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Physiotherapy Management After Modified Tension Band Wiring for Comminuted Left Patellar Fracture: A Case Report

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Abstract

Background: Patellar fracture after open reduction and internal fixation (ORIF) may cause pain, restricted knee motion, muscle weakness, and activity limitations.

Objective: To describe physiotherapy management and clinical changes after ORIF for a comminuted left patellar fracture treated with modified tension band wiring.

Methods: This case report involved a 42-year-old woman with a comminuted left patellar fracture diagnosed in January 2025. ORIF using modified tension band wiring was performed in January, and physiotherapy began in February. Two assessments, on 26 November and 3 December 2025, were available. Interventions included infrared, ultrasound applied to muscles around the knee, active range of motion, manual resistance strengthening, straight leg raises, walking, balance exercise, and home exercise. The knee range of motion target was 0° to 130°, with non-weight bearing for 2 weeks. Outcomes were summarized descriptively.

Results: Movement pain decreased from 5/10 to 4/10 and pressure pain from 3/10 to 2/10. Left knee flexion increased from 70° to 75°, and hamstring strength from 3/5 to 4/5. Circumference 10 cm above the patella increased from 39 to 39.5 cm, while 12 cm below remained 29 cm. Initial observation showed limping gait and supported sit to stand. No standardized functional score was available.

Conclusion: Changes were observed across the two assessments. These findings describe change during multimodal rehabilitation but do not establish treatment effectiveness or causality because of the single case design, limited exposure, short interval, recovery, healing, home exercise, and measurement variability.

Keywords

Patellar Fractures; Physical Therapy Modalities; Rehabilitation; Pain; Range of Motion, Articular; Muscle Strength

Introduction

Patellar fractures are relatively uncommon injuries but can substantially affect the knee extensor mechanism and the ability to perform daily activities. An observational study of 3,194 patellar fractures recorded in the Swedish Fracture Register found that patellar fractures accounted for approximately 1% of all fractures, with a median patient age of 67 years and a predominance of low energy trauma. Transverse fractures were the most frequently reported pattern in that population.[1] Disruption of the patella and extensor mechanism may result in pain, restricted knee range of motion (ROM), reduced muscle performance, gait impairment, and difficulty performing activities that require knee flexion and controlled loading.[2] These impairments may persist during the postoperative period and can influence the patient's ability to resume functional activities.

Operative management may be indicated when fracture displacement or disruption of the extensor mechanism compromises knee function or stability. Contemporary treatment emphasizes restoration of fracture stability while considering the characteristics of the fracture and the potential for postoperative complications.[2] Following open reduction and internal fixation (ORIF), rehabilitation is an important component of postoperative management because patients may present with pain, restricted ROM, muscle weakness, and limitations in mobility. Recovery after operative treatment may continue for several months, and functional recovery should therefore be considered in relation to the patient's clinical condition and the progression of rehabilitation.[3] At the same time, surgical treatment of patellar fractures may be associated with complications that can influence subsequent recovery, reinforcing the importance of clinical monitoring during rehabilitation.[4]

Postoperative physiotherapy requires attention to several domains simultaneously. Pain may restrict active movement, while limited knee flexion may interfere with gait, transfers, and other activities of daily living. Reduced muscle performance may further affect controlled loading of the lower limb and contribute to compensatory movement patterns. Rehabilitation progression therefore needs to consider impairment findings, functional performance, range of motion, muscle strength, and the patient's response to exercise rather than relying solely on a predetermined postoperative time point. In clinical practice, serial assessment can provide information about changes in individual impairments and help guide the continuation or modification of rehabilitation activities while maintaining appropriate medical precautions.

