeting
  - Redesign matrix for Dr. Williams to cut
- Tanya Predko
  - Meet with Dr. Tipple on 01/30 to address questions
  - Refine the design based on the client's suggestions
  - Begin the laser cutting process with the help of Dr. Williams
- Joseph Koch
  - Revise design
  - Create files for cutting
  - More research into material stiffness

Timeline

Task	February				March				April					May	
	6	13	20	27	6	13	20	27	3	10	17	24	3	1	8
Project R&D															

Empathize															
Background…															
Prototyping															
Testings															
Deliverables															
Progress Reports															
Prelim presentation															
Final Poster															
Meetings															
Client															
Advisor															
Website															
Update															

Filled boxes = projected timeline
X = task was worked on or completed

Previous week's goals and accomplishments

- N/A

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Roshan Patel	01/29/2026	- Team Meeting - Research	1 1	2	2
Anya Hadim	01/29/2026	-			
Keleous Lange	01/29/2026	- Team Meeting - Researched Cavity Filling Techniques	1 2	3	3
Tanya Predko	01/29/2026	- Team meeting - Question brainstorming and	1 1	2	2

		LabArchives			
Joseph Koch	01/29/2026	-			