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The Precision of Available Commercial Fitness Trackers in Stroke Patients

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Introduction

Fitness trackers may be an affordable, simple-to-use tool for measuring stroke survivors daily physical activity while they recuperate at home. The study's objective was to determine how well the fitbit activity tracker tracked stroke survivors locomotor activity in relation to gait problems, walking speed, walking aids and body location. In the study, 24 ambulatory stroke survivors with a locomotion/gait dysfunction took part. Patients conducted two walking tests while wearing fitbit alta HR trackers in five distinct locations on their bodies. Three patient groups those using single-point sticks, rolling walkers and those not using any walking aids were used to examine the trackers accuracy. Due to their popularity, affordability, comfort when worn and motivational impact, physical activity trackers (smart bracelets) are being used in the healthcare industry. Although serious clinical patient monitoring has already begun using them, it is still unclear how accurate they are [1].

Description

The use of these motivational tools for careful, ongoing monitoring of patients gait ability at home could boost the efficiency of home-based rehabilitation, increase patients' mobility and shorten recovery times. Fitness trackers were created and evaluated for the broad adult population of healthy individuals and it is largely unknown how well they operate for those with abnormal gait patterns and those who use different types of walking aids. As a result, patients who walk with varied gaits may not have enough accuracy from activity trackers. In other tests, where participants already had gait disorders, it was discovered that, in addition to speed, gait disorders, the use of walking aids and the positioning of the activity tracker on the body all had an impact on the device's capacity to identify steps. Walking with a rolling walker, for instance, creates a particular body movement primarily because its handles are carried by both upper limbs. This causes considerable speed differences in comparison to the usual human gait and also has an impact on kinesiology. Additionally, compared to the non-paretic side, the step count accuracy is reduced when the activity tracker is coupled to a paretic side. Patients place their hands in the same posture and roll their walker in front of them [2].

The total walking duration and the manually counted number of steps were both recorded during the walking test. The tracker's count of the patient's steps was recorded once the test was complete. A walking stick or a rolling walker was employed during the test depending on the gait impairment of the patient. For added precaution, a physical therapist followed each patient the entire way. Patients had to halt, hold still, or sit during the trial and both time and steps were not recorded. The number of steps recorded by the activity trackers, the number of steps manually counted, the total amount of time spent walking, the position of the sensors on the body and the type of walking aid utilized were among the data gathered for the study. The fitbit alta HR smart wristband can be used to remotely monitor patients' ability to walk after a stroke, according to study results, but there are several requirements that must be followed. The circumstances for patients who did not require any support for walking, those who used a stick and those who used a rolling walker were evaluated due to the restriction on the number of patients in specific groups varied in the walking aid utilized. Data from patients whose speed was at least 2 km/h were examined in relation to the speed restriction [3].

As a result, the upper limbs relative inaccuracy was typically 100%, which means the sensor didn't pick up any steps. Only once on a paretic lower limb did the relative inaccuracy on a healthy lower limb approach 5%. The same patient's extreme value measured on both lower limbs of the same body part was what led to the large variance in both lower limbs. Although it wasn't clearly visible during the assessment, the patient's particular gait may have contributed to this irregularity. Positive relative inaccuracy can be caused by shaking the limb or by the tracker strap not being tightened enough. This means that the tracker recorded more steps than the tally counter. The small sample size of this study must also be taken into account as a potential source of errors [4]. At least 30 walks in each group would need to be measured in order to get more pertinent data. A landscape might be another disruptive component. While the individuals in the study at hand were allowed to move along a straight corridor without encountering any barriers, varied slopes and ground surfaces may be present in free-living situations. Therefore, another study in this field of research may focus on determining accuracy in free-living settings. In that situation, a 10% mistake would be considered accurate enough for use [5].

Conclusion

In the study that was just presented, stroke patients with various gait mobility and walking aids were utilised to examine the accuracy and optimal placement of the fitbit lta activity tracker on the body. The tracker is most accurate when worn on the waist by a patient who can move around alone. At this angle, the tracker's accuracy for half of the measurements is 100%. High accuracy is also attained by the activity tracker mounted above the ankle of a healthy lower limb. Seven out of the 18 walks at this position had accuracy of 100% and none of the deviations went above the 5% limit.

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