The clinical knowledge gap addressed by this case concerns the documentation and interpretation of multimodal physiotherapy management after operative treatment of a patellar fracture when standardized functional outcomes and long term follow up are unavailable. Although case reports cannot establish treatment effectiveness, they can illustrate how impairment findings and functional observations are documented alongside the physiotherapy interventions provided during a particular period of care. This is particularly relevant when the available clinical record contains several concurrent treatment components, because changes in individual outcomes cannot readily be attributed to one modality. Clear documentation of the clinical presentation, treatment exposure, exercise parameters, functional observations, and follow up is therefore important for maintaining an appropriate distinction between observed clinical change and treatment effectiveness.

In the present case, the patient sustained a comminuted left patellar fracture with displacement of the distal fragment inferiorly and subsequently underwent ORIF using modified tension band wiring in January 2025. Physiotherapy began in February 2025, with the patient instructed to remain non weight bearing during the first 2 weeks and a target knee ROM of 0° to 130°. The available physiotherapy documentation includes two assessment points in November and December 2025 and records several concurrent interventions, including infrared, ultrasound applied to the muscles surrounding the knee joint, active ROM exercise, strengthening, straight leg raises, walking, balance exercise, and a home exercise program. The available clinical material does not include a standardized functional outcome measure, and therefore functional change cannot be quantified. The clinical lesson from this case is consequently not that any particular intervention was effective, but that changes in pain, ROM, muscle strength, limb circumference, gait, and transfer ability should be documented separately and interpreted cautiously in the context of postoperative recovery and multimodal rehabilitation.

Accordingly, this case report aims to describe the patient's clinical presentation and physiotherapy problems following operative treatment of a comminuted left patellar fracture, describe the documented physiotherapy management, and report the clinical changes observed between the two available physiotherapy assessments. The report also highlights the limitations associated with incomplete treatment exposure data, the absence of standardized functional outcomes, and the limited follow up available for interpretation of rehabilitation progress.

Methods

This report was prepared as a single patient case report describing physiotherapy management following operative treatment of a left patellar fracture. The case involved a 42-year-old woman who sustained a left patellar fracture after falling while walking outside her home in January 2025. Radiographic information identified a comminuted fracture of the left patella with displacement of the distal fragment inferiorly. The patient subsequently underwent open reduction and internal fixation (ORIF) using modified tension band wiring in January 2025. The exact date of surgery was not available in the clinical material. Physiotherapy was initiated in February 2025, although the exact starting date could not be determined from the available records.

The available clinical information did not include a complete record of comorbidities, medication use, previous rehabilitation, or other relevant medical history. Postoperative radiological healing status at the initiation of physiotherapy was also not available. The patient was instructed to remain non weight bearing during the first 2 weeks after surgery, and the documented target for knee joint ROM was 0° to 130°. These postoperative restrictions were considered part of the clinical context for interpreting rehabilitation management. Because the exact date of surgery and initiation of physiotherapy could not be established, the clinical timeline was reported using the available month and year rather than an unverified specific date.

The reported physiotherapy assessments were performed on 26 November 2025 and 3 December 2025. Physiotherapy was conducted twice weekly according to the available clarification; however, only these two treatment dates were included in the present report because subsequent and preceding treatment sessions were not available to the authors. Thus, the two documented visits should not be interpreted as representing the entire rehabilitation course or as evidence that treatment was provided only twice after surgery. The duration of the overall physiotherapy program and the total number of sessions before or after the reported assessment period could not be established. The statement of once daily treatment appearing in the original intervention table was therefore not interpreted as the verified clinical frequency.

Clinical outcomes were assessed by the same physiotherapist at both documented assessments. Pain was evaluated using the Visual Analogue Scale (VAS), with movement pain and pressure pain recorded separately. Knee ROM was assessed using a goniometer. At the initial assessment, left knee flexion was recorded as 70°, whereas the contralateral right knee demonstrated 130° of flexion. Muscle strength was evaluated using Manual Muscle Testing (MMT), with the hamstrings initially graded 3/5. Limb circumference was measured using a measuring tape at two specified landmarks, 10 cm above the patella and 12 cm below the patella. The available clinical material did not document a formal edema assessment or provide sufficient information regarding the exact patient positioning and operational procedure used during circumference measurement. Accordingly, circumference was interpreted as limb size or asymmetry rather than as a direct indicator of muscle mass.

