

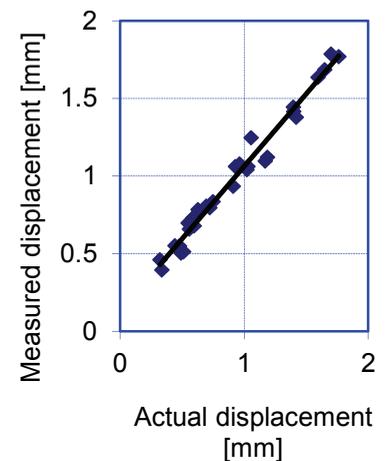
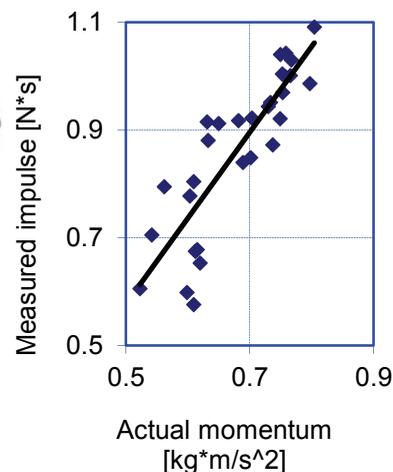
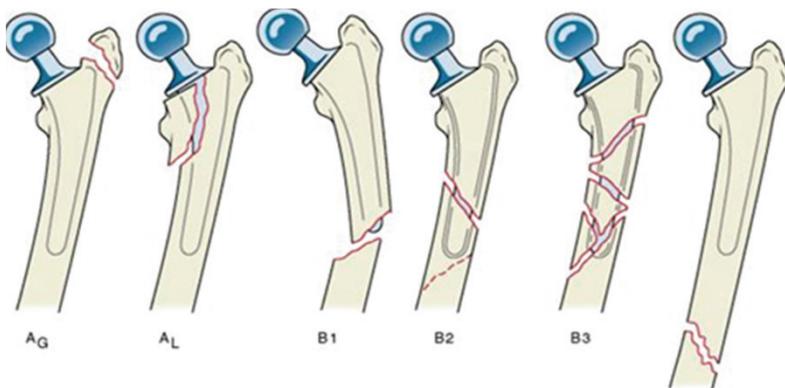
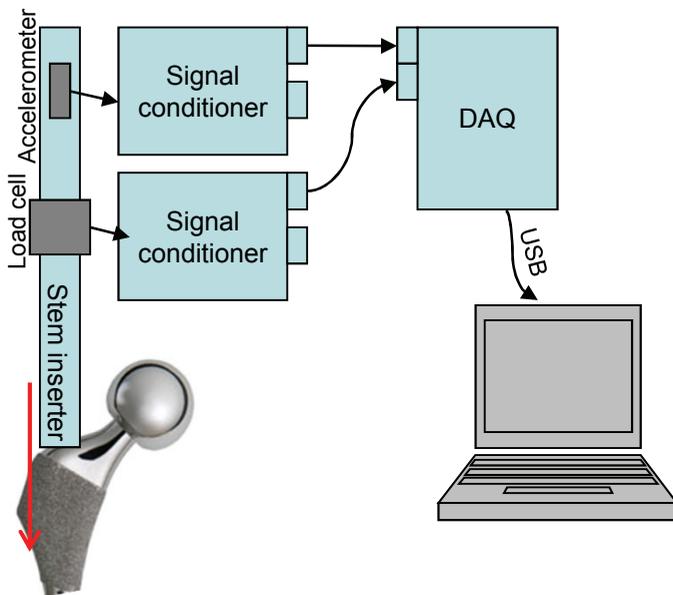
Preventing complications during orthopaedic surgeries

Summary

A major complication in total hip replacements is the risk of fracture of the femur as the implant stem is inserted. This fracture can occur intraoperatively in up to 5% of patients and causes serious difficulties during the surgery and in recovery. In collaboration with surgeons and Massachusetts General Hospital, Cambridge Polymer Group developed a unique tool for predicting issues before they occur. The telemetry available could also be used to guide the surgeon on optimal impact forces and potentially warn of other operative issues.

Description

Periprosthetic fracture occurs when the press-fit femoral component generates excessive hoop-stress in the femoral bone and forces a crack to propagate down the length of the shaft. If caught during surgery, this can be complex and difficult to correct, but if undetected, further surgeries will be required. The CPG system utilizes standard surgical hardware, but with additional instrumentation. By adding an accelerometer and force sensor to the impactor shaft, momentum transfer and displacement can be measured in real time. The resulting telemetry, in conjunction with theoretical analysis, can be used as a predictive tool to provide the surgeon with data indicating impending failure, thus preventing a serious side-effect in conventional surgeries, or alternatively flag other potential issues.



Markets

- Predictive tool for determining complications during orthopaedic surgery
- Simple warning system for prediction of impending fracture during any impactor driven process in industry or medicine



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We work with clients throughout the product life cycle to:

- **Develop new materials**
- **Design prototypes for proof-of-concept studies**
- **Create and execute experimental design**
- **Validate and verify manufacturing processes**
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Cambridge Polymer Group, Inc. was founded in 1996 to provide a cost-effective resource for testing, research and development to clients who need periodic access to Ph.D.-level scientists and their support structure. We have developed a host of testing methods and materials for our clients, which number more than 300.



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