Title: Reusable 3D pelvic floor teaching model for layered construction activities (Super-Models) 200/300

Date: 10/17/2026 - 10/23/2026

Client: Kelsey Henriquez
Advisor: Prof. David Dean
Team:
- Katherine Ahlquist (kahlquist@wisc.edu) - Co-Team Leader
- Sara Mlodik (mlodik@wisc.edu) - Co-Team Leader
- Mina Hawkins (mjhawkins@wisc.edu) - Communicator
- Abigayle Chapman (akchapman2@wisc.edu) - BWIG
- Hiba Shah (hashah2@wisc.edu) - BPAG
- Karen Pisano (kpisano@wisc.edu) - BSAC

Problem statement

The Physician Assistant anatomy curriculum currently has a pelvic floor anatomy workshop that uses a 2-dimensional paper template of the bony pelvis, on which PA students build pelvic floor musculature and tissues using colored Play-Doh. While the activity promotes hands-on learning, the 2D model does not adequately allow students to develop the three-dimensional spatial relationships required for future clinical practice. The client needs a classroom set of pelvic outlet models that accurately represent the normal adult pelvic anatomy, including anatomical landmarks for muscle and ligament attachment, that can serve as a stable scaffold for students to build pelvic floor musculature. It should be durable enough for repeated classroom use, easy to assemble and store, and allow Play-Doh or another inexpensive modeling material to be adhered and removed without causing residue or degradation.

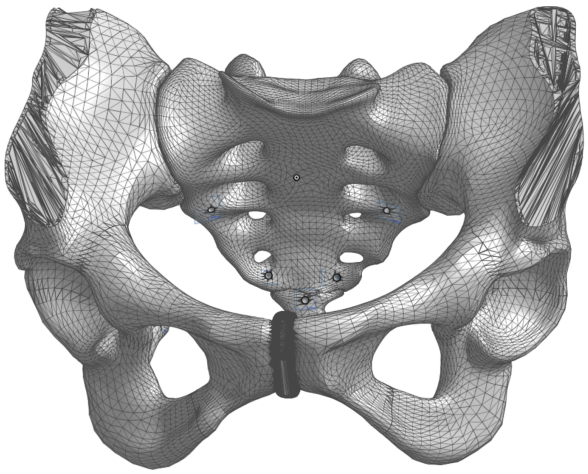
Brief status update

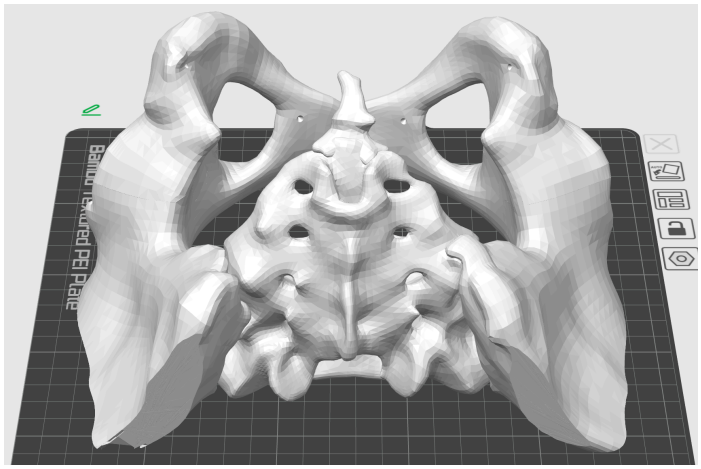
Our team was able to figure out how to even out the top of both sides of the surface of the pelvis so it is smooth and doesn't need filing. We have a semi finalized pelvic floor model which we plan on finalizing by next week. We are also close to finalizing our TPU ligaments which we will 3D print next week as well. We have received all materials needed to complete this project.

Difficulties / advice requests

-

Current Design



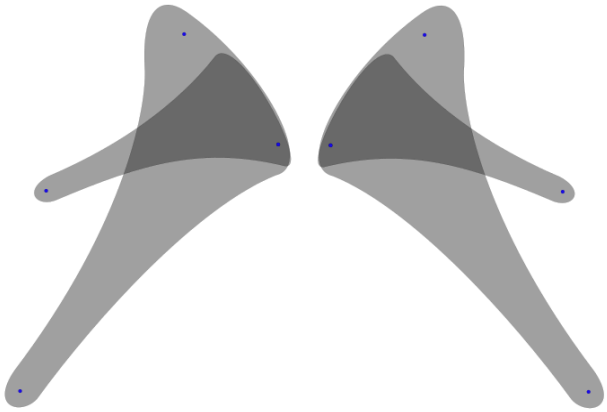


[OnShape 3D Model]