Functional status was assessed through clinical observation rather than a standardized functional instrument. Observations included gait, sit to stand, toileting, walking, and activities of daily living. The patient presented with a limping gait and required support during sit to stand at the initial assessment. No standardized functional outcome measure, such as the Lower Extremity Functional Scale, Lysholm Knee Score, Tegner Activity Scale, or International Knee Documentation Committee score, was documented. Consequently, functional status was treated as qualitative clinical information, and no quantitative estimate of functional recovery was derived from these observations.

The documented physiotherapy program consisted of infrared therapy, ultrasound, active ROM exercise, strengthening exercise, straight leg raises, walking exercise, balance exercise, and a home exercise program. Infrared therapy was administered for 15 minutes at a recorded distance of 30 cm. Ultrasound was administered at 1.5 W/cm² for 7 minutes and was applied to the muscles surrounding the knee joint and patellar region rather than directly over the patella. Active ROM exercise was documented as 8 repetitions for 3 sets, with a reported duration of approximately 10 minutes. The strengthening program included the quadriceps, hamstrings, hip abductors, and hip adductors, with approximately 8 counts and 3 repetitions and a reported duration of approximately 5 minutes for each component.

Exercise was performed in the supine lying position. Strengthening resistance was provided manually by the physiotherapist and was adjusted subjectively according to the patient's response. The physiotherapist asked whether the patient was experiencing fatigue and monitored the patient's pulse during the session. When the patient's condition did not permit continued exercise, a short rest period was provided before continuing. The documented target knee ROM was 0° to 130°. Walking exercise was reported as three rounds or approximately 5 minutes, while balance exercise was documented as 8 counts for 3 repetitions or approximately 5 minutes. The available records did not provide sufficiently detailed criteria for progression or modification of each exercise, specific external load, standardized rest interval, or equipment specifications; therefore, these details were not inferred.

The home program consisted of active ROM exercise performed for 8 repetitions and 3 sets and straight leg raise exercise performed for 8 repetitions and 3 sets. No reliable documentation of the patient's adherence to the home program was available. Similarly, the available records did not provide sufficient information regarding the qualifications of the treating physiotherapist beyond the fact that the same physiotherapist performed the documented clinical measurements. These limitations were retained rather than supplemented with assumptions to preserve the accuracy and reproducibility of the case description.

Outcome data were analyzed descriptively because this was a single patient case report with two documented assessment points. Changes between 26 November and 3 December 2025 were calculated from the reported clinical measurements without

inferential statistical testing, confidence intervals, or effect estimates. Changes in pain, knee flexion, hamstring strength, and limb circumference were described as observed changes during the reported rehabilitation period rather than as treatment effects. Potential influences including postoperative recovery, fracture healing, home exercise, simultaneous interventions, and measurement variability were considered when interpreting the findings. No causal attribution to any individual physiotherapy modality was made.

Written informed consent for use of the patient's clinical information and publication was available according to the source material. The available documentation did not provide a confirmed institutional ethical approval, exemption, or waiver. Therefore, no approval number or institutional decision was fabricated, and the applicable ethical status remains subject to confirmation before submission. Adverse events were not documented in the available case material, and their absence could not be conclusively established from the records provided.

Results

The patient was a 42-year-old woman who sustained a left patellar fracture after falling while walking outside her home in January 2025. The available radiographic description identified a comminuted fracture of the left patella with displacement of the distal fragment inferiorly. The patient subsequently underwent ORIF using modified tension band wiring in January 2025. Physiotherapy was initiated in February 2025. Postoperative radiological healing status at the beginning of physiotherapy was not available. The patient had been instructed to remain non weight bearing during the first 2 weeks after surgery, with a target knee ROM of 0° to 130°.

