

Pediatric kidney transplant surgical instrument development

Progress Report #2

Date: 9/17/2026

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:

The team is currently continuing the literature search phase. The team has asked for access to more resources and to conduct research about the project with a focus on the surgical procedure and instruments of the transplant process of an adult kidney into a paediatric patient. Additionally, the team has used the information from the client to develop a product design specification document.

Goals

Major team goals for the next week

1. Do more in-depth research after identifying more variables we need to focus on from the database we will be provided.
2. Brainstorm possible designs and complete a design matrix
3. Start preparing for the preliminary design presentation.

Next week's individual goals

- Brannick Larson

- Continue research on the amount of force it takes to stop the blood flow and how the existing designs accomplish this, along with an article on a surgeon's perspective and what they think could be improved in the process. Additionally, brainstorming and designing 3 potential ideas for the clamps, and working on the group's PDS.

- Ishita Bhardwaj

- Continue research on various methods by which adult-sized surgical instruments have been modified for use in pediatric surgeries; talk to our client about accessing the data in her database and having a look at her vascular clamps; begin drawing out 3 potential designs with modifications to the clamps

- Lily Walden

- Continue research on kidney transplants and what tools are now being used for pediatric surgeries, brainstorm and start to draw out three possible designs, meet with our client and find out more information about what she would like the instrument to look like.

- Madison Poza

- Continue researching the amount of force needed to fully stop blood flow and how current vascular clamp designs achieve occlusion while minimizing damage to the vessel. Research surgeons' perspectives on the current kidney transplant process, including what they find difficult and what aspects of existing surgical instruments could be improved. Additionally, work on the group's PDS to define the requirements and constraints for the final design.

- Mariamawit Tefera

- Continue reading more about competitive designs and instruments suited for underweight patients.

- Noa Biener

- Continue to complete research regarding the surgery itself, surgical clamps, standards, and competitive designs; speak to clients more about expectations and share group brainstormed ideas with them; access database regarding previously studied statistical measurements; draw/model 2-3 possible designs for the clamps

Detailed accomplishments

Previous week's goals and accomplishments

- Successfully conducted a client meeting and gathered useful information regarding client expectations and vision
- Completed, edited, and finalized the product design specification (PDS) document
- Members completed additional research regarding specific parts in the PDS

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Lily Walden	9/17/2026	Working on the PDS Additional Research	2 2	4	5
Madison Poza	9/17/2026	Research Working on the PDS	3 2	5	7
Noa Biener	9/10/2026	Working on PDS Research	4 2	6	9
Mariamawit Tefera	9/10/2026	Working on the PDS	5	5	8
Ishita Bhardwaj	9/15/2026 9/16/2026	Working on the PDS Additional research	2 1	3	6
Brannick Larson	9/10/2026	Research Working on PDS Designing 3 preliminary clamps	2 4 1	7	10

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.

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