

Pediatric kidney transplant surgical instrument development

Progress Report #6

Date: 10/15/2026

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

- Conduct research on wound depth and overall abdominal cavity size of children.

Designing the clamp and ratchet system in CAD as well as testing the 3D print capabilities for our project.

- Ishita Bhardwaj

- Do research on the jaw curvature + begin CADing the vascular clamp because we are having trouble with the threads so I will begin experimenting with printing just the threads

- Lily Walden

- Developed questions to ask the client during our second client meeting and did more research

- Madison Poza

- Did research on competing designs and more on what happens during kidney transplants and brainstormed questions for our client meeting.

- Mariamawit Tefera

- Get updates from the rest of the team from the meeting with the client and facilitate the communication for setting up another meeting.

- 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

- Finishing up the preliminary report
- Continuing to contact the client

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Lily Walden	10/14/26 10/15/26	Research Brainstorm client meeting questions	2 1	3	24
Madison Poza	10/8/2026	Research	2	2	27
Noa Biener	10/1/2026	Research Developing client meeting questions	2 1	3	27
Mariamawit Tefera	9/10/2026	Continue brainstorming and research that will help prototyping	5	5	27
Ishita Bhardwaj	9/30 10/1 10/2	Make presentation research CAD the prop + practice Preliminary presentation	2 2 2	6	22
Brannick Larson	10/14/2026 10/15/2026	Research different designs for attaching the jaws CAD and testing	2 3	5	30

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&ouid=107280994554232547414&rtpof=true&sd=true>

Materials and expenses

Item	Description	Manufac-turer	Mft Pt#	Vendor	Vendo r Cat#	Date	#	Cost Each	Total	Link
Prototyping										
Spring prototype	3D printed spring									
Ratchet system test 1	3D printed prototype of clamping ratchet system	Wendt Commons Makerspace	1	Wendt Commons	X	10/15/26	1	\$0.20	\$0.20	https://making.engr.wisc.edu/
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