



Reversible Stemless Shoulder Implant T112

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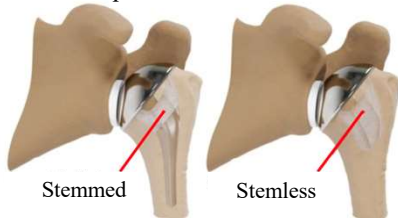


Objective

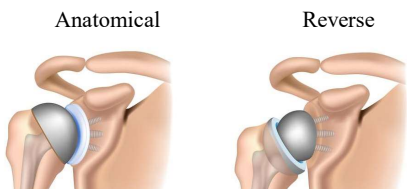
The objective of this project is to improve upon Exactech's current reversible stemless shoulder implant the Equinox.

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
- Stemmed implants require extensive bone loss while stemless reduces bone removal required

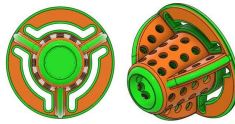


- Anatomic implants typically impede upon range of motion
- Reversible implants increase range of motion and decrease scapular notching

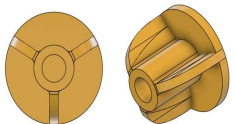


Models

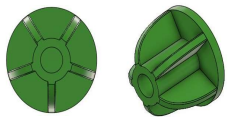
Equinox



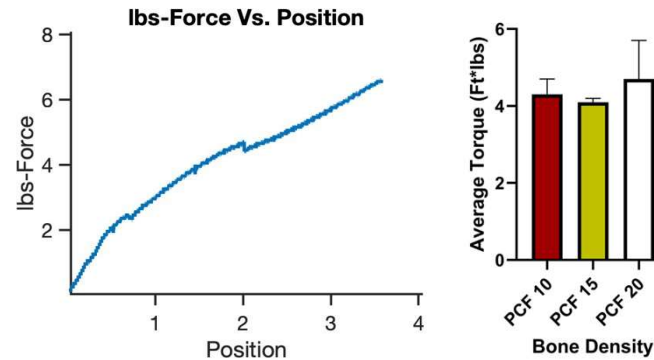
3 Fin Design



5 Fin Design



Results



- Conducted testing on all fin designs to determine the maximum torque when using ten, fifteen, and twenty density bones blocks
- The testing was done by utilizing the custom testing rig, orientating each design at an in-line and out-of-line position

Discussion

- Tests show some variation, but more experiments will be conducted to make sure data is representative.
- This experiments show the need for better standards and more rigorous testing.
- It would be ideal to standardize the material used for these tests.
- The main challenge with the reverse shoulder arthroplasty is to mimic dislocation. More complex equipment is needed if this phenomena wants to be studied.

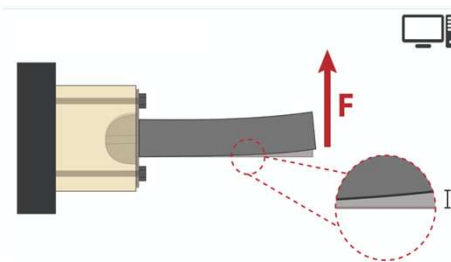
Future Work

- Fatigue testing for all bone densities, fin numbers, and fin orientation
- Max force and fatigue testing for the 7-fin design

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

Methodology



Acknowledgements

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