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AFFORDABLE PRESSURE ULCER PREVENTION: DEVICE, SYSTEM AND ALGORITHM

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The incidence and prevalence of wound problems in an aging and longer-lived population continue to increase substantially. Pressure ulcers (bedsores) are painful, increase risk for secondary infection, and add $ 11 billion annually to health care costs in the US. When a sufficient fraction of the patient's weight is supported in a region with a bony prominence, the resulting localized concentration of external pressure reduces the cross-sectional area of blood vessels, restricting blood flow and limiting oxygen supply to the at-risk tissue. If this external contact pressure is maintained for sufficient time, the lack of oxygen leads to tissue death and formation of a pressure ulcer. Very few effective ulcer prevention devices exist and those available have focused almost exclusively on some form of off-loading (specialized and costly beds and wheelchair cushions) designed to equalize pressure distribution on at-risk tissue areas. Furthermore, wheelchair cushions have no applicability to other body areas (legs, heels, etc.) at risk for pressure injury. Despite extensive work in this area of pressure ulcer prevention, a survey of available options shows that there is no compact, low-cost solution that is workable in a hospital setting, for patients confined to bed at home, or for those with limited mobility in wheelchairs.

In this work we present a wireless sensor patch to be placed on known at-risk sites on the patient's skin, directly measuring local contact pressure and temperature, and communicating with a base station (in a hospital setting) or smartphone (for home care). Alerting a patient or caregiver to a potentially harmful level of pressure allows early intervention (only when necessary) to prevent pressure ulcer formation, easing workload on caregivers and enabling more independence for mobile at-risk patients.

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