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Exploring the Efficacy of Gong's Mobilization Versus Angular Joint Mobilization on Physical and Functional Outcomes in Frozen Shoulder: Insights from ICF Core Set and RPS Form - A Case Report

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Abstract

Background: Frozen Shoulder (FS) is a painful condition marked by discomfort and stiffness. The affected shoulders range of motion is limited to less than 50% of the opposing shoulder. Gong's mobilization is an end range mobilization which helps in improving range and functional impairment. Angular Joint Mobilization (AJM) helps in reducing shoulder pain, increased range of motion, and decreased disability. The International Classification of Functioning, Disability and Health (ICF). The ICF core sets address the domains and categories relevant to a particular health condition by which it can be utilized systematically to evaluate and document the specific areas of activity limitation and participation restriction experienced by the patient. **Aim**: The aim of the study is to compare the effectiveness of Gong's mobilization versus angular joint mobilization in patients with frozen shoulders on physical and functional outcome using ICF corset. **Methodology**: Two patients diagnosed with frozen shoulder stage 2 who meet the inclusion were assessed with the baseline outcome measurement of PENN shoulder scale, ROM and UEFS by using ICF corset, one patient was treated with Gongs technique and one with angular joint mobilization for 2 weeks. Rehabilitation protocol was designed using Rehabilitation Problem solving form (RPS-Form). **Result:** The patient who received AJM showed positive improvement in pain, ROM, functional activity and disability than Gongs mobilization after 2 weeks. **Conclusion:** Angular Joint Mobilization significantly improved pain, ROM, function, and disability over 2 weeks using the ICF corset and rehabilitation form. **Major Findings:** Angular Joint Mobilization (AJM) was more effective than Gong's mobilization in reducing pain, enhancing range of motion (ROM), and improving functional outcomes in stage 2 frozen shoulder. The use of the RPS form and ICF core set facilitated personalized rehabilitation planning, establishing AJM as the optimal intervention for advanced cases.

Keywords: Angular Joint Mobilization, Frozen Shoulder, Gong's Mobilization, ICF Corset, RPS-Form

Abbreviations: FS- Frozen Shoulder, **ICF**- International Classification of Functioning, Disability and Health, **AJM**- Angular Joint Mobilization, **ROM**- Range of Motion, **UEFS**- Upper Extremity Functional Scale, **RPS**- Rehabilitation Problem Solving Form

1. Introduction

Adhesive capsulitis, or frozen shoulder, is a condition characterized by pain and stiffness in the shoulder joint, gradually worsening over time and restricting both active and passive range of motion. While the exact cause remains unclear, it is often associated with inflammation, thickening, and scarring of the shoulder capsule. Frozen shoulder occurs in two forms: Primary (idiopathic) and secondary, typically following surgery or injury. The condition progresses through three stages-freezing, frozen, and thawing, each lasting several months[1].

The link between diabetes mellitus, thyroid disease, and frozen shoulder is rooted in specific physiological

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mechanisms. In diabetes, high blood glucose causes glycosylation of collagen, leading to stiffening of the shoulder capsule and restricted movement. Both diabetes and thyroid disease trigger chronic inflammation, promoting fibrosis and shoulder capsule thickening. Diabetes-related vascular damage further reduces joint flexibility, while thyroid issues disrupt collagen metabolism, increasing susceptibility. Globally, the prevalence is around 2-5 %, with higher rates in individuals with endocrine disorders, such as diabetes and thyroid disease. In India, frozen shoulder is particularly common, affecting 10-20 % of individuals with diabetes. Middle-aged adults are more prone to the condition, especially those with underlying thyroid or diabetes issues[2,3].

Gong mobilization, a manual therapy technique involving oscillatory movements, is shown to improve joint function and mobility[4]. Sindura K. *et al.* found it effective in reducing pain, enhancing joint mobility, and improving functional activity. Angular Joint Mobilization (AJM), a novel approach, uses rotational movements with a joint axis shift to treat frozen shoulder. According to Younghoon Kim *et al.*, AJM effectively improves shoulder pain, range of motion, and disability in frozen shoulder patients[5].

