

Indexed, Abstracted and Cited: [Index Copernicus International \(Poland\)](#), [ISRA Journal Impact Factor](#), [Google Scholar](#), [International Impact Factor Services \(IIFS\)](#), [Directory of Research Journals Indexing \(DRJI\)](#), [International Institute of Organized Research and Scientific Indexing Services](#), [Cosmos Science Foundation \(South-East Asia\)](#), [International Innovative Journal Impact Factor](#), [Einstein Institute for Scientific Information {EISI}](#), [Directory of Open Access Scholarly Resources](#), [Science Indexing Library \(UAE\)](#), [Swedish Scientific Publication \(Sweden\)](#), [citefactor.org journals indexing](#), [Directory Indexing of International Research Journals](#)

World Journal of Biology and Medical Sciences

Published by Society for Advancement of Science®

ISSN 2349-0063 (Online/Electronic)

Volume 4, Issue- 2, 94-97, April to June, 2017

Journal Impact Factor: 4.197



WJBMS 04/02/244/2017

All rights reserved

A Double Blind Peer Reviewed Journal / Refereed Journal

www.sasjournals.com

wjbmedsc@gmail.com / wjbms.lko@gmail.com

CASE REPORT

Received: 29/05/2017

Revised: 05/06/2017

Accepted: 06/06/2017

Therapeutic Uses of CPM: A Case Report

Aavrati Rastogi

Department of Physical Medicine and Rehabilitation, King George's Medical University,
Lucknow, U.P., India

Continuous Passive Motion (CPM) devices are used during the first phase of rehabilitation following lower limb joint surgeries or traumas.

The CPM device continuously and repeatedly moves the joint through a controlled range of motion. Daily treatment increases the initially limited movement of the joint and is used to prevent negative effects of joint immobilization such as joint stiffness, swelling, poor articular cartilage nourishment, and collagen loss or thromboembolic disease.

The therapy ensures safe exercise throughout the healing and repair process of the tissue by providing passive movement, reduces postoperative pain and minimizes chances of inflammation. CPM also helps increase range of motion and it has favorable effect on muscle strength. CPM stimulates chondrocyte metabolism which makes it important for joint regeneration processes. At this time, the routine use of CPM as an adjunct to the program of intensive, inpatient rehabilitation cannot be recommended ([Chen et al., 2000](#)). During the past 3 decades, continuous passive motion (CPM) devices have become a generally accepted part of postsurgical treatment to promote healing and regeneration of joint cartilage ([Stroud, 2003](#)).

Benifits of CPM

The benefits of CPM for healing cartilage:

- Enhanced nutrition and metabolic activity
- Accelerated healing of articular tissues

- Regeneration of cartilage

The benefits of CPM for healing tendons

- Restoration of the tendon's gliding surface
- Greater mean breaking strength of the tendon
- Enhanced intrinsic healing through synovial diffusion
- Prevention of adhesion formation

Because CPM therapy

- Increases joint mobility and range of motion
- Helps decrease complications such as joint stiffness and adhesions
- Reduces the length of post-operative hospitalization, and
- Builds patient confidence, well-being and independence.

Indication for Ankle

- Passive mobilization of the following fractures after internal fixation
- Mobilizations of the joints of the foot after operative or conservative treatment of lesions of the:
 - Achilles tendon
 - Lateral collateral ligament
 - Medial collateral ligament
 - Surgical lengthening of the achilles tendon for post-traumatic stiffness
 - Club foot.

MAIN CHARACTERISTICS OF THE SYSTEM

The rehabilitation system will perform the flexion-extension motions for the knee rehabilitation. It can make flexion-extension, plantar flexion-dorsiflexion, abduction-adduction and inversion-eversion movement for the ankle joint. The device has to be designed for both left and right lower limb. In addition, it can be adjusted for different limb dimensions. The device's mechanical structure will use the classical methods for fixation the knee and ankle.



The rehabilitation device must have the following main characteristics: - Automatic anatomically correct alignment, - Feedback force control to evaluate and limit the amount of force, - Speed control: from 40°/minute to 145°/minute - Effective passive mobilization of the joint; - Multi-Mode operation – active, passive and their combination during every cycle, pause in flexion or extension; - Adjustable in length from small children to large adults. - Remote control with digital display allowing easy adjustment of all parameters - range of motion, speed, pause and timer;- Large range of motion: knee -3° to 130°; ankle plantar flexion 40° dorsiflexion 30° internal rotation 30° external rotation 30°; - Patient and user safety: The patient can stop and reverse the unit at any time; The movement reverses if the load is excessive. This review compared the difference in means of studies using CPM as an intervention against control interventions (**Lenssen et al., 2006**).

