

## **Immediate mobilization versus 2 weeks cast immobilization after distal radius fracture treated with volar locking plate- rehabilitation program**

### **Rehabilitation program – 2 week cast group**

The primary goal after distal radius fracture treated with volar locking plate is to restore normal wrist movement. A prerequisite for achieving this goal is regular training in accordance with the instructions, which is very important for the functioning of the wrist.

The start of the exercises should not be delayed in any way, and there should be no unnecessary fear of moving the wrist after the cast treatment. The exercises in this guide are designed with the healing schedule in mind and are therefore safe to perform.

Hard-working and long-term self-training can be seen at its best as a restored ability to function on the wrist. Failure to do so or delaying training can, at worst, lead to a stiff and poorly functioning wrist.

- 1) Feel free to start training as instructed as soon as pain allows**
- 2) Diligent training allows good end result.**
- 3) Operated hand should be used from the beginning in light everyday tasks, such as eating and brushing your teeth.**
- 4) Practice patiently. Restoration of wrist function does not happen in an instant.**
- 5) Follow the training schedule, but respect your unpleasant feelings!**

### **Rehabilitation during the 2 week cast immobilization**

A plaster cast will be placed in the operating room after surgery and will be removed in health care center after 2 weeks. After the procedure, it is normal for the wrist to be sore and swollen. Goals immediately after surgery focus on relieving swelling and treating pain.

#### **Elevated position**

As long as the swelling occurs, you should keep your hand in elevated position above the level of the heart as much as possible. The elevated position relieves both pain and swelling.

When resting, support your arms for example with pillows and keep your hand on your chest as you move. When the swelling is no longer disturbing, it is important that you allow the hand to be free and avoid unnecessary support.

#### **Cold treatment**

Cold therapy soothes tissues after surgery and is effective in treating pain. Carry out regular cold care at home with cold packs. Start cold therapy immediately after surgery. Keep the cold pack on the palm side of your wrist for short periods several

times a day. Be careful not to freeze the skin. The cold pack should never be kept exposed to the skin.

### **Finger exercises**

Start moving your fingers immediately after surgery. Do the following exercises while you are awake about every hour. You can't move your fingers too much. Movements reduce swelling and pain in the hand.

- a) Put your fingers fully in your fist so that your thumb is on top. Then extend your fingers quite straight and as far apart as possible. If you are unable to make the move to the top with a full active trajectory, you can gently assist with one hand until the full active movement is successful. Repeat the movement 10 times
- b) Touch each fingertip alternately with your thumb. After each touch, extend your fingers straight, just like after punching. Repeat the movement so that you touch each finger 10 times in turn.
- c) Rotate your thumb in a large circle. Move 10 turns in each direction.

### **Full upper limb movement exercises**

When the cast is on, there is a risk that the entire upper limb will remain unused. Your shoulder and elbow joints need movement despite the cast. So do the following exercises several times a day.

- a) Keep your hand next to your body. Extend your elbows completely straight and at the same time extend your fingers. Keep your arm straight for a moment. Then hook the elbow joint as far as you can and at the same time hook your fingers. Cast should not prevent flexion. Do the exercise 10 times and repeat several times a day.
- b) Raise your hand towards the ceiling. Remember good posture when moving. Do the exercise 10 times and repeat several times a day.

You can also do the shoulder joint exercise while lying down, by raising your arm above your head on the pillow.

### **After cast removal**

Cast will be removed after two weeks from operation. Then it is time to start active progressive full range of motion. Regular training can improve to restore the wrist ability to function. The wrist can be very stiff at first, and the primary goal immediately after removing the cast is to increase mobility. Do the exercises several times during the day.

### **Wrist and forearm movement exercises**

In addition to increase mobility, the movements activate the muscular activity of the wrist. If movements a and b feel too heavy at first, you can make the movement in the plane of the table with gravity eliminated as in movement c, but with your thumb up.

