



Abstract:

Our system will use technology to assist physicians and patients minimize post-operative injuries and speed up the overall recovery process. It will alarm the patient when they exceed a weight limit set by their physician and record the instance, which will eliminate the guessing involved when the patient is outside the doctor's office. Further, the financial savings resulting from a shortened recovery time with fewer doctors's visits and less rehabilitation cost will be used to leverage insurance companies into supporting the deployment of our solution.

The knee accounts for 45% of all sports surgeries. There are more than 1.5 million knee surgeries annually and as many as 150,000 (10%) are re-injured during the recovery process. The number of knee surgeries has increased drastically since 1990, some as much as four times. Hip surgeries have been steadily increasing along with the knee. In a multi-billion dollar orthopedic industry, there are few solutions to mitigate re-injury outside of braces, which do not provide support for vertical loading.

After most severe leg injuries and surgeries patients are instructed to limit that vertical load distributed to their recovering leg, yet problems arise because the instructions are relative and easily misunderstood. If the patient favors their leg too much, muscles atrophy rapidly and if the patient over uses the leg, the repaired tendon or joint is even more susceptible to be hurt. Both result in increased recovery time and money to pay for such.

The design calls for a short bill of materials including only existing technologies. Through an insole design equipped with a sensor, alarm, and wireless transmitter, it will provide feedback to the patient and physician to speed recovery which saves patients and insurance companies money.

Our system will be used and tested by athletic teams in order to obtain FDA approval. Distribution will be through doctor's offices like the Hospital for Special Surgery (HSS) in New York City. Patients that undergo knee or hip surgery will have their doctors provide and set the device for them before they leave the hospital like knee braces and immobilizers currently are.