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Clemson University Retrieval of Explants Program and Registry in Orthopaedics (CU-REPRO)

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Introduction

- Total joint replacements have been implanted successfully for more than 50 years.
- Unfortunately, a small percentage of these devices fail each year due to material failure, infection, loosening, osteolysis, or other medical problems.
- Trends in device failures can be assessed systematically using implant retrieval collections.
- The Retrieval of Explants Program & Registry in Orthopaedics (CU-REPRO) was established in 2008. It includes a network of 11 hospitals in South Carolina to collect, process, and store explanted joint replacements.
- The overall goal of CU-REPRO is to address critical variables in device performance to improve patient care and joint replacement outcomes.

Retrieval Protocol

Explantation

We are able to stay in contact with many surgeons around the state that offer implants they have worked on for further research in our laboratory.

Transportation

Each member on the Creative Inquiry team is assigned a hospital and communicates with their personnel to acquire the implants in an appropriate and timely manner

Cleaning

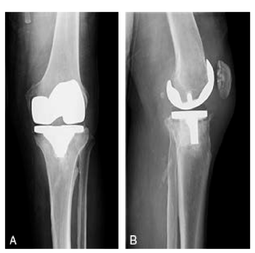
The implants are cleaned using a standard operating procedure that includes disinfection and sonication.

Evaluation

Each implant is photographed and logged electronically. Researchers can determine where the implant was placed, which hospital it was received from, and other very important information that will help researchers.

Analysis

By recording over 500 implants, we have collected enough data to help support or disclaim theories on possible knee and hip implant problems.



Implant Design

In 2015, the REPRO team developed an "Atlas of Joint Replacement Designs" to classify explants by various design features.

Fixation Mechanisms

Uncemented

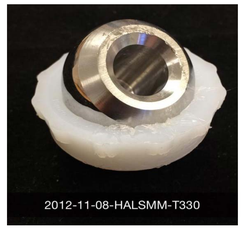
Cemented

Knee Stabilization

With Cam

With Box

Hip Bearing Materials



Ceramic on Polyethylene

Metal on Metal

Ceramic on Ceramic

Hip Polymer Liners

Constrained

Standard

Elevated Rim

Uses of the Registry

- Explore clinical issues with hip and knee replacements
- Database of specific problems related to total joint replacements, such as recent issues and FDA recall surrounding metal on metal hip implants
- Support clinical case studies based on problems related to specific implants in REPRO. The team is currently conducting a case study on fractured hip stems.
- Work closely with surgeons throughout the state
- Gain knowledge about common orthopaedic implants though a hands on experience.
- Educate the community through several community outreach programs a year.

Implant Statistics

Table 1: Over 500 explants have been collected from our SC clinical partners

Hospital	THR	TKR	UKR	Other	Total
Anmed	3	5			8
Greenville Hospital System	8	27		2	37
Moore Orthopedic Clinic	2				2
University of South Carolina School of Medicine	41	39	4		84
Medical University of South Carolina	94	85	1	2	182
Lexington Medical Center	29	10	2		41
St. Francis Greenville		1			1
Greer Memorial Hospital	21	15	1		37
Patewood Memorial Hospital	44	65	2	2	113
				TOTAL	505

Examples of Implanted Devices

Total Knee Replacement

Total Hip Replacement

CI and Program Dissemination

The Implant retrieval program is committed to educating students and the community about biomaterials and orthopedic devices, and to the dissemination of student research and educational outcomes. To date, we have had 35 students participate in our program, with over 14 undergraduate research presentations at national and regional conferences.

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