

Pediatric kidney transplant surgical instrument development

Progress Report #4

Date: 10/01/2026

Client: Dr. Kelly Collins and Dr. Jennifer Philips

Advisor: Professor Shawn Gomez

Team - *KidneyKrew*:

Brannick Larson - *BPAG*

Ishita Bhardwaj - *Team Leader*

Lily Walden - *BSAC*

Madison Poza - *BWIG*

Mariamawit Tefera - *Communicator*

Noa Biener - *Team Leader*

Problem statement:

End-stage renal disease (ESRD) is a condition affecting more than 808,000 people in the United States. Approximately 5645 of these people are under the age of 18. Renal transplantation is considered the best and most cost-effective treatment for ESRD. A major challenge that arises while performing kidney transplants in children is the lack of appropriate surgical tools and instruments. Current surgical instruments are designed with adult bodies in mind. These instruments are often too large to be used on children's smaller bodies, among other issues. Our clients, Dr. Kelly Collins and Dr. Jennifer Phillips, often face this issue while performing surgery and have requested the design of a vascular clamp that could be used during kidney transplant surgeries in pediatric patients. The device will be scaled down to allow for the lesser wound depth corresponding to the body of a pediatric patient. It will also have lower clamping strength than current vascular clamps to prevent damage to the blood vessels being clamped because children have smaller blood vessels and lower blood pressure than adults.

Brief status update:

Goals

Major team goals for the next week

1. Meet with clients to ask further questions regarding project requirements and needs and get feedback about preliminary designs
2. Consider methods for modeling prototype, such as through 3D CAD modeling

Next week's individual goals

- Brannick Larson

- Start modeling the design in a CAD software. Ask the client for the info regarding the different sizes of the vessels to make a sheet and dimensions needed for all different jaw sizes. Additionally research more on materials that are and can be used in the jaws and see if research exists on pediatric vessel sizes.

- Ishita Bhardwaj

- Do research on how the curvature of the jaws relates to the diameter of the blood vessel. Begin making a model in SolidWorks of our jaws and clamps.

- Lily Walden

- Set up another meeting with the client to make sure that we are heading in the right direction. Do more research on forces and more competing designs, possibly create our first prototype.

- Madison Poza

- Research on forces and competing designs to help refine ideas for the kidney transplant clamps. Contributed to the preliminary design presentation and rehearsed to be ready for presentation.

- Mariamawit Tefera

- Start thinking about 3D printing or other way to prototype and test our designs
- Set-up another meeting with client to ask further questions

- Noa Biener

○Schedule/Meet with client again to ask more questions regarding the project requirements and get feedback regarding preliminary designs, consider ways to model or prototype the intended design, research process of manufacturing surgical clamps and consider what tools the group can use for the final product.

Detailed accomplishments

Previous week's goals and accomplishments

- Finalizing all our design ideas and preparing for our preliminary presentation

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Lily Walden	9/28/26 10/1/26	Preliminary Presentation Additional Research	2 2	4	17
Madison Poza	9/17/2026	Research Preliminary Presentation	2 2	4	21
Noa Biener	10/1/2026	Preliminary Presentation Research	3 2	5	19
Mariamawit Tefera	9/10/2026	Doing my preliminary presentation section Meet with team to practice	2 2	4	19
Ishita Bhardwaj	9/30 10/1 10/2	Research Practice for the presentation Practice + Preliminary Presentation	2 2 1	5	16
Brannick Larson	9/10/2026	Research Meet with team to practice Preliminary presentation	2 2 2	6	21

Difficulties / advice requests:

The group has currently encountered no challenges and does not require any advice at this time.

Current design

No prototyping or designing has been done at this phase of the project.

Design Matrix

<https://docs.google.com/document/d/19oGdQEvqTIm9TxLk1T0g0kg00Hqiy1yV/edit?usp=sharing&oid=107280994554232547414&rtpof=true&sd=true>

Materials and expenses

Item	Description	Manufac-turer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
Category 1										
X	X	X	X	X	X	X	X	X	\$0.00	X
X	X	X	X	X	X	X	X	X	\$0.00	X
Category 2										
X	X	X	X	X	X	X	X	X	\$0.00	X
X	X	X	X	X	X	X	X	X	\$0.00	X
X	X	X	X	X	X	X	X	TOTAL:	\$0.00	X