1.1 International Classification of Functioning, Disability, and Health (ICF CORESET)

The World Health Organization (WHO) developed the ICF core set as a standardized tool to assess an individual's functioning and disability. It provides a structured framework for evaluating health conditions by considering factors such as participation, activities, body functions, environmental influences, and personal factors[6]. Clinicians can use the core set to assess the impact of conditions like frozen shoulder on a patient's quality of life and daily functioning.

1.2 Rehabilitation Problem Solving (RPS) Form

The Rehabilitation Problem Solving (RPS) Form is a clinical tool designed to systematically identify, assess, and document patient concerns during rehabilitation. It helps healthcare providers organize information about a patient's impairments, functional limitations, and participation restrictions. By using a structured approach, the RPS form aids in developing personalized rehabilitation goals and treatment plans, making it particularly useful for conditions like frozen shoulder, where a step-by-step strategy is needed to address pain, stiffness, and reduced range of motion. The form ensures a comprehensive assessment of patient needs and tracks progress over time, maximizing therapeutic outcomes[7,8]. This approach enhances self-efficacy, improves coping strategies, and empowers patients to actively participate in their rehabilitation. It is commonly used in rehabilitation settings to facilitate clear communication between therapists and guide evidence-based interventions.

1.3 Integrated Approach for Enhanced Outcomes

By combining the physical support of ICF corsets with benefits of the rehabilitation problem-solving form, this solution offers a comprehensive rehabilitation strategy that addresses the multifaceted nature of frozen shoulder. This integrated approach not only aims to reduce pain and improve frozen shoulder by applying Gongs mobilization and AJM along with exercises following clinical practice guidelines as an evidence based treatment approach.

There is a lack of studies comparing the effectiveness of gongs versus angular joint mobilization on physical and functional outcomes among patients with frozen shoulder using the ICF (International Classification of Functioning, Disability, and Health) core set. Therefore, this study is being conducted to fill that gap. The ICF core set and the Rehabilitation Problem Solving (RPS) form will be used to systematically evaluate, document, and address the specific areas of activity limitation and participation restriction experienced by these patients. To date, no studies have utilized the ICF core set in the evaluation of frozen shoulder. Therefore, this study will incorporate the ICF core set for assessment and the RPS form for exercise prescription.

2. Aim

The aim of the study is to compare the effectiveness of Gong's mobilization and Angular Joint Mobilization (AJM) in improving physical and functional outcomes in patients with frozen shoulder. This study also additionally intends to evaluate these interventions using the International Classification of Functioning (ICF) core set and the Rehabilitation Problem Solving (RPS) form,

providing a structured assessment framework to better understand their impacts on pain relief, range of motion, and overall disability reduction.

3. Objective

The objective is to determine the most effective treatment for frozen shoulder by comparing the impact of Gong's mobilization and Angular Joint Mobilization (AJM) on physical and functional outcomes in frozen shoulder patients, using the ICF core set and RPS form for assessment.

4. Case Report

Patient A, a 55-year-old male shopkeeper, initially consulted an orthopedician due to persistent pain in his left shoulder, which was affecting his ability to perform daily activities. A thorough evaluation, including an X-ray, ruled out complications like dislocation, subluxation, or other conditions. No significant abnormalities were found, and the patient tested negative for diabetes mellitus, a common contributor to shoulder issues. Based on the clinical findings, the orthopedician diagnosed stage 2 frozen shoulder and recommended physiotherapy.

When the patient later visited the physiotherapy OPD, he reported difficulty with essential activities such as overhead movements, bathing, combing, dressing, and sleeping on the affected side. The pain and limited shoulder mobility were significantly affecting his quality of life and work as a shopkeeper. His primary goal for physiotherapy is to achieve pain relief, restore shoulder mobility, and return to his daily activities at home and work without limitations.

Patient B, a 48-year-old male lawyer, reported persistent right shoulder pain for two months. Initially, the pain was severe, leading him to seek medical advice from an orthopedician, who prescribed medication for temporary relief. However, the pain worsened over time, prompting the patient to revisit the orthopedician. After further evaluation, he was diagnosed with stage 2 frozen shoulder, characterized by significant pain and stiffness. An X-ray ruled out underlying conditions such as dislocations, and there was no nerve involvement. The patient was referred to physiotherapy, aiming to reduce pain and restore shoulder mobility. He also reported difficulty with daily activities like driving, bathing, and dressing, which were notably impacted by his condition.

