

# Reversible Stemless Shoulder Implant

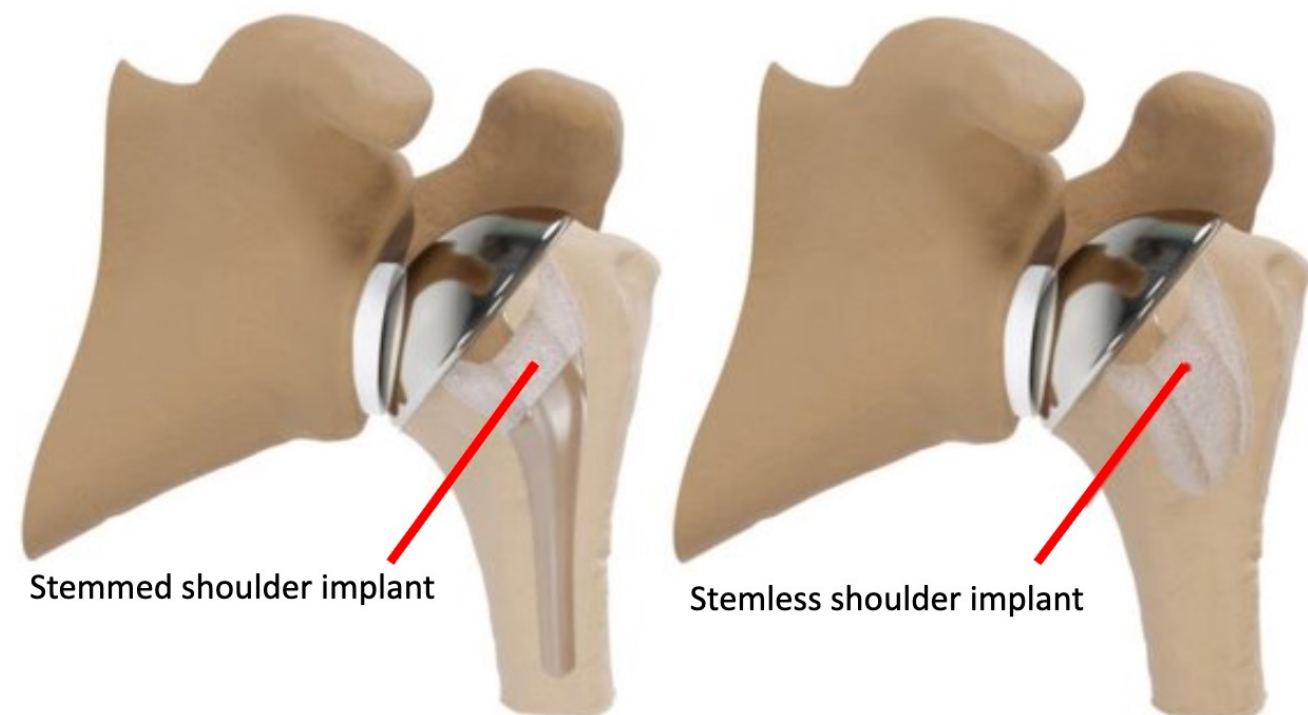
Kiersten Cady | Angelina Lanh | Santiago Lazarte  
John Sorenson | Taylor Vanderlinden | William Wartman

