Continual motion promises more effective healing of joints

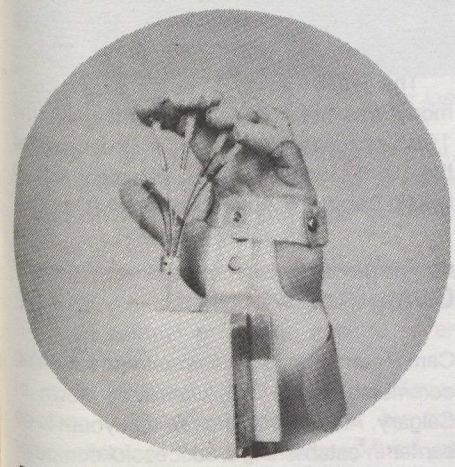
"Continuous passive motion" (CPM), a concept for healing joints conceived by orthopaedic surgeon Robert Salter of the Hospital for Sick Children in Toronto, promises a number of immediate and long-term clinical advantages, from a reduction of post-operative pain and excessive swelling to the prevention of degenerative arthritis.

The concept has since been applied to develop CPM machines for lower limbs, elbows, shoulders and fingers, by John Saringer, the president of Toronto Medical Corp. of Scarborough, Ontario, the only company in Canada that manufactures Mobilimb machines. At present about 95 per cent of the company's sales are directed at the international market.

Dr. Salter has been actively engaged in research on CPM since 1969. After nine years of research he found there was a strong correlation between motion and healing. Joints with surgical defects treated in the traditional way with casts and prolonged immobilization did not show any new cartilage formed after six months. In fact, the scar tissue fills the fracture in the existing cartilage, which later breaks down and leads to arthritis. Joints treated by continuous passive motion for at least one week were, however, found to have significantly fewer signs of degenerative arthritis and many of them had developed new cartilage.

Robert Salter

Although the biochemical and cellular details of cartilage regeneration are not yet fully understood, Dr. Salter has discovered that underlying bone as well as cartilage must be affected if new cartilage is to form. According to Dr. Salter, certain embryonic-like cells located in bone appear to be capable of differentiating into bone, scar tissue, or cartilage, depending on the stimulus. And for some reason motion encourages these cells to form bone where bone should be and cartilage where cartilage should be. Lack of motion, on the other hand, only causes rampant growth of scar tissue.



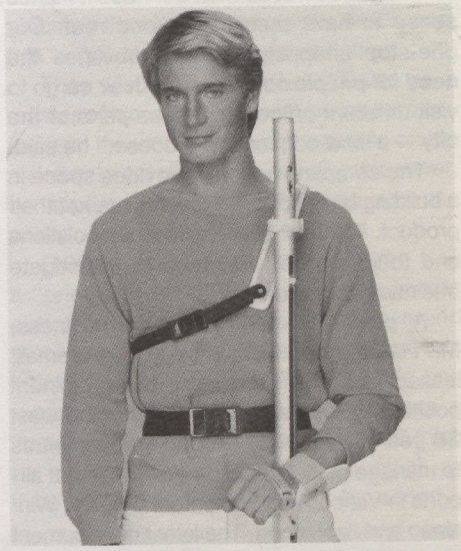
The Mobilimb hand unit, a portable, battery-operated CPM device, provides articulation of the joints through a prescribed range of motion.

First CPM device

After nine years of research, Dr. Salter began assisting John Saringer, a research assistant at the University of Toronto's Department of Mechanical Engineering, in the construction of a device that would provide CPM for the knee joint. The first device designed by Mr. Saringer moved the joint through one complete cycle of its natural range of motion every 45 seconds. The device was successfully used on a young girl whose knee was virtually useless from an injury. The CPM machine was placed on her leg during surgery and she awoke from the anaesthetic to find her knee bending without pain. Her knee is now considered completely normal and she is able to actively participate in all sports and activities that require the use of the knee.

John Sarringer

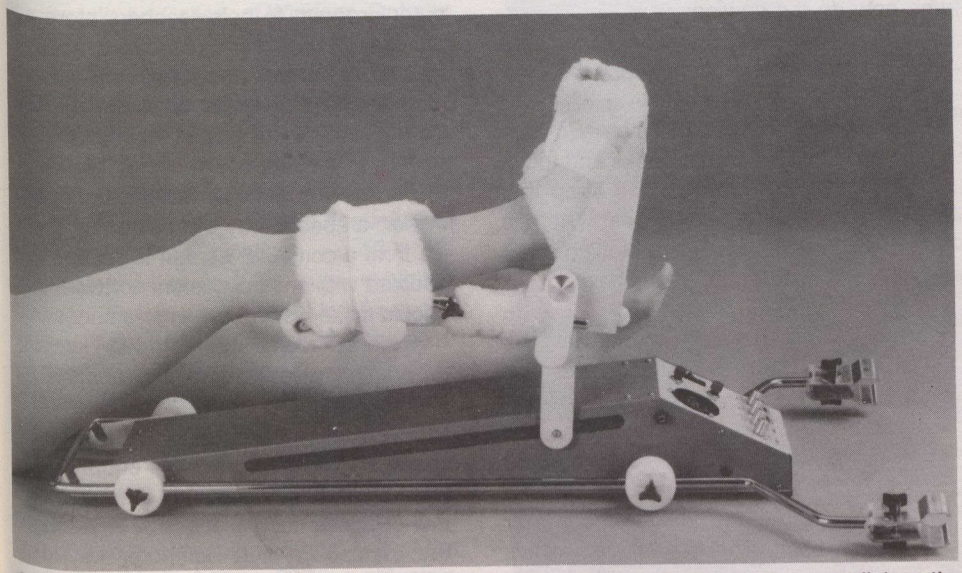
The CPM lower limb unit manufactured by Toronto Medical Corp. today, offers a complete range of motion for the knee, hip or ankle, a speed control with one to 15 minutes per cycle, and reverse on the load, as well as bed or chair use. A control panel incorporated into the body of the unit allows the patient to control the speed, the load control variable from 4 to 7 kilograms and the amount of extension and flexion.



An upper limb CPM Mobilimb used for post-operative procedures related to the elbow.

The upper limb CPM Mobilimbs are light, comfortable to wear and easily adjustable to the patient's size. Powered by rechargeable batteries, they can be altered for optimum speed and range of motion for each individual patient.

All of the Mobilimbs are applied during the immediate post-operative period and continue for at least one week after operative procedures. They allow the patient to be ambulatory in the early post-operative period and to continuously maintain a good range of motion.



Continuous passive motion lower-leg machine designed by John Saringer in collaboration with Robert Salter, offers complete range of motion for knee, hip and ankle.