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Effect of an Early Mobility Exercise Protocol on Pain and Functional Recovery in the Conservative Treatment of Superior and Inferior Pubic Rami Fracture: A Case Study of A 45-Year-Old Woman

Yogeshwari Kolhe

Student, Physiotherapy, Peoples College of Paramedical Sciences and Research Centre

Abstract:

Fractures of the pubic rami are a frequent kind of pelvic ring injury that include the superior and inferior pubic rami, constituting the anterior part of the pelvis. These fractures can result from low-energy injuries like falls or high-energy incidents such as road traffic accidents (RTA). The pelvic ring is essential for transferring loads between the trunk and the lower limbs. Fractures that include both superior and inferior pubic rami are usually regarded as stable injuries if the posterior pelvic structures are preserved. Even though they are stable, these fractures cause pain, limit mobility, and hinder the ability to carry out everyday tasks. Traditionally, management focused on rest; however, extended immobilization may result in issues like muscle weakness, joint stiffness, and slower recovery. Recent rehabilitation strategies highlight early mobilization, which enhances circulation, preserves joint flexibility, avoids deconditioning, and boosts functional recovery. Physiotherapy is essential through organized exercise regimens that concentrate on gradual weight-bearing and functional training.

Background: Fractures of the superior and inferior pubic rami are often treated conservatively when the pelvic ring is stable; nevertheless, accompanying pain and functional restrictions can hinder recovery. This case report details a 45-year-old woman who exhibited pelvic pain and challenges with walking, sitting, and moving in bed after a traffic accident. Computed tomography verified a stable fracture of the right superior and inferior pubic rami, with no involvement of the posterior pelvis. A systematic early mobility physiotherapy program was started on Day 5 after the injury and lasted for 6 weeks. The rehabilitation program consisted of graduated weight-bearing, exercises for range of motion, strengthening, gait training, and activities focused on functional tasks. Pain and functional mobility were evaluated through the Numeric Pain Rating Scale (NPRS) and the Timed Up and Go (TUG) test. The patient showed a marked decrease in pain from 5/10 during movement at baseline to 0–1/10 after 6 weeks, with TUG improving from 22 seconds to 11 seconds. Autonomous walking with a standardized gait pattern was accomplished. This case illustrates that an early mobility exercise regimen is a safe and effective strategy in the conservative treatment of stable pubic rami fractures, promoting quicker pain relief and enhanced functional recovery

Case Description and Assessment

Case Overview: A 45-year-old woman approached the physiotherapy outpatient clinic with reports of pelvic discomfort and challenges in walking, sitting, and moving after a road traffic accident (RTA) that occurred 5 days earlier.

Pain intensity was 3/10 while at rest and 5/10 when in motion (NPRS). A CT scan showed a stable fracture of the right superior and inferior pubic rami, with no involvement of the posterior pelvic ring. Conservative treatment was recommended. The patient possessed no notable past medical issues and was functionally self-sufficient prior to the injury.

Evaluation

Observation Pain-relieving posture, Decreased weight support on the right side, Challenges in sitting and mobility. Palpation : Sensitivity in the right pubic area, No inflammation, Flexibility of Movement (FM), Motion, Discovering, Hip flexion, Aching, slightly limited, Hip Abduction Somewhat limited Hip Extension Minor limitation Knee and Ankle Standard, Manual Muscle Evaluation (MME) Muscle Category Mark Hip Flexor Muscles 3 out of 5, Hip Abductor Muscles 3 out of 5, Hip Extensor Muscles 3 out of 5

Functional Evaluation Sit-to-stand: Discomfort, Ambulating: Using a walker, Bed mobility: Challenging Analysis of Walking Patterns, Painful walking pattern, Decreased stride length

Results Indicators (Initial Stage).

NPRS: 3/10 (at rest), 5/10 (during movement). TUG: 22 seconds.

Uniqueness of the Study

This case emphasizes early mobility in a stable superior and inferior pubic rami fracture, which is traditionally managed with rest. Unique aspects:Early physiotherapy (Day 5), Structured phase-wise exercise protocol Early weight-bearing approach Significant recovery within 6 weeks Use of functional outcome measures (NPRS, TUG)

Result: The patient demonstrated progressive improvement in pain and functional mobility over the 6-week rehabilitation period. Pain intensity, measured using the Numeric Pain Rating Scale (NPRS), decreased from 3/10 at rest and 5/10 during movement at baseline to 0–1/10 by the end of 6 weeks.