## Objective

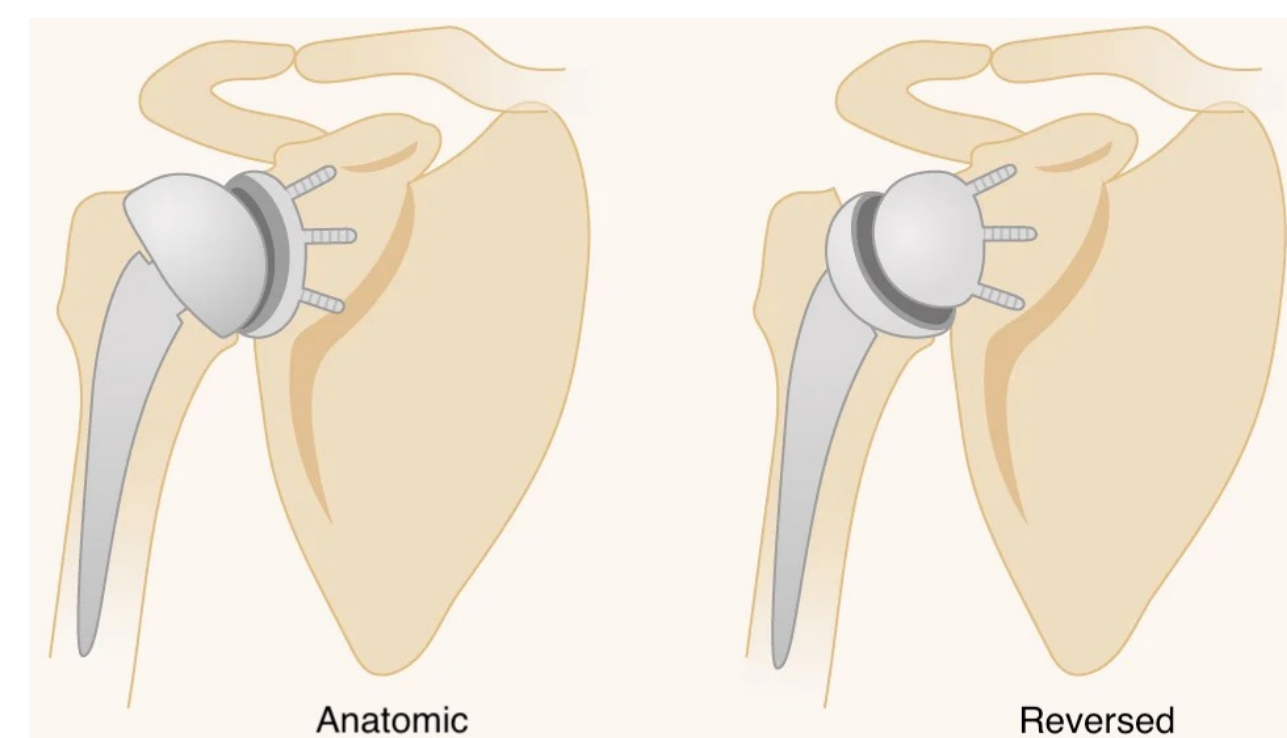
The objective of this project is to improve upon Exactech's current reversible stemless shoulder implant the Equinox.

## Background

- Shoulder joint complications are becoming more prevalent, especially with the aging population, diseases, and accidents
- The glenohumeral (shoulder) joint is the most mobile joint in the body
- The current implant models (stemmed) require extensive bone loss



- Anatomic implants typically impede upon range of motion
- Reversible implants increase range of motion and decrease scapular notching



## Assumptions

Current designs and CAD models will be provided by Exactech and used as a base design model for iterative testing. All substitutive methods of testing designs will be indicative of human bone and loads experienced by patients in daily activities.

## Key Goals

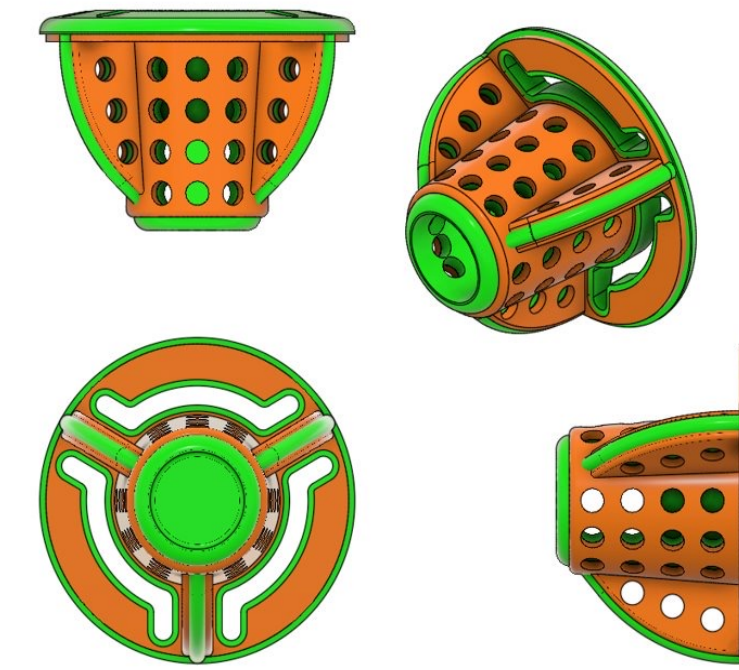
- Understand methods of implant failure
- Develop robust and repeatable testing method
- Address the methods of implant failure in redesign
- Lengthen overall part lifespan
- Ease of manufacturing

