DME Continuous Passive Motion AHM

Clinical Indications

- Continuous passive motion (CPM) machines are considered medically necessary durable medical equipment (DME) to improve range of motion in circumstances in 1 or more of the following
  - During the post-operative rehabilitation period for members who have received a total knee arthroplasty or replacement as an adjunct to on-going physical therapy (PT)
  - Members who have had an anterior cruciate ligament repair until the member is participating in an active PT program
  - Members undergoing surgical release of arthrofibrosis/adhesive capsulitis or manipulation under anesthesia of any joint (knee, shoulder, and elbow the commonest) until the member is participating in an active PT program
  - To promote cartilage growth and enhance cartilage healing during the non-weight bearing period 1 or more of the following until the member begins the weight bearing phase of recovery
    - After abrasion arthroplasty or microfracture procedure
    - Autologous chondrocyte transplantation
    - Chondroplasties of focal cartilage defects
    - Surgery for intra-articular cartilage fractures
    - Surgical treatment of osteochondritis dissecans
    - Treatment of an intra-articular fracture of the knee (e.g., tibial plateau fracture repair)

- Members who have undergone certain surgeries and may not be able to benefit optimally from active PT, for example members with 1 or more of the following
  - Dupuytren's contracture
  - Extensive tendon fibrosis
  - Mental and behavioral disorders
  - Reflex sympathetic dystrophy

- Members who are unable to undergo active PT
- Where the CPM device is used for surgical rehabilitation, the use of this device must commence within 2 days following surgery to meet medical necessity
guidelines. Although the usual duration of CPM usage is 7 to 10 days, up to 3 weeks of CPM therapy may be considered medically necessary upon individual consideration. Use of the CPM machine beyond 21 days post-op is not supported by the medical literature. There is insufficient evidence to justify use of these devices for longer periods of time or for other applications.

- Current role remains uncertain. Based on review of existing evidence, there are currently no clinical indications for this technology. See Inappropriate Uses for more detailed analysis of the evidence base. CPM machines are considered investigational for the following indications because there is insufficient scientific evidence to support the use of these machines for these indications (not an all inclusive list):
  - Motion or strength following metacarpophalangeal arthroplasty
  - Rehabilitation following back surgery
  - Rehabilitation of distal radial fractures
  - Treatment of low back pain or trauma
  - Rehabilitation following foot surgery
  - Rehabilitation following quadriceps tear
  - Rehabilitation following temporomandibular joint repair
  - Rheumatoid arthritis in the absence of a covered indication

### Evidence Summary

- **Background**
  - Published studies suggest that CPM can improve range of motion (ROM) in those patients undergoing surgical release of arthrofibrosis of the knee or manipulation of the knee under anesthesia. In these settings, CPM provides for early post operative motion and is considered a substitute for active PT. Once the patient is participating in active PT, CPM is no longer medically necessary. These observations may be extended to other joints, such as the elbow where arthrofibrosis is a common complication of trauma.

- **Systematic evidence reviews have found weak or limited evidence for CPM for a number of indications.** In a Cochrane review, Handoll et al (2006) evaluated the effects of rehabilitation interventions in adults with conservatively or surgically treated distal radial fractures. Fifteen trials, involving 746 mainly female and older patients, were included. Initial treatment was conservative, involving plaster cast immobilization, in all but 27 participants whose fractures were fixed surgically. Though some studies were well-conducted, others were methodologically compromised. For interventions started during
immobilization, there was weak evidence of improved hand function for hand therapy in the days after plaster cast removal, with some beneficial effects continuing one month later (one trial). There was weak evidence of improved hand function in the short term, but not in the longer term (3 months), for early occupational therapy (one trial), and of a lack of differences in outcome between supervised and unsupervised exercises (one trial). For interventions started post-immobilization, there was weak evidence of a lack of clinically significant differences in outcome in patients receiving formal rehabilitation therapy (four trials), passive mobilization (two trials), ice or pulsed electromagnetic field (one trial), or whirlpool immersion (one trial) compared with no intervention. There was weak evidence of a short-term benefit of CPM (post external fixation) (one trial), intermittent pneumatic compression (one trial) and ultrasound (one trial). There was weak evidence of better short-term hand function in participants given physiotherapy than in those given instructions for home exercises by a surgeon (one trial). The authors concluded that available evidence from randomized controlled trials is insufficient to establish the relative effectiveness of the various interventions used in the rehabilitation of adults with fractures of the distal radius.