At the first documented physiotherapy assessment on 26 November 2025, the patient presented with pain during movement and pressure, restricted left knee flexion, reduced hamstring strength, and differences in limb circumference compared with the contralateral limb. The left knee demonstrated flexion of 70°, compared with 130° on the right, indicating a 60° difference in flexion at the initial assessment. Hamstring strength on the affected side was graded 3/5 using MMT. The patient also demonstrated a limping gait and required support during sit to stand. Difficulties with walking, toileting, and household activities were documented as qualitative functional limitations. No standardized functional assessment instrument was available.

The available clinical measurements from the two documented assessments are presented in Table 1. The table includes the contralateral measurements available at baseline to provide a consistent clinical reference for knee flexion and limb circumference. During the reported assessment period, movement pain decreased from 5/10 to 4/10, while pressure pain decreased from 3/10 to 2/10. Left knee flexion increased from 70° to 75°, and hamstring strength increased from 3/5 to 4/5. Circumference measured 10 cm above the patella increased from 39.0 to 39.5 cm, whereas the measurement 12 cm below the patella remained 29.0 cm.

Table 1. Clinical outcomes at the two documented physiotherapy assessments

Outcome	Affected limb, 26 Nov 2025	Affected limb, 3 Dec 2025	Change	Contralateral limb, baseline
Movement pain, VAS	5/10	4/10	1 point decrease	Not available
Pressure pain, VAS	3/10	2/10	1 point decrease	Not available
Knee flexion	70°	75°	5° increase	130°
Hamstring strength, MMT	3/5	4/5	1 grade increase	Not available
Circumference, 10 cm above patella	39.0 cm	39.5 cm	0.5 cm increase	41.0 cm
Circumference, 12 cm below patella	29.0 cm	29.0 cm	No change	30.0 cm

VAS indicates Visual Analogue Scale. MMT indicates Manual Muscle Testing. Contralateral measurements were available at baseline and are presented as clinical reference values.

As shown in Table 1, the numerical changes were relatively small over the interval between the two assessments. The most notable changes were the 5° increase in left knee flexion and the one grade increase in hamstring MMT, accompanied by a one-point reduction in both movement and pressure pain. The circumference measurement 10 cm above the patella increased by 0.5 cm, whereas the measurement below the patella did not change. Baseline contralateral measurements showed greater knee flexion and slightly larger limb circumference than the affected side. These findings describe differences and changes in the available clinical measurements but do not establish the magnitude of overall recovery.

The documented physiotherapy exposure consisted of two reported clinical sessions, on 26 November and 3 December 2025. The intervention components included infrared therapy, ultrasound, active ROM exercise, strengthening of the quadriceps, hamstrings, hip abductors and adductors, straight leg raises, walking exercise, balance exercise, and a home exercise program. Infrared was administered for 15 minutes at a recorded distance of 30 cm, while ultrasound was administered at 1.5 W/cm² for 7 minutes to muscles surrounding the knee joint and patellar region rather than directly over the patella. Exercise was performed in the supine lying position, with strengthening resistance provided manually according to the patient's response. The physiotherapist monitored fatigue and pulse and allowed rest when continued exercise was not considered appropriate.

Active ROM exercise was documented as 8 repetitions for 3 sets, while strengthening and straight leg raise exercises were documented using 8 counts or repetitions and 3 repetitions or sets, depending on the recorded intervention description. Walking exercise was documented as three rounds or approximately 5 minutes, and balance exercise as 8 counts for 3 repetitions or approximately 5 minutes. The home program consisted of active ROM exercise and straight leg raises, each prescribed for 8 repetitions and 3 sets. Adherence to the home program was not documented. The available records also did not provide sufficient information to establish detailed progression criteria, standardized rest intervals, external loading, equipment specifications, or the precise operational procedures used for each exercise.