5. Examination

Both patients were assessed by demonstrating a 50% loss of passive Range of Motion (ROM) in the shoulder joint compared to the unaffected side, specifically in movements such as hand-to-neck, hand-to-scapula, and hand-to-opposite-scapula. Outcome measures, including shoulder ROM, PENN shoulder score, Upper Extremity Functional Scale (UEFS), and ICF core set were generated, were recorded both pre- and post-treatment.

6. Intervention

Patient A received a treatment plan consisting of Gongs mobilization, ultrasound therapy, and specific therapeutic exercises. The Gongs mobilization was performed for a duration of 2 to 3 minutes, aimed at improving joint mobility and reducing stiffness. Following this, ultrasound therapy was applied for 8 minutes at pulsed mode, providing deep tissue heating to facilitate pain relief and promote healing. In addition to these modalities, Patient A was prescribed Codman's pendulum exercises and wand exercises. Each of these exercises consisted of 10 repetitions per set, performed 3 sets (Table 3). This exercise regimen was designed to enhance shoulder mobility and strengthen the surrounding musculature. The treatment were performed over a period of 2 weeks, with 3 sessions conducted each week, resulting in a total of 6 treatment sessions. The overall treatment plan was designed according to the International Classification of Functioning, Disability, and Health (ICF) core set, ensuring a holistic approach to patient care. Furthermore, the treatment protocol was structured using the RPS form, which facilitated a systematic problem-solving method tailored to Patient A's specific needs and functional goals. Patient B received a treatment plan consisting of angular

Table 1. Outcomes of AROM of patient A

Shoulder (left)	Active ROM (Pre) in Degrees	Active ROM (Post) in Degrees
Flexion	0-150	0-165
Extension	0-30	0-50
Abduction	0-90	0-150
Adduction	90-0	150-0
Internal rotation	0-55	0-70
External rotation	0-70	0-80

Table 2. Outcomes of AROM of patient B

Shoulder (right)	Active ROM (Pre) in Degrees	Active ROM (Post) in Degrees
Flexion	0-140	0-170
Extension	0-30	0-50
Abduction	0-90	0-150
Adduction	90-0	150-0
Internal rotation	0-60	0-75
External rotation	0-70	0-80

Table 3. Treatment protocol for patient A and patient B

Intervention	Goal	Patient A	Patient B
Technique	To improve ROM To reduce pain	Gongs mobilization (2-3 minutes)	Angular joint mobilization (5 minutes)
Conventional therapy (exercises)	To improve functional activities	1. Codman's pendulum exercise. 2. Wand exercise. (10 repetitions * 3 sets)	1. Codman's pendulum exercise. 2. Wand exercise. (10 repetitions * 3 sets)
Ultrasound	To reduce pain	Pulsed ultrasound (1:1) for 8 minutes.	Pulsed ultrasound (1:1) for 8 minutes.

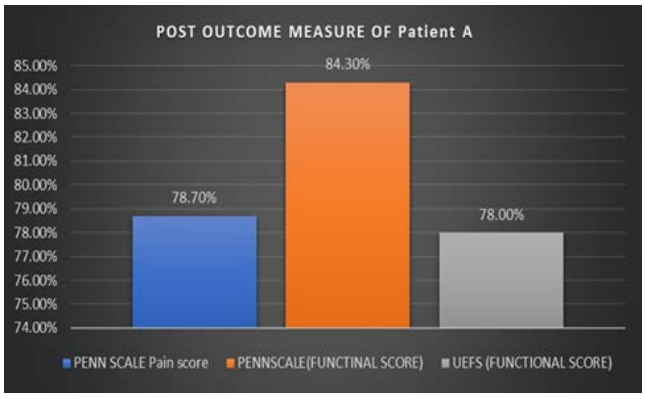


Figure 1. Post outcome of patient A on PENN scale (painscore, functional scale) and UEFS.

