

Pediatric kidney transplant surgical instrument development

Progress Report #3

Date: 9/24/2026

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 and a design matrix.

Goals

Major team goals for the next week

1. Prepare slides for the preliminary presentation and divide up the sections
2. Consult with client regarding preliminary design choices (if able to meet)

Next week's individual goals

- Brannick Larson

- Conduct further research on wound depth and its use to our project as well as any clamp designs that are similar to the preliminary designs that the team agreed upon. Improve the design matrix and explain why we choose to rank the designs the way we did. Meet with clients and discuss our designs and reasoning.

- Ishita Bhardwaj

- Continue research while focusing specifically on varying types of jaws and varying amounts of curve of vascular clamps. Improve the design matrix's chosen designs and think about further modifications or changes to be made as well as methods of prototyping. Potentially start making CAD models. Work on the preliminary presentation.

- Lily Walden

- Revise the design matrix, create our three designs to present at the preliminary presentation, and meet with the client.

- Madison Poza

- Create three designs and ideas for preliminary designs and present them to the group.

Improve the design matrix and specify certain criteria on what they represent. Research on the forces that are needed to be applied to the vessels for both pediatric and adult.

- Mariamawit Tefera

- Refine the design matrix and prepare for the preliminary presentation.

- Noa Biener

- Continue to edit design matrix, prepare for preliminary present, continue doing research in regards to the surgical process and designs currently on the market similar to our

own ideas, consider creating a more professional model for our brainstormed ideas and continue to reach out to client(s) about gaining feedback for our initial designs

Detailed accomplishments

Previous week's goals and accomplishments

- We reached out to client(s) regarding meeting again to gain some feedback about our preliminary designs (still awaiting response)
- We all brainstormed 3 design ideas each that solve one specific problem(either force control or adjustable jaw) and organized them and graded them in our design matrix.

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Lily Walden	9/20/26	Designing 3 preliminary clamp designs Additional Research Working on the design matrix	4 2 2	8	13
Madison Poza	9/17/2026	Designing 3 preliminary clamp designs Research Working on the design matrix	5 3 2	10	17
Noa Biener	9/10/2026	Brainstorming designs/choosing preliminary designs Group Meeting Research	3 1 2	5	14
Mariamawit Tefera	9/10/2026	Working on the design matrix	7	7	15
Ishita Bhardwaj	9/20/2026 9/21/2026 9/24/2026	Research Made Designs for the design matrix Worked on the design matrix criteria and grading	2 2 1	5	11
Brannick Larson	9/10/2026	Research Refining and brainstorming designs Design matrix	2 2 1	5	15

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