CONTEXT & PROJECT

Over 600,000 arthroscopic knee procedures are performed every year in the U.S. [1] Tissue can be damaged through trauma (such as a sports injury) or through degradation over time. Preserving as much healthy tissue as possible is essential for a long-lasting and stable recovery [1].

Arthroscopic procedures are performed using a viewing scope, irrigation pump, and instruments. Modern scopes and pumps are integrated, requiring the creation of only two portals. This puts serious constraints on the surgeon’s vision of and access into the knee.

Our goal was to apply a user-centered design philosophy to identify opportunities for innovation in this space. By understanding the preferences and problems of surgeons, we were able to develop a compelling new arthroscopic instrument that adds functionality over existing instruments while also reducing cost. Its simple design is familiar to surgeons, making a strong business case for widespread adoption.


PROCESS

RESEARCH THE MARKET

EMPATHIZE WITH SURGEONS

IDENTIFY PROBLEMS

IDEATE SOLUTIONS

DEVELOP MECHANISMS

EVALUATE PROTOTYPES

DELIVER AND DOCUMENT

INSIGHTS

In designing a new instrument, we needed to develop a deep understanding of surgeon habits, needs, and frustrations. Some of these insights include:

Surgeons have different preferences for how they hold and use instruments.

Tactile feedback gives surgeons confidence about what an instrument is doing to tissue.

Surgeons must correlate movement on a large 2D display with movement in a small 3D joint.

Sometimes surgeons will use sub-optimal instruments to avoid switching tools.

“This procedure is like a pool full of alligators: it’s a question of which challenge will bite you first” - Surgeon Interview