

# Effect of Combined Physiotherapy and Hydrotherapy on Post-Immobilization Wrist Stiffness in an Elderly Patient: A Case Study

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## Abstract

**Background:** Post-immobilization wrist stiffness is a common complication following distal radius fractures, particularly in elderly individuals. It often results in pain, restricted range of motion, reduced grip strength, and difficulty performing daily activities, thereby affecting overall functional independence.

**Objective:** To evaluate the effectiveness of combined physiotherapy and hydrotherapy in reducing pain, improving wrist mobility, and restoring functional ability in a patient with post-immobilization stiffness.

**Case Description:** A 72-year-old female presented with complaints of wrist pain, stiffness, and inability to perform activities of daily living following immobilization with a plaster cast after a distal radius fracture. Clinical examination revealed reduced range of motion, decreased muscle strength, and mild swelling, while sensation remained intact.

**Intervention:** The patient underwent a structured physiotherapy program including infrared radiation (IRR), interferential therapy (IFT), joint mobilization, and Muscle Energy Technique (MET). In addition, hydrotherapy was incorporated through active exercises in lukewarm water, particularly ball-squeezing activities to enhance functional movement and reduce stiffness.

**Outcome Measures:** Pain intensity was assessed using the Numeric Rating Scale (NRS). Range of motion was measured using goniometry, and muscle strength was evaluated using Manual Muscle Testing (MMT). Functional improvement was assessed based on the patient's ability to perform daily activities.

**Results:** Following intervention, the patient demonstrated significant reduction in pain (NRS 8 to 2), improvement in wrist range of motion across all planes, and increased muscle strength from grade 3 to grade 4. Functional ability improved notably, with the patient able to perform daily household activities more independently. Swelling was also reduced.

**Conclusion:** The combined use of physiotherapy and hydrotherapy proved to be an effective and practical approach in managing post-immobilization wrist stiffness. The addition of simple hydrotherapy techniques enhanced recovery by promoting movement in a comfortable environment. Further studies with larger sample sizes are recommended to support these findings.

**Keywords:** Distal radius fracture, Wrist stiffness, Hydrotherapy, Muscle Energy Technique, Physiotherapy rehabilitation.

## BACKGROUND

In elderly individuals, distal radius fracture is very common due to fall on an outstretched hand. This requires prolonged immobilization following the fracture, which alters the activities of daily living (ADL

s), independence, and causes pain.

Physiotherapy interventions such as heat therapy, mobilization, MET, and hydrotherapy give noticeable results. In this case study, a 72-year-old female patient with wrist stiffness following distal radius fracture was treated with a combination of heating, mobilization, MET, and hydrotherapy, with special emphasis on performing movements in lukewarm water, which improved her ability to make a fist and improved overall wrist movements.

## CASE PRESENTATION

A 72-year-old female patient, namely [A], who is a housewife, reported a history of a fall leading to a wrist fracture. Following the injury, due to severe pain and swelling, she consulted an orthopedic surgeon. The surgeon advised her to undergo an X-ray of her hand.

The X-ray showed that she had a closed fracture. Thus, the orthopedic surgeon decided to apply a plaster of Paris (POP) cast.

After a period of immobilization, she was referred for physiotherapy. At the physiotherapy department, she complained of pain (NRS 8) and stiffness of the wrist joint, along with inability to perform activities of daily living (ADLs) such as chopping vegetables and cooking.

She also complained of inability to make a fist and difficulty in supination. She had no history of diabetes or hypertension.

On observation, no deformity was noted, but mild swelling was present. On palpation, tenderness and stiffness were noted at the wrist joint.

Range of motion (ROM) was restricted in flexion(50), extension(20), radial deviation(10), ulnar deviation(25), supination(50), and pronation(75).

Flexion at the PIP joint was difficult to perform. Manual Muscle Testing (MMT), according to standard grading, was 3/5 for flexors, extensors, and radial and ulnar deviation. Her sensations were intact.

On Day 1 of treatment, she was educated about her condition, the physiotherapy treatment plan, and prognosis. She was given IRR for at least 5 minutes.

Range of Motion (ROM) exercises were initiated, including flexion, extension, and radial and ulnar deviation. Home advice was given to apply ice for swelling for at least 5 minutes.

From the next session onwards, after IFT, mobilization with movement (10 repetitions × 2 sets) and Muscle Energy Technique (MET) were applied to address stiffness and improve ROM. Resistance was gently applied (3–5 seconds hold), followed by relaxation and passive stretching into the desired range.

The patient was also advised to immerse her hand in lukewarm water and squeeze a soft ball, holding for 3–5 seconds. She was instructed to perform at least 10–15 repetitions per set, with a minimum of 3 sets per session, twice daily.

## CASE UNIQUENESS

The uniqueness of this study lies in the use of a simple, cost-effective, hydrotherapy-based functional training approach.

This includes ball squeezing in lukewarm water, combined with IFT, mobilization, and MET techniques. This integrated approach helps in improving tissue extensibility, reducing stiffness, and enhancing overall range of motion.

## RESULT

The patient showed improvement in fist closure and increased grip strength. She was able to perform activities of daily living (ADLs) with reduced pain.

The results showed significant improvement in range of motion (ROM) of wrist flexion(70), extension(65), radial (15) and ulnar deviation(25), supination(70) and pronation(75). Pain assessed using the Numeric Rating Scale , reduced from 8 to 2.

Swelling at the hand was also reduced significantly. Muscle strength improved to Grade 4 on Manual Muscle Testing (MMT).

The patient is now able to perform most household activities that were previously restricted.

## DISCUSSION

The physiotherapy intervention that included IRR, mobilization, MET, and hydrotherapy helped in reducing pain and restoring the movements of the wrist.

This case highlights the uniqueness of using lukewarm water, where underwater movements showed significant results.

In future, larger sample size studies can be conducted. However, this study is limited to a single patient and has no long-term follow-up.

## CONCLUSION

This case report shows that the combined approach, including IFT, mobilization, and MET along with hydrotherapy, proved to be effective in managing post-operative stiffness. It also helped in reducing pain and swelling, with a significant increase in range of motion (ROM) and strength.

In the future, further studies can be conducted on a larger sample size. They can also include subjective outcome measures such as grip strength and detailed ROM analysis.

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