

CAT → Closed and open chain strengthening exercises equally effective in improving pain & function in PFPS patients.

Clinical Bottom Line(s):

1. Almost no difference between open and closed chain exercise in terms of pain & function. Contradicts recent allegations that open-chain exercises should be avoided in PFPS.
2. Best program would probably combine both open and closed chain exercise.

Citations(s): Witvrow E, Lysens R, Bellermans J, Peers K, Vanderstraeten G. Open vs. Closed Kinetic Chain Exercises for Patellofemoral Pain. *American Journal of Sports Medicine*. 2000;28(5):687-694.

Three/four part clinical question: In a younger patient with patellofemoral pain syndrome, are closed-chain exercises more effective than open-chain exercises in reducing pain and increasing functional ability?

The study: Prospective randomized-controlled trial.

The study patients: 60 patients, age 14-33 (avg 20.3), divided into equal groups of closed and open chain exercise rehab. Both groups had 10 men & 20 women. Average duration of symptoms was 15.1 months. 27 of 60 patients had bilateral knee pain. Inclusion criteria included pain for > 6 wks plus 2 of the following: pain with direct compression of the patella with the knee extended, TTP posterior patellar surface, pain with resisted knee ext, and pain with isometric quadriceps contraction against suprapatellar resistance with the knee in slight flexion. Patients with other knee problems than PFPS were excluded along with those who had previous surgery.

Control Group (Closed-chain Exercise): 3x per wk for 5 wks. 3 sets x 10 reps with 1 min rest period. Exercises consisted of: seated leg presses, 1/3 knee bends on one leg & both legs, stationary bicycling, rowing-machine exercises, step-up & step-down exercises, and progressive jumping exercises.

Experimental Group (Open-chain Exercise): 3x per wk for 5 wks. 3 sets x 10 reps with 1 min rest period. Exercises consisted of: quadriceps muscle setting, SLR, short arc quads from 0 – 10 degrees, and leg adduction exercises in lateral decubitus position.

The evidence:

Outcome	Time to Outcome	DV or CER	DV or EER	RRR (option)	ARR (option)	NNT (option)
Pain – OC ex	5 wks	.52	.52	0	0	---
Pain – OC ex	3 mo	.34	.32	.06	.02	50

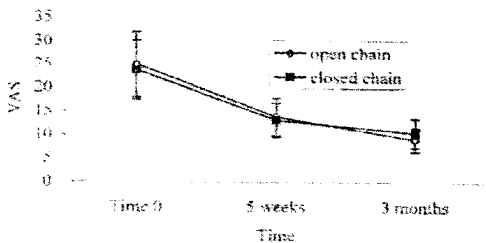


Figure 3. Changes in value of the pain score, using a 100-mm visual analog scale (VAS), during the triple-jump test of the open and closed kinetic chain groups.

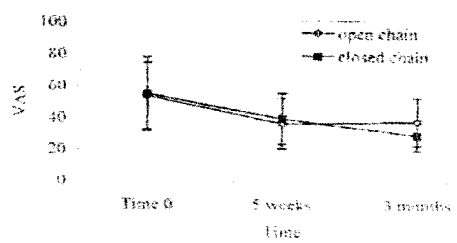


Figure 2. Changes in value of the pain scores, using a 100-mm visual analog scale (VAS), during daily activity for the open and closed kinetic chain groups at the different evaluation periods.

Comments:

1. Figure 2 & 3 (above): improvement statistically significant for both groups. No difference b/w groups @ 5 wks (P>0.05). Open chain exercise did not improve at 3 mo follow-up, but not significantly different from closed chain (Figure 2).
2. Closed chain exercises may be slightly better at improving functional level.
3. Investigators did not discuss issues of blinding for evaluators or compliance with the program.
4. This is the first study comparing the effect of exercise type. More research is needed to validate findings.

Appraised by: ILT Michael Crowell

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Kill or update by: 4 JUN 04