- A systematic evidence review by Michlovitz, et al. (2004) of nonsurgical interventions to restore range of motion to persons with injuries to the upper extremities found insufficient evidence to support the use of continuous passive motion. The systematic evidence review identified one cohort study, which found CPM to be similar to range of motion (ROM) exercises at improving ROM and extension, but better at improving flexion, after surgery for elbow flexion contractures. The review identified another cohort study that found CPM to be no better than passive ROM exercises after rotator cuff repair. The investigators concluded that "[t]he quality and quantity of evidence in this area were moderate to low."

- In a Cochrane review, Massy-Westropp et al (2008) compared the effectiveness of post-operative therapeutic regimens for increasing hand function following metacarpophalangeal (MCP) arthroplasty in adults with rheumatoid arthritis. Randomized controlled trials and controlled clinical trials were accepted if they evaluated the efficacy of a post-operative therapeutic regimen for MCP arthroplasty. No data analyses were performed as only 1 controlled clinical trial was found. The data from that study were described. These investigators' search only identified 1 controlled clinical trial involving 22 subjects. The majority of the evidence for various splinting and exercise regimens consisted of case series and case studies. Results from the 1 (poor quality) trial suggested that the use of CPM is not effective in increasing motion or strength after MCP arthroplasty. The authors concluded that well-designed randomized controlled trials which compare the effectiveness of different therapeutic splinting programs following MCP arthroplasty are required. At this time, the results of 1 study suggested that CPM alone is not recommended for increasing motion or strength after MCP arthroplasty.

- In a randomized controlled study, Lenssen and colleagues (2008) examined the effectiveness of prolonged CPM use in the home setting as an adjunct to standardized PT. Effectiveness was assessed in terms of faster improvements in ROM as well as functional recovery, measured at the end of the active treatment period, 17 days after surgery. A total of 60 patients with knee osteoarthritis undergoing total knee arthroplasty (TKA) and
experiencing early post-operative flexion impairment were randomized into 2 treatment groups. The experimental group received CPM + PT for 17 consecutive days after surgery, whereas the usual care group received the same treatment during the in-hospital phase (i.e., about 4 days), followed by PT alone (usual care) in the first 2 weeks after hospital discharge. From 18 days to 3 months following surgery, both groups received standardized PT. The primary focus of rehabilitation was functional recovery (e.g., ambulation) and regaining ROM in the knee. Prolonged use of CPM slightly improved short-term ROM in patients with limited ROM at the time of discharge after TKA when added to a semi-standard PT program. Assessment at 6 weeks and 3 months after surgery found no long-term effects of this intervention. These researchers also did not detect functional benefits of the improved ROM at any of the outcome assessments. The authors concluded that although results indicate that prolonged CPM use might have a small short-term effect on ROM, routine use of prolonged CPM in patients with limited ROM at hospital discharge should be re-considered, since neither long-term effects nor transfer to better functional performance was detected.

- In a Cochrane review, Gray et al (2012) evaluated the effectiveness of interventions for congenital talipes equinovarus (CTEV). The review found, among other things, a lack of evidence for continuous passive motion treatment following major foot surgery. The authors could draw no conclusions from other included trials because of the limited use of validated outcome measures and lack of available raw data; and future randomized controlled trials should address these issues.

- There is also a scarcity of peer-reviewed evidence on the use of CPM for other conditions including degenerative joint diseases (e.g., rheumatoid arthritis) as well as rehabilitation following quadriceps tear and temporo-mandibular joint repair.

- Ring and colleagues (1998) examined if a post-operative rehabilitation protocol incorporating CPM would increase the total ROM obtained 6 months following silicone interposition arthroplasty of the metacarpophalangeal joints in patients with rheumatoid arthritis. A prospective trial randomizing patients to receive either CPM or the standard dynamic splint protocol (modified Madden protocol) was undertaken. A total of 15 hands (60 joints) were treated with the modified Madden protocol and 10 hands (40 joints) had CPM. The mean 6-month post-operative ROM was 7 degrees in the modified Madden cohort compared with 39 degrees in the CPM cohort, representing an improvement of 22 degrees in the modified Madden cohort compared with an improvement of only 5 degrees in the CPM cohort.

- Residual ulnar deviation 8 degrees versus 12 degrees and grip strength (2.3 kgf versus 3.7 kgf) were both lower in the CPM cohort. The authors concluded that incorporation of the CPM machine in the post-operative rehabilitation protocol does not offer sufficient advantages to justify the added costs.

- An UpToDate review on "Total joint replacement for severe rheumatoid arthritis" (Weisman and Rinaldi, 2013) states that "It is unclear whether the use of continuous passive motion devices in the postoperative management of total knee arthroplasty results in enough clinical benefit to justify the inconvenience and expense of the procedure".
References

34. Weisman MH, Rinaldi RZ. Total joint replacement for severe rheumatoid arthritis. Last reviewed September 2013. UpToDate Inc., Waltham, MA
Codes