First Study to Compare Hand Therapy After Finger Flexor Tendon Repair

Back in the 1970s, hand surgeons discovered that early motion after flexor tendon repairs yielded better results. Putting the hand in a splint that blocked some motions but allowed others was better than no motion at all. Those early studies supported the idea that motion is lotion.

Since that time, research has continued in the area of hand therapy. Hand rehab programs have expanded to include all different ideas for post-op positioning, motion, and exercise. In this study, the use of a passive motion program was compared to early active motion therapy. The authors believe this is the first study published comparing these two hand therapy techniques.

Passive motion refers to the fact that someone else other than the patient (in this case, a hand therapist) is moving the affected fingers. Active motion means the patient is moving the finger by himself.

The major concern following tendon repair surgery is re-rupture of the healing tendon. At the moment surgery is completed, the only thing holding the damaged tendon together is the sutures. It takes time for the tendon to heal across the tear. There’s always a fear that too much movement too soon would tear the newly forming tissue.

On the other hand, without some movement, scar tissue forms. Adhesions within and around the tendon create loss of motion in joints. The tendon stops gliding smoothly. The end result can be joint contractures -- joints that can't move beyond a certain range.

Hand therapists carried out the motion therapy. Specific programs were used for the passive motion rehabilitation program (Duran and Kleinert programs). Patients in the passive motion group wore a special protective rubber-band traction splint in between sessions with the hand therapist.

Patients in the active motion group wore a special hinged splint that held the fingers in flexion but still allowed wrist extension. This splint was used during the motion exercises to allow for the right kind of motion yet still prevent some movements. In between sessions, the active motion group wore a special blocking splint. The design of the splint was to keep the wrist and fingers in a position of flexion (bent) and prevent extension (straightening).

The researchers took several steps to help keep things even between the groups and make comparisons more meaningful. Everyone had the same tendon repair (zone-II flexor repair using a four-strand suture). The young (less than 15 years old) and the old (more than 75 years old) were not included because of age-related complications that often develop. To keep it simple, anyone with other hand injuries (e.g., crush injury, fracture, blood vessel injury) was excluded as well.

The results were measured using finger joint range-of-motion, dexterity tests, and ratings of patient satisfaction. A well-known and valid questionnaire called the Disabilities of the Arm, Shoulder, and Hand (DASH) was given to each patient as a self-report measure of function and symptoms.

In addition, factors known to affect the results of tendon injuries and repairs were also compared between the two groups. These included things like whether or not the patient was a cigarette smoker, age, which hand was injured versus which hand was the dominant hand, number of fingers injured, and type of injury.
The results were striking. Patients in the early motion group had significantly better outcomes. They had much more motion (and less severe) joint contractures, and better dexterity (e.g., picking up small objects, using fingers to manipulate objects). It was not surprising, the early motion group with the better results were also much happier with the progress they made after surgery.

It was also the case that patients with more than one finger injured had worse outcomes. The patients with multiple-digit injuries had less motion and worse contractures compared with single-digit injuries in both groups. Patient satisfaction with results was higher among the patients with single-finger injuries.

Analysis of the data collected showed two additional negative risk factors: smoking and nerve injury. A negative risk factor means that when either of these factors were present, the patients were more likely to have worse results. On the positive side, patients treated by a certified (specially trained) hand therapist had better outcomes.

The authors concluded that early motion after flexor tendon surgical repair is a good thing. Under the supervision of a hand therapist, results are better than when the finger is kept immobilized or only passively moved.

Patients should be advised that results can be affected by certain (negative) risk factors such as tobacco use, the presence of nerve injuries, and when more than one finger is involved. There is always the risk of tendon re-rupture as a possible complication. Surgeons and therapist do everything possible to keep this from happening. Patients are also asked to stop smoking to aid in their own recovery.

One final note: in this study, most of the re-ruptures affected the little finger. The authors advise NOT using the early active motion program for patients with flexor tendon ruptures of the little finger. The tendon fibers in that particular finger are just too few to handle the force of motion in the early phases of recovery.


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