## Targets

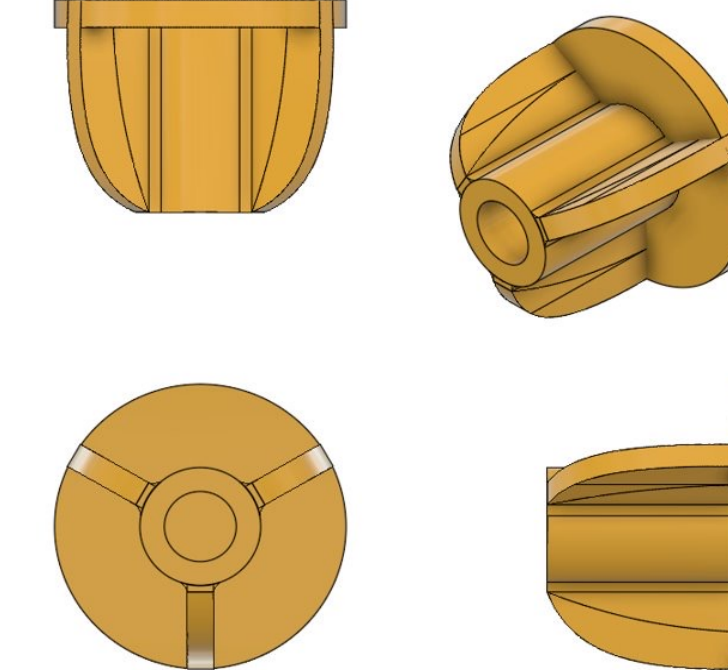
- The critical components of this project are preventing premature implant failure, resisting shear, torque, and rocking moments and improving the ease installation.
- Resists rocking moments at least 10% better than Equinox
  - Resists torque at least 10% better than Equinox
  - Resists shear forces at least 10% better than Equinox
  - Implantation is at least 10% better than Equinox
  - Increase the lifespan to 10-20 years with minimal surgical revisions
  - Minimize the cost of manufacturing
  - 90% recyclable