Continuous Passive Motion (CPM) device

Continuous passive motion (CPM) is one of the primary methods for decreasing the deleterious effects of immobilization and can deliver orthopedic, neurological, and even circulatory benefits to the patient. Immobilization, in turn, can create deleterious sequelae of physiological and functional impairments (**Hammesfahr and Serafino, 2002**).

Case History

In our **Department Of Physical Medicine and Rehabilitation, KGMU, LKO**. we conducted a therapeutic trial on a case of crush injury of leg. 25 yrs old Arti, she was a symptomatic 15 months back when she met accident with train her right leg was amputated immediately and left leg was suffered crush injury. After few limb saving surgery bilateral transfemoral amputation was done.

The patient had restricted movements' difficulty in doing her daily life activities. CPM was applied on the left ankle for 6 weeks for 30 minutes twice everyday on the ankle was noted at fifth and tenth day. Her rehabilitation session of left ankle begins by programming the device with the following values:

- Dorsiflexion limit 5 degree,
- Planter flexion limit -10 degree,
- Dorsiflexion speed 4,
- Planter flexion speed 4, force (had been established during movement with respect to the resistance of the patient's limb).
- Working time 30 m,
- Dorsiflexion auto- increase 0.2 degree,
- Dorsiflexion auto- increase limit 15 degree,
- Planter flexion auto- increase 15 degree,
- Planter flexion auto- increase limit -30 degree,
- Dorsiflexion pause 0,
- Planter flexion pause 0,
- Warm up: flexion decrease 5degree.

RESULT

The patient had speed recovery in left ankle. The planter flexion and dorsiflexion improved her was inflate at the end of the treatment and was able to perform daily life activity more independently with this leg. She also had marked improvement in her joint ROM.

Contraindication

Here, I would like to add this **CPM is contraindicated in unstable fracture, active infection, fused joints, blood –thinning medications, proper positioning, alignment and monitoring, external fixation device.** Subsequently, some physiotherapists or orthopedic surgeons have shortened the duration of CPM per day and the number of days of duration, with less dramatic results (Salter, 2004).

CPM must not be used through the full range of motion until the swelling has been reduced. CPM acts to reduce blood and fluid accumulation in and around joints that have been traumatized 187 O'DRISCOLL and GIORI: Continuous passive motion (CPM) or undergone surgery. In this way, CPM is useful in avoiding the development of subsequent joint stiffness in the first few hours or days. Avoiding stiffness in the early stages minimizes its chances of progression to fibrosis of the joint and establishment of contracture. Long-term benefits, however, are predicated on preventing the accumulation of blood and/or edema fluid in the joint or periarticular tissues. This is accomplished by the immediate application of a full range of passive motion on CPM, or by briefly elevating and splinting the limb in a position that keeps the periarticular tissues stretched before instituting a full range of passive motion on CPM (O'Driscoll and Giori, 2000).

REFERENCES

- Chen, B., Zimmerman, J.R., Soulen, L. and DeLisa, J.A. (2000). Continuous passive motion after total knee arthroplasty: prospective study. *American Journal of Physical Medicine and Rehabilitation* 79: 421-426.
- Lenssen, A.F., Crijns, Y.H., Waltje, E.M., Roos, G.M., van Steyn, M.J., Geesink, R.J. et al (2006). Effectiveness of prolonged use of continuous passive motion (CPM) as an adjunct to physiotherapy following total knee arthroplasty: design of a randomised controlled trial. *BMC Musculoskeletal Disorders* 7: 15.
- Salter, R.B. (2004). Continuous passive motion: From origination to research to clinical applications. *Journal of Rheumatology*, 31: 2104-2105.
- O'Driscoll, S.W. and Giori, N.J. (2000). Continuous passive motion (CPM): theory and principles of clinical application. *J Rehabil Res Dev.* 37; 179-188.
- Hammesfahr, R. and Serafino, M.T. (2002). CPM: The key to successful rehabilitation. *Orthopedic Technology Review*, 3(2).
- Stroud, R. (2003). CPM: Healing in motion. *Orthopedic Technology Review*, 5 (4).

Corresponding author: Dr. Aavrati Rastogi, Department of Physical Medicine and Rehabilitation, King George's Medical University, Lucknow, U.P., India

Email: aavrati26@gmail.com