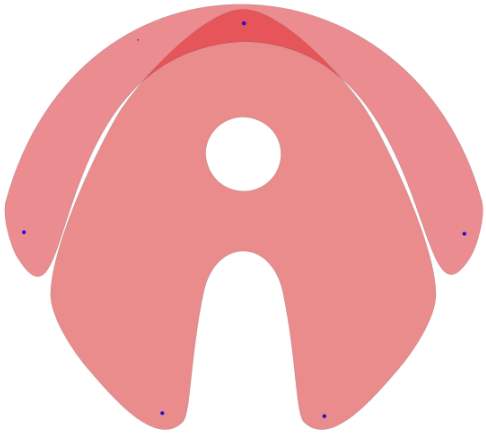


In the Screws with Attachments design, there are 7 pieces total: a 3D printed pelvis, a coccygeus muscle, a levator ani muscle, 2 flexible sacrospinous ligaments, and 2 sacrotuberous ligaments. The outer surface of the model will be coated with matte Mod Podge spray, allowing for better Play Doh adhesion onto the 3D printed surface. The pelvis is a simplified model, with the iliac crest sections superior to the proximal end of the sacrum removed. To allow the attachment of the diaphragm and ligaments, there are screws on the pelvis surface. To address the lower longevity score, the attachment sites involve self-threading screws, with future testing to ensure the screws are able to withstand repeated use without snapping under grip forces up to 624 N. Each of the flexible ligaments and musculature will have attachment holes at the ends with a wide and a narrow section to match anatomical shapes, as seen in the musculature attachment prototypes below. Finally, all structures will adhere to an average of male and female anatomical dimensions, creating a gender-neutral multi-piece pelvis model.

First prototype of musculature attachments:

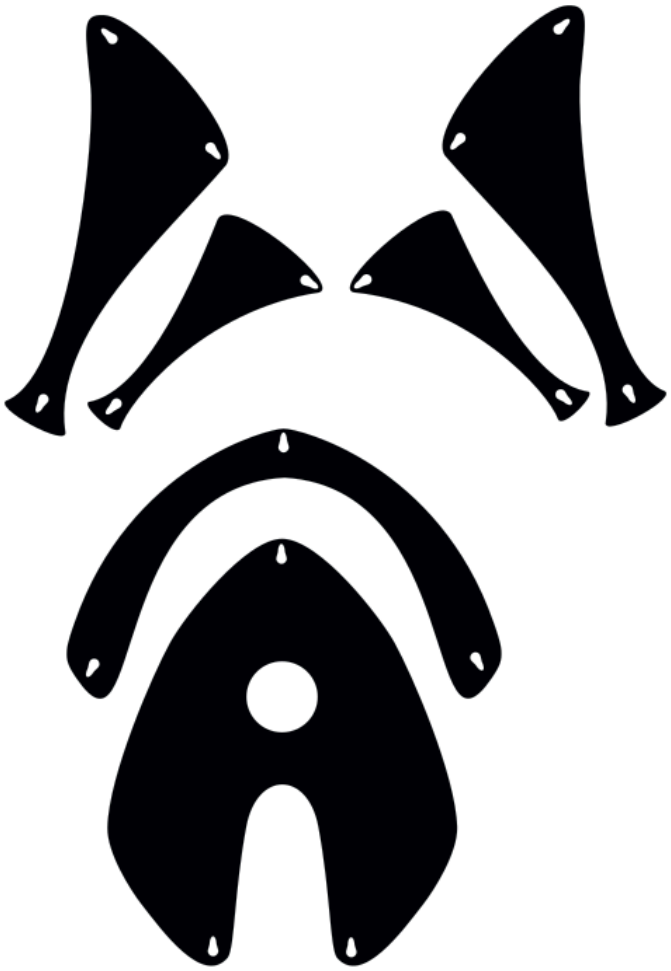


Sacrotuberous and Sacrospinous Ligament Dimensions



Levator Ani and Pubococcygeus Dimensions

Second Prototype of attachments:



- Coccygeous: narrower, and shorter to get rid of slack.
- Levator Ani: slightly longer.
- Sacrotuberous ligament: slightly shorter and splayed out anchoring end.
- Sacrospinous ligament: same sizing, slightly splayed out anchoring end.