The available radiographic material included a diagnostic image dated 12 January 2025 and a postoperative image dated 13 October 2025. The radiographic description for the January examination reported good left knee alignment without apparent dislocation, a comminuted left patellar fracture with displacement of the distal fragment inferiorly, preserved bone density, and a preserved knee joint space. Obliteration of the left knee fat pad and soft tissue swelling were also described. The postoperative image demonstrated the presence of fixation material at the patella. The radiographic information available for the postoperative examination was limited, and a definitive assessment of fracture healing was not available in the supplied clinical documentation.

The qualitative functional findings documented at the initial assessment included limping gait and the need for support during sit to stand, together with reported limitations in walking, toileting, and household activities. Because no standardized functional instrument was administered at either assessment, the available data cannot quantify the degree of functional change between 26 November and 3 December 2025. No adverse events were documented in the supplied case material, although the available records do not provide sufficient documentation to conclusively establish the absence of adverse events during the entire rehabilitation period. A structured patient perspective was also not documented.

Discussion

This case describes the documented clinical course of a 42-year-old woman following operative treatment of a comminuted left patellar fracture with displacement of the distal fragment inferiorly. The patient underwent ORIF using modified tension band wiring in January 2025 and subsequently began physiotherapy in February 2025. During the two documented physiotherapy assessments on 26 November and 3 December 2025, movement pain decreased from 5/10 to 4/10, pressure pain decreased from 3/10 to 2/10, left knee flexion increased from 70° to 75°, and hamstring strength increased from 3/5 to 4/5. Circumference 10 cm above the patella increased by 0.5 cm, whereas the measurement 12 cm below the patella remained unchanged. These findings describe changes observed during a period of multimodal rehabilitation and should not be interpreted as evidence of treatment effectiveness.

The reduction of one point in both movement and pressure pain indicates a change in the patient's reported symptoms between the two assessments. However, the clinical significance of this change cannot be established from the present case because the report was not designed to determine a minimal clinically important difference. Several interventions were provided concurrently, including infrared, ultrasound, active ROM exercise, strengthening, straight leg raises, walking, balance exercise, and a home program. Consequently, the observed reduction in pain cannot be attributed to infrared, ultrasound, exercise, or any individual component. Postoperative recovery, fracture healing, home exercise, spontaneous variation, and measurement variability may also have contributed to the change. This interpretation is consistent with the descriptive nature of the case and avoids attributing a causal effect to physiotherapy alone.

Left knee flexion increased by 5°, from 70° to 75°, but remained substantially below the contralateral value of 130° recorded at the initial assessment. The persistent difference indicates that restricted knee flexion remained an important impairment at the end of the documented assessment interval. The target knee ROM documented in the clinical information was 0° to 130°, while the patient had initially been instructed to remain non weight bearing for the first 2 weeks after surgery. These postoperative instructions provide relevant clinical context for rehabilitation progression, although the available records do not establish how orthopedic restrictions were modified over the subsequent months. Therefore, the observed increase in flexion should be interpreted as a short term change in ROM rather than evidence that the prescribed ROM target was achieved or that a specific intervention accelerated recovery.

Jain and Deshmukh reported a case involving a comminuted patellar fracture managed with tension band wiring in which pain, knee motion, strength, and ambulation were monitored during rehabilitation.[5] The similarity is useful for illustrating the value of serial clinical assessment in postoperative patellar fracture rehabilitation. However, differences in fracture characteristics, rehabilitation duration, clinical circumstances, and assessment procedures prevent direct comparison of treatment effectiveness. Similarly, Mirapurkar et al. described a comprehensive physiotherapeutic approach in a patient with a malunited postoperative patellar fracture that incorporated ROM, strengthening, functional exercise, and progression monitoring.[6] The substantially different clinical context means that this report should not be regarded as an effectiveness benchmark for the present case. Its relevance is instead conceptual, supporting the need to address several impairment and activity domains during rehabilitation.