Functional mobility showed significant improvement, as reflected by the Timed Up and Go (TUG) test, which improved from 22 seconds with walker assistance at baseline to 11 seconds without support at 6 weeks. Gait analysis revealed a transition from an antalgic gait pattern with reduced weight-bearing on the affected side to a normalized gait pattern with improved step length and symmetry.

The patient achieved independence in activities of daily living, including walking, sit-to-stand transfers, and bed mobility. Overall, the early mobility exercise protocol contributed to effective pain reduction, restoration of functional mobility, and return to independent ambulation without any reported complications.

Rehabilitation Plan

The rehabilitation program commenced on Day 5 after the injury and was organized into gradual phases depending on pain tolerance and functional improvement. During the acute phase (Day 5 to Week 1), the main objectives included alleviating pain, preventing complications like deep vein thrombosis and joint stiffness, and starting safe mobility.

Patient education was highlighted, covering the explanation of fracture stability, the significance of early mobilization, and the need to avoid sudden twisting or overloading. Recommended positioning involved lying on the back with a pillow beneath the knees and resting on the side with support placed between the legs to alleviate pressure on the pelvic area.

Deep diaphragmatic breathing exercises (10 repetitions, three times a day) were incorporated to avoid respiratory complications. Circulatory workouts like ankle pumps (20 repetitions, three times daily) and foot circles were done to improve blood flow. Isometric strengthening workouts such as quadriceps sets, gluteal sets, and hamstring sets (holding for 5 seconds, repeated 10 times) were begun to avert muscle atrophy and sustain circulation. Active-assisted range of motion exercises for the hip (within pain-free limits) and knee were conducted for 10–15 repetitions. . Partial weight-bearing walking using a walker was started as tolerated.

During the subacute phase (Week 2–3), the emphasis was on enhancing joint range of motion, starting strength training, and boosting functional mobility. Exercises for active range of motion focusing on hip flexion, abduction, and extension were conducted (10–15 repetitions, two sets). Progressive strengthening activities comprised straight leg raises, supine hip abduction, and modified bridging exercises.

Exercises for pelvic control, including pelvic tilts and core activation, were included to enhance pelvic stability and lessen strain on the fracture area. Functional training involved sit-to-stand exercises utilizing upper limb assistance, slowly advancing towards self-sufficiency. Gait training persisted with walker support, focusing on even weight distribution. Balance training began with static standing exercises and managed weight-shifting activities.

During the functional recovery phase (Weeks 4–6), the objectives included regaining muscle strength, normalizing gait, and enhancing endurance. Exercises utilizing the full active range of motion were conducted for all hip movements. Progressive resistance workouts focusing on hip abductors, extensors, and core muscles were intensified. Bridging exercises were advanced from double-leg to single-leg as tolerated. Dynamic balance training comprised tandem standing and weight-shifting activities. Gait retraining centered on the gradual reduction of assistive devices and adjustment of step length and symmetry. Functional training incorporated step-up exercises, self-sufficient sit-to-stand tasks, and practice of daily living activities. Endurance training was accomplished by gradually increasing walking distance.

The rehab program took place five days a week, with each session lasting 30–45 minutes, complemented by a daily home exercise regimen. Advancement relied on decreased pain levels, enhanced capacity for weight-bearing, normalization of gait, and the patient's capacity to carry out functional tasks autonomously

Discussion

This case illustrates that early mobility exercise programs greatly improve recovery in stable pubic rami fractures. The observed pain relief and enhanced functional mobility in this patient endorse the significance of early physiotherapy intervention.

Prompt activation of muscles and regulated weight-bearing led to better circulation, less muscle guarding, and improved neuromuscular control. The enhancement in TUG scores indicates greater functional independence.

The results align with contemporary rehabilitation principles that support early movement instead of

extended immobilization. Nonetheless, since this is an isolated instance, the ability to generalize is restricted.

Conclusion

The early mobility exercise protocol effectively decreases pain and enhances functional independence in patients with stable fractures of the superior and inferior pubic rami.

The patient experienced considerable improvement in 6 weeks, indicating that prompt physiotherapy treatment is both safe and advantageous.

This case study shows that an early mobility exercise regimen is a safe and effective method for the conservative treatment of stable superior and inferior pubic rami fractures. The patient exhibited a notable decrease in pain and considerable enhancement in functional mobility. Timely commencement of physiotherapy, incorporating gradual weight-bearing, strengthening exercises, and functional training, aided in the recovery of independent walking and daily living activities. These results endorse the clinical importance of early mobilization for improving recovery and avoiding complications linked to extended immobilization in stable pelvic fractures.

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