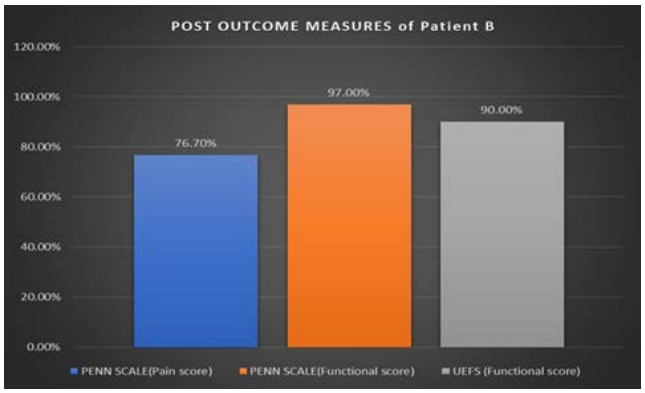


Figure 2. Post outcome of patient B on PENN scale (pain score, functional scale), UEFS.

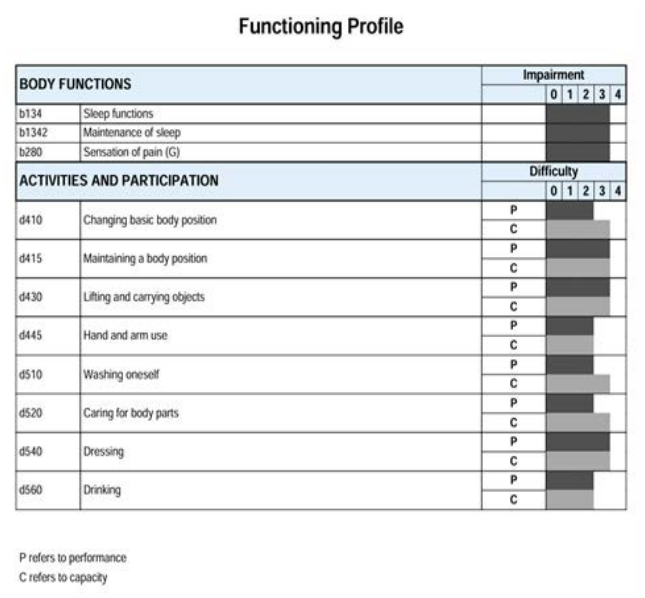


Figure 3. Patient A pre-test ICF functioning profile.

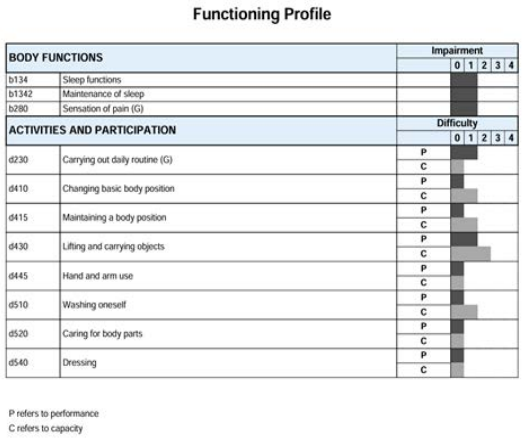


Figure 4. Patient A post -test ICF functioning profile.

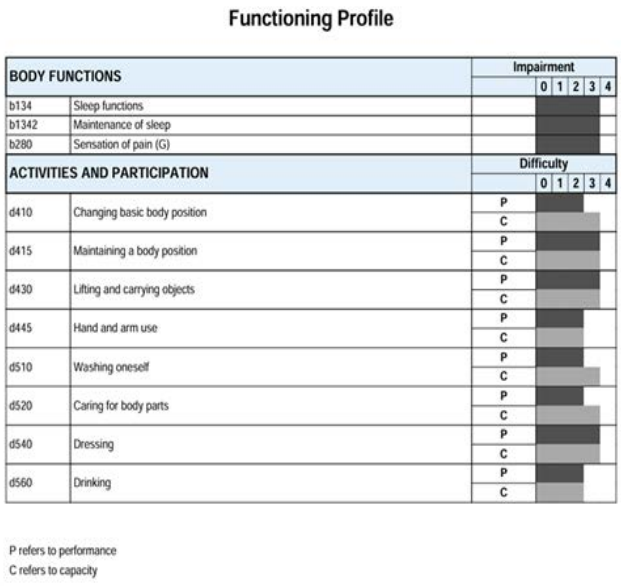


Figure 5. Patient B pre -test ICF functioning profile.