Hamstring strength increased from 3/5 to 4/5 according to MMT. Although this change represents an improvement in the recorded ordinal grade, its magnitude cannot be quantified using the available assessment. MMT is influenced by factors such as patient effort, pain, motor activation, examiner judgment, and testing conditions.[7] A one grade change in a single patient therefore cannot by itself establish a clinically important improvement in muscle performance. Objective strength measurement was not available, and the results should consequently remain limited to the reported MMT findings.

The circumference measured 10 cm above the patella increased from 39 to 39.5 cm, while the measurement 12 cm below the patella remained 29 cm. These findings should be described as changes in limb circumference or asymmetry rather than as evidence of increased muscle mass. At baseline, the corresponding measurements on the contralateral side were 41 cm and 30 cm, respectively. Circumference can be influenced by muscle tissue, fluid accumulation, measurement location, and other local factors, while formal edema assessment was not documented.[8] The 0.5 cm change is therefore insufficient to support an interpretation of muscle hypertrophy. Consistent landmark selection and standardized positioning would be important for subsequent monitoring.

The patient's limping gait and need for support during sit to stand indicate functional limitations at the initial assessment. Walking and balance exercises were included in the documented rehabilitation program, providing a clinical focus on mobility and activity in addition to impairment management. Song et al. demonstrated that patellofemoral joint loading differs across weight bearing rehabilitation exercises and activities of daily living, with loading influenced by knee flexion and extensor demand.[9] This finding supports consideration of task demands when progressing functional activities, although it does not demonstrate that the specific progression used in this patient was effective. Berninger et al. reported functional and activity outcomes in a multicenter cohort following patellar fracture osteosynthesis, illustrating the value of standardized functional assessment during longer term follow up.[10] This cohort evidence should be understood as support for measuring function rather than as evidence of effectiveness for the physiotherapy program described here.

The principal clinical lesson is the importance of serial, problem-oriented assessment in postoperative patellar fracture rehabilitation. Pain, knee flexion, muscle strength, limb circumference, gait, and transfer ability represent different dimensions of recovery and should not be collapsed into a single interpretation of improvement. In this case, changes were observed across several impairment measures, but the absence of a standardized functional outcome prevents quantitative assessment of functional recovery. The limited number of documented assessments also prevents evaluation of whether the observed changes were sustained over time.

Several limitations substantially restrict interpretation. First, this is a single patient case and therefore has limited generalizability. Second, only two physiotherapy sessions are available for analysis, despite physiotherapy reportedly being conducted twice weekly, because the authors could not access the patient's other treatment records. Third, adherence to the home program was not documented. Fourth, detailed progression criteria, standardized rest intervals, external loading, equipment specifications, and some operational measurement procedures were unavailable. Fifth, long term functional follow up and standardized functional outcomes were absent. Finally, although the available clinical material did not document adverse events, the records were insufficient to establish their absence throughout the entire rehabilitation period. These limitations mean that the present report should primarily be interpreted as a description of clinical assessment and documented rehabilitation management rather than an evaluation of intervention efficacy.

Future case reports should integrate a complete postoperative timeline, operative details, fracture healing status, orthopedic restrictions, actual treatment exposure, exercise dosage and progression criteria, standardized functional outcomes, patient perspective, and systematically documented adverse events. Such documentation would improve reproducibility and provide a

stronger basis for interpreting safety and functional recovery while maintaining an appropriate distinction between observed clinical changes and causal treatment effects.

Conclusion

This case report describes physiotherapy management following ORIF with modified tension band wiring for a comminuted left patellar fracture in a 42-year-old woman. Across the two documented physiotherapy assessments, movement pain decreased from 5/10 to 4/10, pressure pain from 3/10 to 2/10, and left knee flexion increased from 70° to 75°. Hamstring strength also increased from 3/5 to 4/5, while circumference 10 cm above the patella increased by 0.5 cm and the measurement 12 cm below the patella remained unchanged. Qualitative functional observations indicated limping gait and supported sit to stand at the initial assessment.

