

Veterinary bone marrow aspirate models

Date: 10/3/2024

Client: Dr. McLean Gunderson

Advisor: Prof. Randy Bartels

Team:

- Avery Schuda - Co-Leader - aschuda@wisc.edu
- Helene Schroeder - Co-Leader, BSAC - hschroeder4@wisc.edu
- Anya Bergman - Communicator - ambergman2@wisc.edu
- Ella Cain - BWIG - elcain2@wisc.edu
- Ellie Kothbauer - BPAG - ekothbauer@wisc.edu

Problem Statement

Veterinary professionals commonly collect bone marrow aspirates from three main sites in dogs and cats: the iliac crest, the trochanteric fossa, and, mostly commonly, the proximal humerus. Currently no veterinary bone aspiration models exist for students to practice on, requiring the use of cadaver dogs. Cadavers can only be used for about 5-10 insertions of the Illinois bone marrow biopsy needle per site, but does not contain live bone marrow that can be collected. This project aims to create a low-cost 3D anatomically correct model of the humerus with relevant soft tissue structures, mimics the consistency and structure of the bones, and allows for insertion of "bone marrow" for collection, allowing veterinary students to practice the skill of bone marrow aspiration.

Brief Status Update

This week the team finalized several aspects of the design and worked together to create our preliminary presentation for this Friday. The team met with Dr. Gunderson and Dr. Schmidt to collect dog bones for 3D scanning in the Makerspace, test samples of PLA, ABS, and PETG to reaffirm our decisions in material selection, and answer follow-up questions.

Difficulties / advice requests

None for now!

Background...		X	X	X	X											
Prototyping																
Testings																
Deliverables																
Progress Reports	X	X	X	X	X											
PDS			X													
Prelim presentation					X											
Final Poster																
Final Report/Notebook																
Meetings																
Client		X		X												
Advisor	X	X	X													
Website																
Update	X	X	X	X	X											

*Subject to change after advisor/client meetings

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

- Team
 - Worked together on the Preliminary Design Presentation
 - Continued researching materials to decide if any materials or prefabricated parts will need to be ordered
- Avery
 - Created graphics for the three chosen designs of the replaceable component of the humerus to accompany the design matrix.
 - Worked with the team to complete the preliminary design presentation.
 - Tested 3D printed samples with the client
- Helene
 - Worked on the preliminary presentation with the team.
 - Worked on creating graphics and images to include in the presentation.
 - Looked into what materials to use for components besides the bone.
- Anya
 - Worked on the preliminary presentation with the team.
 - Continued research into what materials can be used for the model.
 - 3D printed samples for the client to test.
- Ella
 - Worked on the preliminary presentation.
 - Continued to research materials for the bone marrow aspiration model.
- Ellie

- Worked on the preliminary presentation.
- Continued to research designs for fabricating the replaceable components.
- Attend BPAG meeting

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Avery Schuda	10/3/24	-Met with Dr G and Dr S to test filament/obtain bones for 3D scanning -Created drawings for each of the three designs -Worked with team to create and practice for preliminary presentation	6	6	23
Ellie Kothbauer	10/3/24	-Attended BPAG meeting -Worked with team to create and practice for the preliminary design presentation	4	4	15
Anya Bergman	10/3/24	-worked on preliminary Presentation with the team -3D printed test samples to use in meeting with Dr. G -Met with Dr. G and Dr. Schmidt to find bones to use	6	6	13
Helene Schroeder	10/3/24	- Worked on the preliminary presentation with the team.	3	3	14
Ella Cain	10/3/24	-Met with Dr. G and Dr. S to create a plan for obtaining 3D models of bones and to test different plastic filaments -Worked with the team to create and practice the preliminary presentation -Continued research on design materials	4	4	16

Current design

Materials and expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
Category 1										
Material test swatches	PLA, ABS, and PETG test swatches	UW Makerspace		UW Makerspace		9/26/2024	3	0.17	\$0.51	
									\$0.00	
Category 2										
									\$0.00	
									\$0.00	
								TOTAL:	\$0.51	