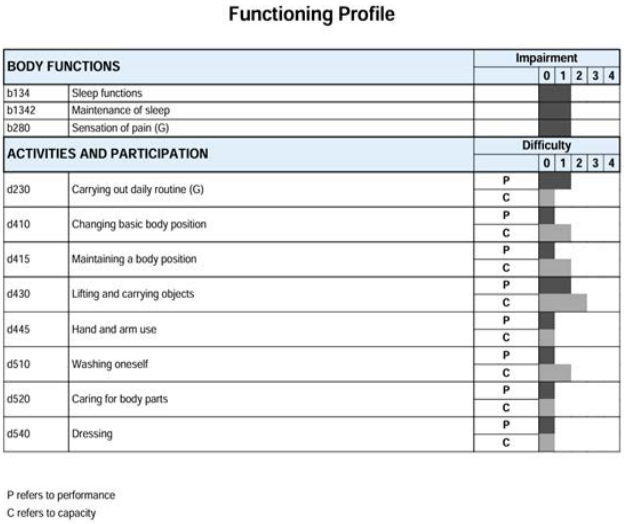


Figure 6. Patient B post -test ICF functioning profile.

joint mobilization (Table 3) along with ultrasound and exercise same as Patient A.

7. Result

The study assessed the comparative effects of Gong's mobilization and Angular Joint Mobilization (AJM) in the treatment of frozen shoulder over a two-week period. Outcome measures included the PENN Shoulder scale, the Upper Extremity Functional Scale (UEFS), and Range of Motion (ROM) assessments. Findings revealed that angular joint mobilization technique (Patient B) provided significantly better outcomes, especially in pain reduction (76.7%), whereas Gong's mobilization (patient A) showed patient satisfaction (84%), and functional improvement (78%) from (Figure 1 and 2). The use of the Rehabilitation Problem solving (RPS) form further supported the development of a tailored treatment plan and detailed documentation, reinforcing an individualized approach to patient care.

In this study, the ICF core set was evaluated as a standardized outcome measurement tool for frozen shoulder, offering a structured, comprehensive framework to assess the multifaceted aspects of patient functioning and disability. The ICF core set facilitates the documentation of key health components, including body functions, structures, activities, and participation, along with environmental and personal factors. Incorporating the ICF core set was instrumental in shaping the rehabilitation strategy, allowing for a comprehensive approach to recovery that addressed multiple facets of each patient's functioning profile (Figures 3 and 4) for patient A and (Figures 5 and 6) for patient B outcome. By evaluating the power and capacity of activities specific to each patient, the ICF core set facilitated a tailored approach, focusing on individual strengths and challenges in recovery. The use of the ICF core set allows clinicians and researchers to capture a broad spectrum of health components, including body functions, body structures, activities, participation, and environmental and personal factors

8. Discussion

Our results highlight that adopting the ICF core set for frozen shoulder provides a more objective. Evaluation of patient outcomes, improves clinical assessment, and fosters a holistic view of treatment effectiveness. This approach enhances communication among healthcare providers and promotes an integrated, patient-centered approach to treatment, advancing clinical practice and research by establishing a common language to describe patient progress and the impact of treatment. This study compared Gong's mobilization and Angular Joint Mobilization (AJM) in treating Frozen Shoulder (FS), revealing that AJM led to better outcomes in pain relief, Range of Motion (ROM), functional activity, and disability reduction. Sindura *et al.* suggested that Gong's technique is beneficial for reducing pain and improving

joint mobility in patients with shoulder dysfunctions, including FS[4]. However, in the present study, despite some improvements, Angular Joint Mobilization (AJM) showed clinical improvement in range of motion and functional outcomes compared to Gong's mobilization. The current findings suggest that AJM may be more effective, especially in later stages of frozen shoulder. Gong's mobilization might yield better results when applied earlier or combined with other treatment methods. According to Swetha *et al.* gongs mobilization showed more effective in treating FS than conventional physiotherapy[9]. Furthermore, the improved results that have been observed with AJM may be associated with its emphasis on rotational joint mechanics, as suggested by Kim *et al.* who observed its significant impact on pain modulation and range of motion[10].

The results of the current study are consistent with Kim's findings, indicating that AJM is especially effective in FS cases, presumably due to its greater impact on joint mechanics and pain modulation. According to Rahbar *et al.* other mobilization techniques such as acromioclavicular mobilization was effective in improving abduction ROM and reducing discomfort and impairment in patient with FS[11]. Phonsopkar *et al.* and Iqbal *et al.* showed improvement in ROM, decrease in pain and functional impairment in FS patients using spencer's technique[12,13].

