Abstract

Boise State University has developed a strain sensor that can detect strain based on changes in magnetic permeability of magnetic shape-memory alloy material with deformation. The apparatus can detect strain in one, two or three dimensions, and all six components of the strain tensor, and can also be used to detect mechanical stress and all six components of the stress tensor.

It is difficult to perform loading analyses without knowing how and to what extent external forces act on body segments. Consequently, it is desirable to accurately measure external forces in three dimensions. Such macroscopic biomechanical loading information is also helpful in cell- or tissue-level analyses to estimate realistic in vivo microscopic loading conditions.

Unfortunately, external force measurements are not always straightforward, especially when obtaining reaction forces during dynamic motor activities. This is because researchers can usually only gather uninterrupted force information when a subject constrains his or her motor activity to always interact with an embedded sensor. Using floor-embedded force platforms to gather Ground Reaction Force (GRF) data during biped activities is a typical approach. These types of facilities sometimes offer limited data quality and quantity. For example, floor-embedded force platforms can suffer from contact problems, present unrealistic conditions, and only give short duration data. Additionally, while insole pressure sensors are currently available, many devices that are currently available detect only a single, vertical force component. With this information, it is difficult for researchers to obtain accurate, clinically relevant kinetic variables such as joint moments and joint contact forces, which can be used to examine a variety of injuries and diseases such as joint and connective tissue injuries, osteoarthritis, and motor dysfunctions such as cerebral palsy, stroke, and Parkinson’s disease.

This Boise State University technology is directed at addressing the above issues.

Boise State is looking for a Licensee for this technology.

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