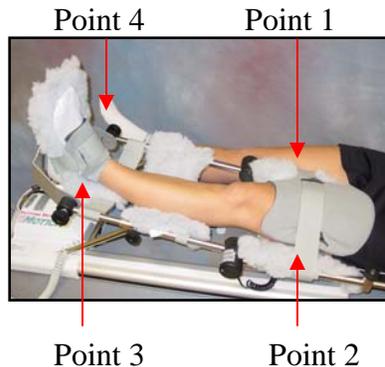


# ***EFFICACY OF KNEE CONTINUOUS PASSIVE MOTION (CPM) FOLLOWING ACL REPAIR***

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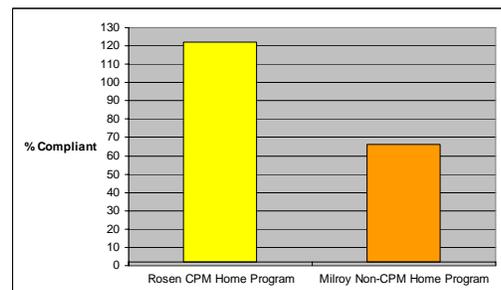
## **Kinex K4-Xtend Knee CPM 4-Point Leverage System**



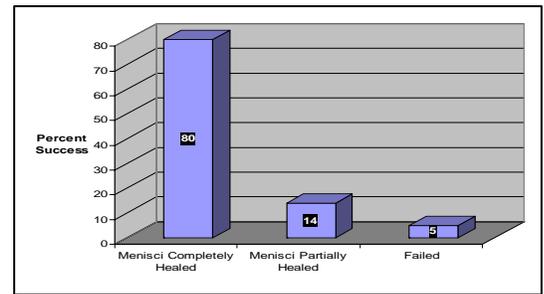
Note: Calf is not a support point.

Many surgeons utilize continuous passive motion (CPM) following knee ACL surgery as their standard of practice. These surgeons base their standard of practice on reliable evidence from published reports and articles in peer-reviewed medical journals. We have included peer-reviewed studies demonstrating the efficacy of knee ACL CPM. In addition, we have included statistically significant graph presentations from peer-reviewed studies demonstrating the efficacy of knee CPM following ACL surgery:

- Zarins et al. (2000) had success with an accelerated rehabilitation protocol in part because they safely move the knee with a CPM device immediately following surgery. *“Since the patients themselves control amount of flexion during use of CPM machine, we have encountered very few complications with this accelerated rehab protocol.”*
- O’Meara (1993, ACL Reconstruction) found early motion with CPM provides controlled stress to the ACL substitute, which is important for the formation and reorganization of the transplanted tissue as part of an accelerated program.
- Rosen et al. (1992, American Journal of Sports Medicine) **found the CPM groups had 9-12% more ROM after 1-2 months**. The ACL CPM group had a 122% compliance rate as participants utilized the CPM 7.3 hours per day which was higher than the requested 6 hour rate. The authors report a 98% (49/50) patient satisfaction rate, and that two physicians “*opted*” out of the study because they refused to be in the non-CPM group.

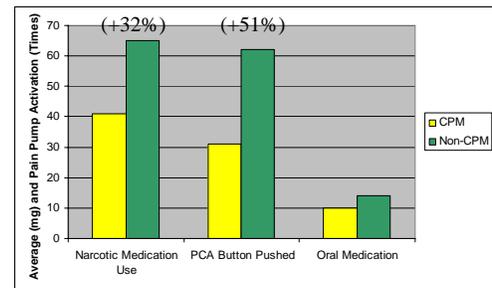


- McLaughlin et al. (1994, Sports Medicine Rehab Series) reported “*CPM devices are frequently indicated when meniscus repair is combined with anterior cruciate reconstruction. This is because there is a greater incidence of limitation of knee extension post operatively when the two procedures are preformed together.*”



- Yates (1990, Journal of Sports Rehabilitation) “well, from the standpoint of the athletic trainers and the physical therapists that I work with, the single most important thing in early rehabilitation is the CPM machine. It has become pretty much of a standard to use the CPM along with a more aggressive rehabilitation protocol.”
- Ploski et al. (1990) compared two postop ACL rehab protocols and found **patients in the early motion (CPM) group had full motion after two months compared to a lack of motion in the non early-motion group.** Early stresses of motion may influence or accelerate remodeling of the graft.
- Noyes et al. (1992, Clinical Orthopaedics & Related Research) indicated the use of **CPM following ACL reconstruction as a means of restoring knee motion without stretching the ligaments or repair.**

- McCarthy et al. (1993, JOSPT) found that the CPM group following in ACL repair exhibited a 36% reduction in narcotic use, 51% fewer requests for medication and a 32% reduction oral medication compared to the non-CPM group. “*The immediate use of CPM facilitates rehabilitation by decreasing medication usage, therefore, CPM is recommended to enhance rehabilitation...*”



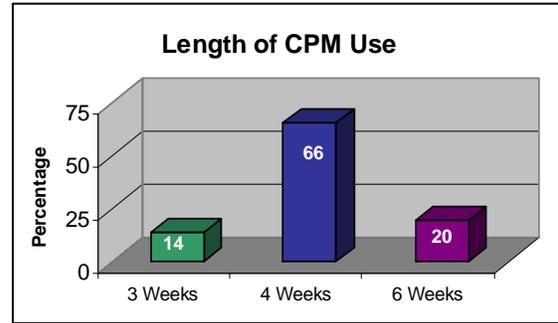
(modified from McCarthy et al., 1993)

- Schnebal et al. (1989,) reported patients “were more comfortable with the use of the machine than without it.” In addition the authors noted, “One variable we had not intended to study, but which became apparent during postoperative care, was the response of the patient during the physical therapy session. The therapists found that the patients on the (CPM) machine had much less discomfort during the sessions and seemed to progress more rapidly. The drudgery of acquiring ROM was decreased such that attention could be directed to education, ambulation and strength exercise”.
- Gaspar et al. (1997) found the CPM group had significantly greater flexion/extension ROM over the non-CPM group following ACL repair.

## Postop ACL Repair

- The CPM is used for 4-6 weeks depending on type of repair. CPM is typically used longer for a concomitant ACL and meniscus repair.

The Center for Orthopedics and Sports Medicine. ACL Reconstruction (Patella Tendon Graft) with Autologous Chondrocyte Implantation (Femoral Condyle) Rehabilitation Guideline, (1999).  
McCarthy M, EdD, PT, ATC, and Yates C, MD, et al: The Effects of Immediate Continuous Passive Motion on Pain During the Inflammatory Phase of Soft Tissue Healing Following Anterior Cruciate Ligament Reconstruction. *JOSPT* 17(2), February 1993.  
Rosen M, MD, Jackson DW, MD, et al: The Efficacy of Constant Passive Motion in the Rehabilitation of the Anterior Cruciate Ligament Reconstruction Patient, ABSTRACT. *Am J Sports Med*, 1991.  
Spaciel, B. Knee CPM guideline. A personal communication. January 2004.



\*Analysis of CPM usage of 15 orthopedic surgeons following ACL repair (practicing in 10 states).

\*Kinex Medical [Unpublished raw data], 2004.