Another key aspect of this study is the use of the International Classification of Functioning (ICF) core set and the Rehabilitation Problem Solving (RPS) form for a more structured assessment. While previous studies have not widely utilized these tools in FS research, their inclusion in this study provided a more holistic view of the patients functional limitations and activity restrictions[14-16]. This systematic approach ensured that all dimensions of functioning, including pain, ROM, and disability, were adequately addressed. Similar structured tools have been encouraged by the World Health Organization (WHO) to provide standardized assessments for musculoskeletal disorders (Figure 3 and 4) using functional profile for the condition[17].

In compared to other rehabilitation methods, AJM appears to surpass Gong's mobilization in stage 2 FS. Kelley *et al.* found that mobilizations that target the angular and rotational components of the shoulder joint, such as AJM, were more effective in recovering ROM and functional independence. However, while Gong's mobilization is successful in early-stage therapies[17,18], it may not have the same biomechanical advantage as angular methods, particularly in later stages of frozen shoulder, which was observed in this study.

The rehabilitation protocol used in this study, centred on the Rehabilitation Problem-Solving (RPS) form, promoted a patient-specific approach[19]. This approach is consistent with Duncan *et al.* who highlighted that tailored rehabilitation plans based on individual functional limitations enhance patient outcomes[20]. The structured use of the RPS form allowed for a more focused and personalized rehabilitation process. This might account for the superior results observed with Angular Joint Mobilization (AJM), as the individualized approach ensured targeted interventions and better alignment with the patient's specific recovery needs.

Further, the integration of the International Classification of Functioning (ICF) core set and Rehabilitation Problem-Solving (RPS) form allowed for a more comprehensive patient assessment, addressing all dimensions of functioning. These tools provided a structured framework that added value to the treatment strategy by considering physical and functional limitations in a holistic manner.

9. Conclusion

In conclusion, this study demonstrates that while both Gong's and angular joint mobilizations benefit frozen shoulder treatment, angular joint mobilizations show greater effectiveness in reducing pain, enhancing range of motion, and minimizing disability specifically in stage two frozen shoulder. Gong's mobilization can also be beneficial for improving patient functional outcomes.

Additionally, the incorporation of the ICF core set as a standardized outcome measurement allows clinicians and researchers to capture a broad spectrum of health components including body functions, structures, activities, participation, and environmental and personal factors within a consistent framework. This approach facilitates reliable data interpretation, enhances comparability across studies, and supports international standards, making the findings applicable across diverse populations.

Our results underscore that the ICF core set not only improves clinical assessment and objective evaluation of patient outcomes but also promotes an integrated, patient-centered approach to treatment. By providing a universal language for tracking patient progress and treatment impact, the ICF core set advances both clinical practice and research in frozen shoulder rehabilitation.

10. Clinical Implementation

- **Personalized Rehabilitation:** Clinicians can adopt AJM, as it has been shown to improve pain, ROM, and function in frozen shoulder patients, particularly in stage 2 frozen shoulder. AJM's rotational techniques should be considered the primary intervention for more comprehensive shoulder joint mobility. Also, Gong's mobilization can be used for improving the functional outcome of the patient.
- **ICF Core Set Application:** Incorporating the ICF core set in clinical assessments can guide practitioners in addressing all aspects of a patient's functional limitations, ensuring holistic and individualized care.
- **Documented Protocols with RPS Form:** The RPS form offers structured documentation, enabling practitioners to systematically tailor rehabilitation strategies and track progress effectively.
- **Future Integration:** Continued research and clinical practice should focus on exploring AJM's integration with Gong's mobilization for a multi-modal approach, especially in patients presenting early-stage FS or complex cases requiring combined interventions.

11. Future Scope

- Larger, well-controlled randomized and double-blind trials are necessary to conclusively compare the long-term effectiveness of Gong's mobilization and AJM for frozen shoulder treatment.
- Future studies should explore the sustainability of outcomes from both techniques, including pain relief and improved ROM.
- Utilizing the ICF core set in a broader population is recommended to confirm its role in tailoring interventions for frozen shoulder, ensuring a more standardized, holistic approach to patient care.
- The combination of these approaches could also be investigated for a more comprehensive rehabilitation strategy.

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