Materials and expenses

Item	Description	Manufac- turer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
3D-Printed Scaffold										
Main body of pelvic model	3D printed using PLA from the UW Madison Makerspace	UW Madison Maker space	N/A	N/A	N/A	10/06.2026	30	8.05	241.5	N/A
Screws	390 screws needed for 30 models' ligament attachment sites.	MoyoCodi	PTZG03 #312	Amazon	PTZG03#312.	10/20/2026	4	3.99	16	link
Modpodge	The entire outer surface requires coating.	Modpodge	1469	Amazon	1496	10/06.2026	3	10.18	30.54	Link
Pelvic accessories: Ligaments & Diaphragm										
TPU (red, black,white)	Printing ligaments with provided filament	UW Madison Maker space	N/a	N/a	N/a	10/25/26	30	2	60	N/a
	*$33 off makerspace left (total not subtracted yet)							**TOTAL***	348.04	

Major team goals for the next week

- Mass printing of 30 models
- Starting post fabrication of models (mod podge layering, screws, etc)
- 3D printing ligaments

Next week's individual goals

- Katherine
  - Print out more 3D printed ligaments and resize as needed.
  - Begin drafting the final report.
- Sara
  - Work alongside the team to begin the mass printing of the pelvis models
  - 3D print ligaments and musculature to finalize the 3D print settings and measurements
  - Begin drafting final report
- Mina
  - Help with printing 3D models.
  - Begin writing the final report.
- Abigayle
  - Test cleaning methods on models
  - Assemble protocols and documentation for testing
- Hiba

    - Help with mass printing 3D printed models
    - Start writing final report
- Karen
    - Help print and store 3D printed models
    - Apply modge podge for adhesion testing
    - Begin writing final report

Timeline

Task	Sept			Oct					Nov				Dec	
	11	18	25	2	9	16	23	30	6	13	20	27	4	13
Project R&D														
Empathize	x	x	x	x										
Background…	x	x	x	x										
Prototyping					x	x	x	x						
Testings							x	x						
Deliverables														
Progress Reports	x	x	x	x	x	x	x	x						
PDS		x	x	x	x	x	x	x						
Design Matrix			x											
Prelim Presentation				x										
Prelim Deliverables					x									
Show and Tell								x						
Final Poster														
Final Deliverables														
Meetings														
Client	x				x	x								
Advisor	x	x	x	x	x	x	x							
Website														
Update	x	x	x	x	x	x	x	x						

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

Previous week's goals and accomplishments

- Finalize product and material design details based on 3D-Printing Consultation
- Have at least one functioning prototype for Show and Tell
- Calculate the specific costs of the required materials.

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Katherine	10/28	Revise the ligaments, adjusting shape and size	.75	2.15	30.5 hr
	10/29	Learn Bambu labs, begin the musculature attachment prints	0.5		
	10/26	CITI Training	1		

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Sara	10/25	Attended the team meeting to confirm TPU color and pricing, altered the coccygeus in OnShape and started the 3D print, and taught team members how to start a 3D print	2	7.5 hr	45.95 hr
	10/26	Analyzed the TPU coccygeus print, brainstormed ways to create a smooth top surface in Bambu, and printed the smooth top model	1		
	10/26	Analyzed the newest printed model, checking screw insertion, coccygeus attachment, and surface texture.	1		
	10/27	Fixed and troubleshot the removal of the posterior pubic symphysis bony prominence	2		
	10/28	Documented the 3D printing, OnShape steps, and OnShape troubleshooting processes	1.5		

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Abigayle	10/25	Documented full protocols and testing results for TPU thickness, hole size, and pelvic model surface texture	2	4	37.95 hr
	10/25	Team meeting at Wendt to confirm TPU accessibility and printing, as well as begin 3D prints.	2		

		Tested and selected optimal TPU thickness, and assisted with subsequent hole adjustments			

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Mina	10/29/26	Prepare for show and tell.	.25	.25	38

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Hiba	10/25/26	Created/ updated progress report	.25	3.75	36.45
	10/25/26	Meeting for TPU @wendt/ started 3D print	2.25		
	10/26/26	Emailing makerspace to ask about filament	.25		
	10/29/26	Prepare for show and tell	1		

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Karen	10/25	Meeting at Wendt to finalize TPU	2.25	2.75	37.5
	10/29	Show & Tell Preparation	.5		