Peer-Reviewed Studies Evaluating Five Outcome Measures For The Efficacy of CPM Following Rotator Cuff Repair

	Study A	Study B	Study C	Study D	Study E	Summary Of Results
Study Title	**Evaluation and Cost Analysis in Use of Continuous Passive Motion After Rotator Cuff Tears, A Prospective, Randomized, Comparative Study; Royer et al (2000, Institutional Review Board at Henry Ford Hospital)**	**Continuous Passive Motion after Repair of the Rotator Cuff, A Prospective Outcome Study; Lastayo et al (1998, Journal of Bone and Joint Surgery)**	**Early Results of Continuous Passive Motion After Cuff Repair, A Prospective, Randomized, Blinded, Controlled Study; Raab et al (1996, American Journal of Orthopedics)**	**The Value of the Continuous Passive Motion after Repair of the Rotator Cuff Tear in Athletes, An Arthroscopic Comparative Study; El-Zahaar et al (1996, Journal of Neurological and Orthopedic Medicine and Surgery)**	**Continuous Passive Motion in the Rehabilitation of the Surgically Reconstructed Shoulder, A Preliminary Report,; Craig (1986, Orthop Trans)**	
Study Parameters	**Compared efficacy and cost effectiveness of two groups providing PROM* for 6 weeks; CPM* only versus PT* only.**	**Compared MPROM* (provided by a 3rd party or healthcare professional; not self-patient directed) to CPM* only for PROM* for 4 weeks. Both groups attended unspecified PT*.**	**Compared CPM* to PT* only for PROM* for 3 weeks, followed by an additional 3 weeks of PROM* & AAROM* by PT* only.**	**Compared CPM* only to a PT* only protocol for PROM* for 4-6 weeks following rotator cuff repairs in athletes.**	**Compared CPM* to early immobilization.**	**In these comparative studies CPM* was compared to PT* only, PT* + CPM*, MPROM* by a trained 3rd party, and immobilization.**
1 Range of Motion	At week one ROM* was statistically superior in CPM* group. ROM* improvements were statistically similar at 6 &12 weeks in both groups. Actual ROM* data was included in the study.	No statistical difference was found between the rate of recovery for both groups in elevation and external rotation. Actual ROM* data was not reported.	Statistically significant gains were seen in the CPM* only group. The non-CPM* group had a loss of motion after 12 weeks. ROM scores were included.	CPM* only group did regain full ROM* in elevation with no loss in rotation as compared to the uninjured shoulder. Actual ROM* data was not included.	CPM* group reached satisfactory ROM earlier (5.7 days vs. 12) than non-CPM* group. ROM* data were not included.	Overall CPM* was either superior to or equal to the non-CPM* groups. In 3/5 studies ROM* was gained earlier in the CPM* group. In one study the CPM* group was statistically superior and the non-CPM* group had a decrease in ROM*.
2 Pain	Not evaluated early on when pain is most prominent. Pain status at 12 weeks was equal.	The CPM* group had statistically significant less pain, especially during the first 2 weeks when the pain is most prominent.	A statistically significant improvement was seen in the subscore for women in the CPM* group. Patients subjectively reported using the CPM* longer then directed because it decreased pain.	25 out of 27 patients in the CPM group reported satisfactory pain reduction. The pain scale consisted of 3 grades.	The CPM* group reported less pain than the non-CPM* group.	Overall the CPM* groups reported significantly less pain. Two studies statistically measured pain, reporting a statistically significant reduction in the CPM* group(p=0.046 & p=0.0185).
3 Compliance	Utilized CPM 5.06 hours on average out of the 6 hours requested. Results for patients who used CPM* for less than 6 hours were equal to those who used CPM 6 hours or more.	Not reported.	Not directly evaluated but the authors reported several patients used CPM* longer than the 8 hours requested for pain relief.	Not reported.	Not reported.	The studies that evaluated compliance reported high compliance in the CPM* groups. One author noted high compliance is related to the pain reducing effect of CPM*.
4 Cost Effectiveness	Found a significant ($990.00 per case) savings in the CPM* group compared to the PT* only group. The author on average performs 100 cases a year and would realize a savings of $99,000 dollars with CPM* only.	The author reported that the CPM group may have higher costs. However, this statement was not supported with comparative results with PT or real cost figures in it's conclusions. Additional PT visits were needed to teach MPROM.	The author compares CPM* plus PT to PT alone. CPM* alone compared to PT alone for PROM* was not evaluated.	The author reported fewer PT* visits in his protocol that included CPM* versus the comparison protocol which was PT* only.	Not reported.	Only one study compared cost for providing PROM between PT* only and CPM* only. CPM* only demonstrated a significant savings in cost over PT* only.
5 Self Assessed Scores (SAS)	Utilized the Shoulder Index of Shoulder and Elbow Surgeons at 6 & 12 weeks. Both groups showed improvement indicating efficacy for both approaches with superior numbers for the CPM* group but not statistically significant.	Utilized the Shoulder Pain and Disability Index. Our primary finding is that CPM is a safe technique that results in little disability & an excellent outcome after repair of a cuff tear. The CPM* group did show statistically significant less pain in the first postop week compared to the MPROM group.	Authors shoulder score based on 4 scales: SA* Function = 50%, Pain SA* =20%, ROM = 15% & Strength =15%. Measured preop & 12 weeks. Both groups showed significant improvements in subjective scores; the CPM group had superior objective scores indicating the efficacy of both CPM* & PT*.	Utilized a SAS score that resulted in a good, fair or poor satisfaction result. The specific SAS form was not reported. This series replicated a previous series with the addition of CPM*. The CPM* approach resulted in superior good results and no poor results compared to the non-CPM* group which had 13% poor results.	Patients reported on pain level only. CPM* group reported less pain then the non-CPM* group.	**In all studies the CPM* group was either equal to the PT* (or MPROM*) group or superior to the PT* group. CPM* is efficacious following rotator cuff repair and offers additional objectivel benefits; increased ROM, pain reduction, high compliance and cost savings over PT* protocols for PROM*.**

PROM= Passive Range of Motion; CPM= Continuous Passive Motion; PT= Physical Therapy; MPROM= Manual Passive Range of Motion; AAROM= Active Assistive Range of Motioin; ROM= Range of Motion; SA= Self Assessment

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