These findings represent short term clinical changes observed during a multimodal rehabilitation period and should not be interpreted as evidence of physiotherapy effectiveness or the effect of any individual intervention. The absence of a control condition, limited documented treatment exposure, short assessment interval, lack of standardized functional outcomes, incomplete adherence information, and potential effects of postoperative recovery, fracture healing, home exercise, and measurement variability limit causal interpretation. Future rehabilitation documentation should include complete treatment exposure, standardized functional outcomes, progression criteria, longer follow up, and systematically documented patient perspective and adverse events.

Author Contribution

Meisya Putri: Conceptualization, clinical data collection, physiotherapy assessment, intervention documentation, data curation, data interpretation, manuscript drafting, and manuscript revision.
Immanuel Maulang: Clinical supervision, physiotherapy management review, clinical interpretation, and critical revision of the manuscript.
Amiruddin: Supervision, methodological review, interpretation of findings, and critical revision of the manuscript.
All authors: Reviewed and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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Conflict of Interest Statement

The authors declare that they have no conflicts of interest related to the preparation, conduct, or publication of this case report.

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Ethics Statement

Written informed consent was obtained from the patient for the use of relevant clinical information and publication of this case report, with appropriate anonymization of patient information. The institutional ethical approval, exemption, or waiver status was not documented in the available source materials and should be confirmed with the relevant institution before submission. No ethical approval number has been added without supporting documentation.

References

1. Kruse M, Wolf O, Mukka S, Brüggemann A. Epidemiology, classification and treatment of patella fractures: an observational study of 3194 fractures from the Swedish Fracture Register. Eur J Trauma Emerg Surg. 2022;48(6):4727-4734.
2. Baid M, Narula S, Manara JR, Blakeney W. Evolution in the management of patella fractures. J Clin Med. 2024;13(5):1426.
3. Pesch S, Greve F, Zyskowski M, Müller M, Crönlein M, Biberthaler P, et al. High return to sports rates after operative treatment of patella fractures. Eur J Med Res. 2023;28(1):366.
4. Larsen P, Arildsen M, Kristensen K, Lyng KD, Elsoe R. High risk of complications following surgical treatment of patella fractures: a cross-sectional study of 798 patients with mean 6.4 years follow-up. Eur J Trauma Emerg Surg. 2024;50(3):1127-1134.
5. Jain DR, Deshmukh M. Effectiveness of physical therapy in a comminuted patella fracture managed with tension band wiring: a case report. Cureus. 2023;15(12):e50870.
6. Mirapurkar TS, Boob MA, Bhoge SS, Phansopkar P. A comprehensive physiotherapeutic rehabilitation protocol for malunited postoperative patellar fractures: a case report. Cureus. 2023;15(12):e51252.
7. Bohannon RW. Reliability of manual muscle testing: a systematic review. Isokinet Exerc Sci. 2018;26(4):245-252.
8. Iuchi T, Kobayashi M, Tsuchiya S, Ohno N, Dai M, Matsumoto M, et al. Objective assessment of leg edema using ultrasonography with a gel pad. PLoS One. 2017;12(8):e0182042.
9. Song K, Scattone Silva R, Hullfish TJ, Silbernagel KG, Baxter JR. Patellofemoral joint loading progression across 35 weightbearing rehabilitation exercises and activities of daily living. Am J Sports Med. 2023;51(8):2110-2119.
10. Berninger MT, Korthaus A, Eggeling L, Herbst E, Neumann-Langen MV, Domnick C, et al. Analysis of postoperative complications 5 years after osteosynthesis of patella fractures: a retrospective, multicenter cohort study. Eur J Trauma Emerg Surg. 2024;50(4):1691-1699.