## Concepts

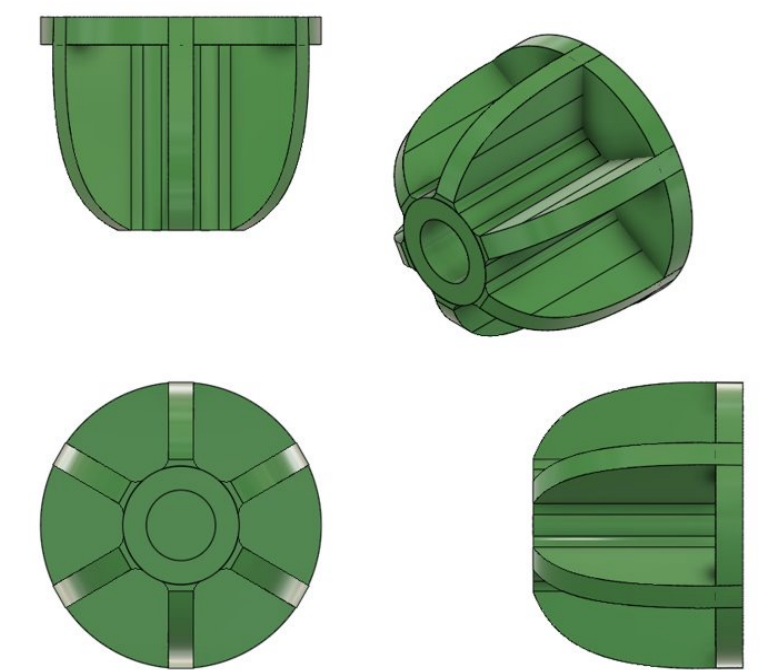
### Equinox



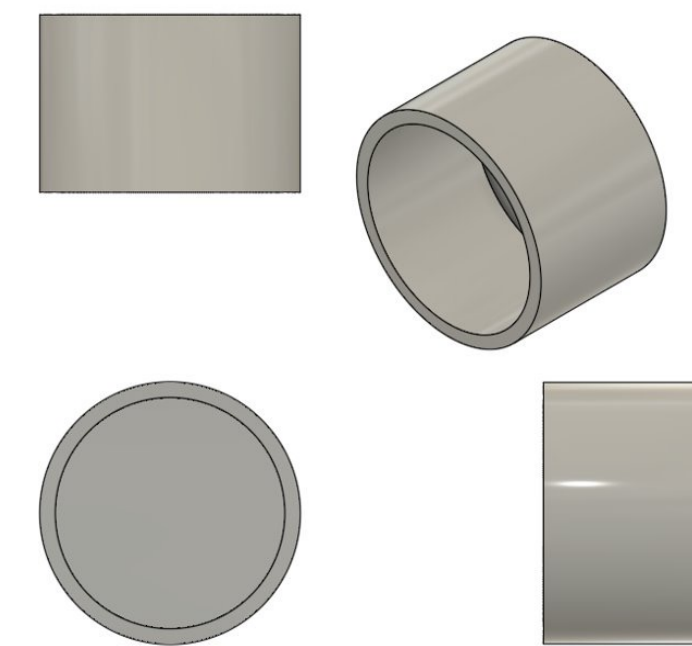
### 3 Fin Design



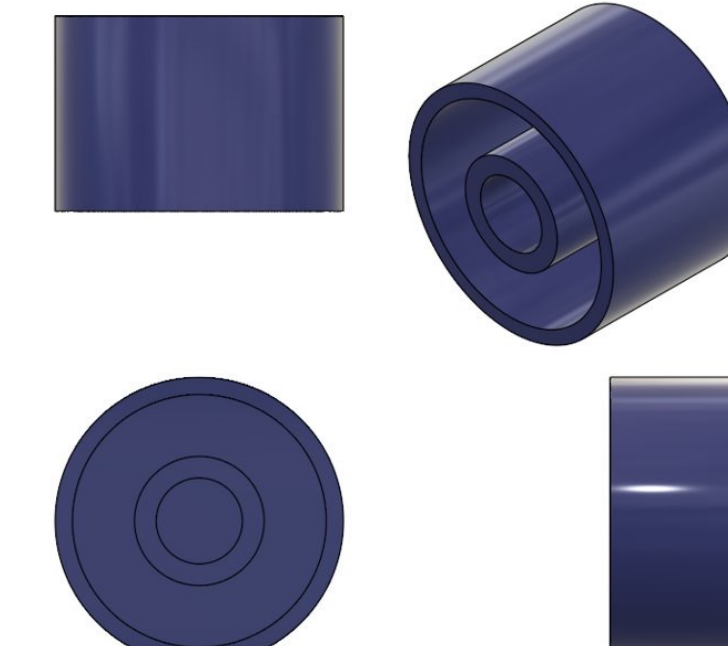
### 6 Fin Design



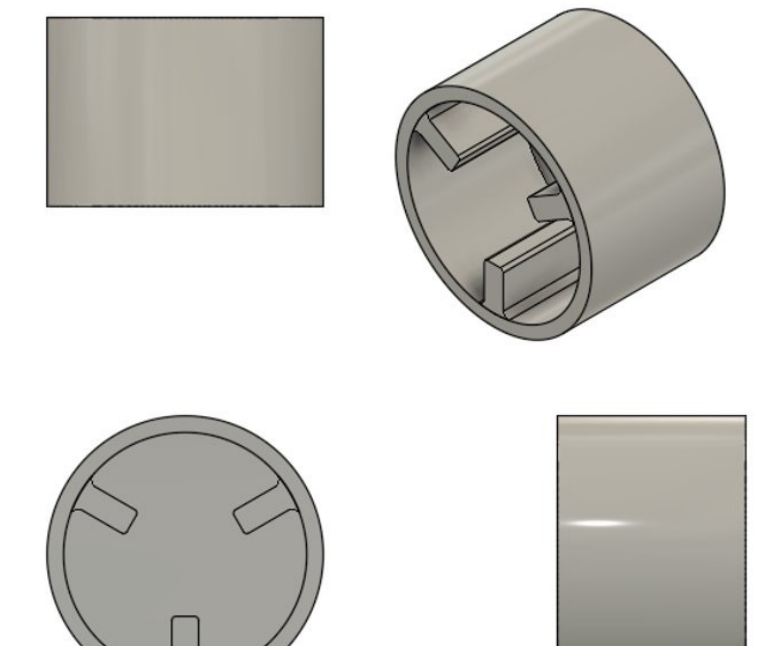
### Cup Design



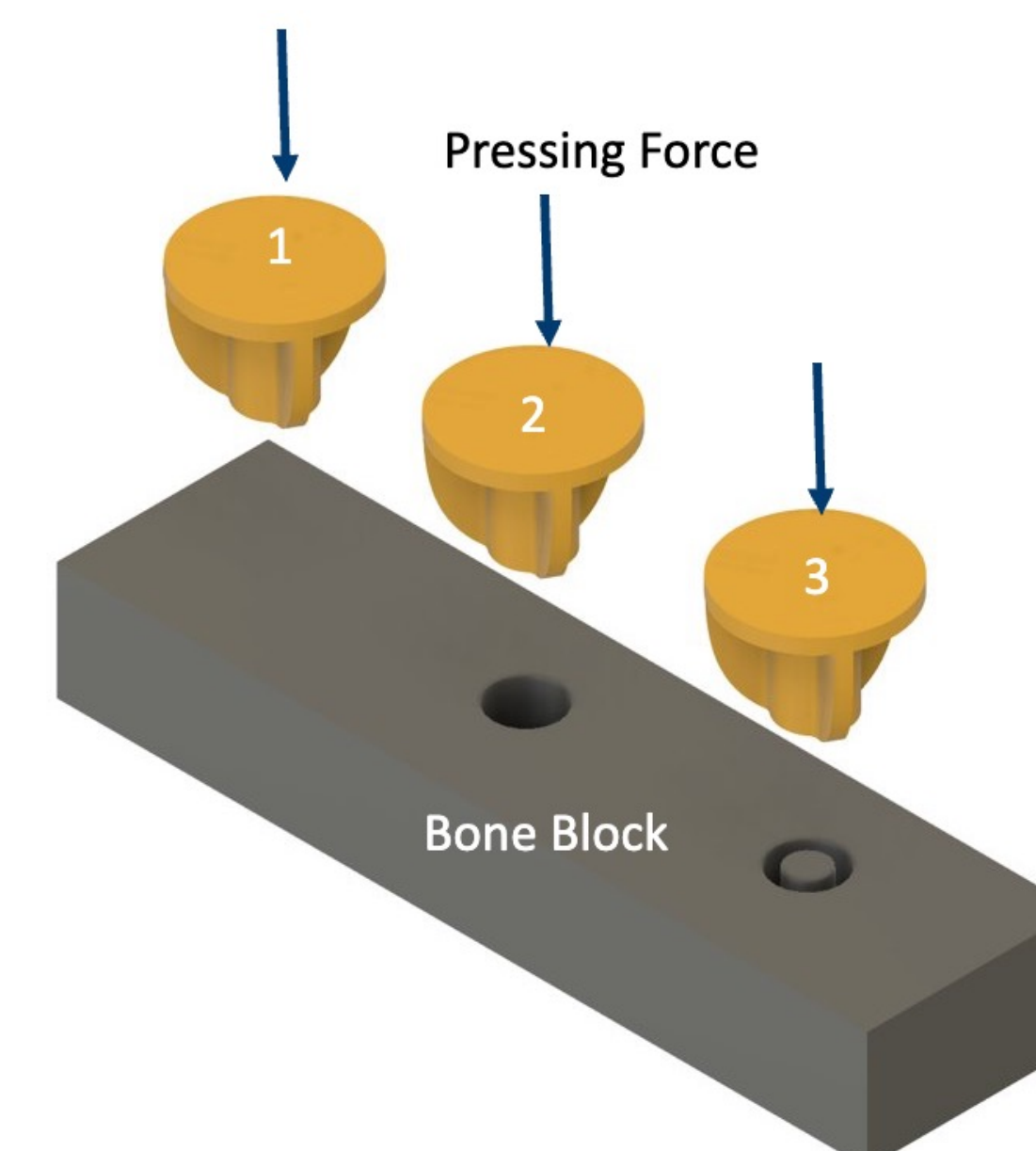
### Cup Internal Cylinder Design



### Cup Internal 3 Fin Design



## Implantation



## Future Work

- Testing Apparatus
- Model Printing
- Implantation Procedure
- Testing Procedure
- Testing
- Finite Element Analysis Validation

## Acknowledgements

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