- a) Hold the back of your palm towards the ceiling at the edge of the table so that your hand can move freely. Fingers should be slightly hooked. Move your hand slowly towards yourself with the back of your palm forward. Restore the motion slowly down. Repeat the exercise 10 times.
- b) Turn your palm towards the ceiling. Fingers should be slightly hooked. Turn your palm towards yourself. Slowly bring your hand back down. Repeat the exercise 10 times.
- c) Turn your palm against the table and hold the support of your other hand on your forearm. Fingers are allowed to be relaxed. Make the lateral slow motion (as if you were wiping the table surface) as large as possible. As you progress, you can do the exercise over the edge of the table with your thumb up. Move 10 times in both directions.
- d) Sit in an upright position with your upper arm next to your body and your elbow hooked about 90 degrees. Alternately turn your palm and back of your palm toward the ceiling. Turn your hand 10 times in both directions.

**Lightly hold a soft roll of yarn or a gauze roll, for example, in your hand. Squeeze the object for five seconds and loosen the squeeze. Repeat the exercise 10 times.**

#### **4 weeks after operation**

All patients will undergo a follow-up at remote clinic 4 weeks after surgery according to the normal follow-up procedure. Before the visit, radiographs will be taken in health centers and orthopedic surgeon will evaluate the x-rays and virtual clinic appointment by phone will be carried out. Patients will visit a physiotherapist in their own health center after 4 weeks from surgery. If everything is okay in the follow-up-Physiotherapist will guide patients in carrying on with full range of motion exercises with progressive weight bearing, exercise protocol being similar in both groups after first follow-up in 4 weeks.

Restoration of wrist function is always individual. The wrist has usually mainly recovered in load capacity and trajectories approximately three months after surgery. A full recovery can take a year or more. The time it takes to recover depends on the severity of the injury and the training activity. Early-onset and active wrist exercise training accelerates injury recovery.

Continue with previous exercises, as regular mobility training is still important to restore wrist function. Now the exercises include wrist stretching, which promotes increased mobility, as well as resisted muscle strength exercise. In addition, the pressing movement familiar from previous weeks will be slightly changed.

#### **Ball compression**

For example, squeeze a tennis ball for five seconds. The ball must now be harder than in the previous compression exercise. This makes the exercise more strengthening. Repeat the compression 10 times.

### **Stretching the wrist**

- a) Using a healthy hand, extend the operated wrist so that you feel a stretch on the palm side of the wrist. Stretch lightly for 30 seconds. Repeat the stretch.
- b) Bend the operated wrist with a healthy hand. The stretch is now felt on the back of the wrist. Stretch lightly for 30 seconds. Repeat the stretch.

### **Resistant muscle strength exercise**

Self-opposed muscle strength exercises are safe to do. In the following exercises, the hands are pressed against each other.

- a) Press with a healthy hand against the palm of the hand cut. Resist the movement with the cut hand so that the hand does not move. Press your hands against each other for five seconds. Repeat the exercise five times.
- b) Press the cut of the hand with the healthy hand against the back of the palm. Resist the movement with the cut hand so that the hand does not move. Press your hands against each other for five seconds. Repeat the exercise five times.

### **Muscle strength training with light weight**

You can do the following movements with a light dumbbell (half a kilogram) or for example using a half-liter drinking bottle. The movements strengthen the wrist.

- a) Hold the back of your palm towards the ceiling at the edge of the table so that your hand can move freely. Hold the weight in your hand. Lift the weight by turning the back of your palm towards yourself. Slowly bring your hand down. Repeat the movement 10 times.
- b) Turn the weight to the vertical position. Lift the weight by turning the top towards you. Again, remember to slowly return the hand to original position. Repeat 10 times.
- c) Turn the weight so that your palm is facing the ceiling. Lift the weight by turning the palm towards you. Slowly bring your hand back down. Repeat 10 times.

**The gradually restoring wrist function is a reward for regular self-training!**