

NON-INVASIVE CHARACTERIZATION OF TOTAL HIP ARTHROPLASTY BY MEANS OF PASSIVE ACCELERATION MEASUREMENT

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Abstract- This paper presents a non-invasive measurement method to detect and characterize failures and material imperfections in total joint prostheses based on acceleration measurement. Therefore, a prototype sensor has been developed to fulfill the requirements of a medical-technical sensor. This sensor has been tested on patients with total hip arthroplasty. Special emphasis is put on the real-time processing of measurement data by means of intelligent signal processing as well as reliable and repeatable measurement procedures, including standardized positions for the sensor front-end and a standardized motion-sequence the patient is performing.

Index terms: Total hip arthroplasty, Non-invasive measurement, Failure characterization, Acceleration measurement, wear detection