3,

GENUFLEX Closure: Closing the Total Knee Replacement in Full Flexion

When patients express dissatisfaction after undergoing total knee replacement, one common complaint is a perceived "stiffness" in the joint, which limits motion and impairs normal activities. This stiffness is expected, given the extensive nature of knee surgery, which the body perceives as a significant injury requiring robust healing mechanisms. Unfortunately, the final stage of this healing process often involves the formation of inflexible scar tissue. In post-surgery rehabilitation, the goal is to counteract this propensity for stiffness by actively and passively moving the knee joint, hoping to achieve sufficient motion before scar tissue becomes dense enough to restrict movement. It becomes a race against time.

A logical concept emerges: If the knee remains in continuous, full motion, it cannot become stiff or scarred. However, early and vigorous flexion presents a challenge. Traditionally, the knee wound is closed with the leg straight, making surgeons hesitant to employ vigorous early flexion fearing the wound may split open. Standard protocols typically advocate for a gradual increase in flexion to minimize the risk of wound dehiscence. In the past, Continuous Passive Motion (CPM) machines were used, initiating motion a day after surgery for 2 to 3 hours and gradually increasing the flexion angle by 10 degrees per day. However, studies have shown that this protocol does not offer significant rehabilitation benefits, leading surgeons to abandon the use of CPM machines. Attaining sufficient flexion has been left to the patient, with adequate pain control and guidance from a physical therapist. Unfortunately, scar tissue often wins the race, resulting in knee stiffness.

In 1992, we introduced a groundbreaking protocol proposing a radically different approach. If the knee never becomes stiff, it cannot develop excessive scarring. Additionally, by closing the knee wound in full flexion at maximal tension, instead of with the leg straight, the wound relaxes throughout the range of motion. This unique closure technique ensures a safe wound. Effective pain control utilizing regional anesthesia (nerve blocks) instead of general anesthesia, a long-acting local anesthetic (Exparel), and non-narcotic analgesics are crucial to manage pain, which frequently hinders progress in knee bending.

Immediately after surgery, patients fully flex and extend the knee, commence walking and climbing stairs within two hours, and start using the CPM machine at home that evening at 120 degrees of flexion. A small drain tube is employed to remove any blood or fluid from the knee, reducing swelling. Retained fluid and swelling limit motion and promote scarring. By utilizing the CPM machine for 8 hours at night and intermittently for another 8 hours during the day, patients experience improved comfort compared to being out of the machine. They are encouraged to exercise the knee when not using the machine, with the assistance of a physical therapist to facilitate motion.

Function returns more rapidly due to enhanced flexion, reduced swelling, and decreased pain. Patients achieve goals at three weeks that would typically take three months under "standard" protocols. The success of this approach lies not solely in the CPM machine itself but in its proper utilization. Previous protocols proved ineffective, whereas the

Genuflex protocol, which encompasses closure in flexion, the use of a drain, and employing CPM, has demonstrated significant success.

Reference: King, T.V., Kish, G., Eberhart, R.E., Holzaepfel, J.L. "The 'Genuflex' Skin Closure for T.K.A.