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How gait is affected by joint replacement

It is recognized and clearly visible by the human eye that subjects who have osteoarthritis of the hip or knee joint adapt their gait sub-consciously to minimize pain. This does result in abnormal joint loading and incorrect muscle usage. However, there is no objective measurement pre-operatively that identifies the type and extent of this abnormal movement, which would need to be corrected post surgery. Once the patient has received their implant, the joint pain is removed, but there is considerable pain from the surrounding muscles and ligaments. Physiotherapy is provided for the first 6 weeks and then, provided the wound has healed and the subject is walking adequately, they are left to just continue exercising, with the hope that a normal gait would eventually be resumed. No objective measurements are taken at any stage in this process to ensure that they have resumed a normal gait. Studies on hip and knee replacement patients using a sensor based tool (Gait Smart) one year post op have shown that 50% of hip patients and 60% of knee patients do not resume a normal gait one year post op. These are supported by other complementary research studies, which also show that an abnormal does have an effect on other joints, due to the incorrect biomechanics of the lower limbs and this can result in further surgery. It is hypothesized that individuals can be retrained to walk properly after surgery, thus reducing the likeliness of further surgery if they are provided with objective measurement to guide the rehabilitation phase. This paper will present results on hip and knee patients who have been monitored following joint replacement.

Biography

Diana Hodgins obtained her degree in Mechanical Engineering and her PhD in solid state gyroscopes from the University of Hertfordshire (UH). She has 30 patents granted, relating to solid state sensors. She is currently a Visiting Professor at the UH and helped to establish a new M-Eng course in Biomedical Engineering and in 2014 was awarded Alumni of the year at the UH. In 1995, she established her own business, ETB and in 2009 ETB launched their sensor based gait monitoring product, GaitSmart. This is at present, a world leading product used in wide range of medical and sports applications including orthopedics.

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