

# Clinical Application of Joint Mobilization in Joint Dysfunction

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**Abstract:** Joint mobilization, as a commonly used technique in the field of rehabilitation therapy, has a significant effect on improving joint dysfunction and holds an important position. This article aims to comprehensively elaborate on the principles of joint mobilization and deeply explore its clinical applications in various joint diseases, including temporomandibular joints, shoulder joints, knee joints, and cervical and lumbar injuries, providing valuable evidence for clinicians to carry out related treatment work.

**Keywords:** Joint mobilization; Rehabilitation; Joint dysfunction

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## 1. Introduction

Joint dysfunction severely affects patients' quality of life, causing them considerable inconvenience and pain. In the context of the continuous development of rehabilitation medicine, joint mobilization has gradually emerged as an important treatment method. Joint mobilization is one of the basic skills of modern rehabilitation therapy techniques, incorporating concepts and clinical experiences from multiple disciplines such as sports medicine, traditional physical therapy, osteopathic medicine, and orthopedics. Specifically, it is a manual manipulation technique performed by a therapist within the patient's joint range of motion, typically utilizing physiological and accessory movements of the joints as basic operation types. This technique has advantages such as strong pertinence, rapid effectiveness, minimal patient pain, and high acceptability. Through specific manual manipulations, joint mobilization can adjust joint positional relationships, improve joint range of motion, and alleviate pain, thereby providing effective solutions for relieving joint dysfunction. Deep research on its clinical application in different joints and related diseases is of great significance for improving the effectiveness of rehabilitation treatment and promoting patients' functional recovery.

## 2. Dynamic joint mobilization

Dynamic joint mobilization, also known as Mulligan dynamic joint mobilization, has garnered significant attention in the field of rehabilitation therapy <sup>[1]</sup>. Originating from New Zealand, it is a professional and distinctive manual therapy technique for rehabilitation. This technique relies on scientific and standardized manipulation methods, allowing therapists to precisely apply treatments based on patients' actual joint conditions.

In clinical applications, dynamic joint mobilization has demonstrated remarkable effectiveness in addressing various joint dysfunction issues, such as limited range of motion and pain. By reasonably adjusting joint positional relationships and promoting the flow of joint fluid, it effectively improves joint function. With numerous successful clinical cases as evidence, its excellent results have been widely recognized, making it one of the important means of rehabilitation therapy.

## 3. Temporomandibular joint disorders

The temporomandibular joint holds an extremely vital position in the human head and face. As a pair of joints, it participates in numerous crucial physiological activities that not only cover the process of eating and chewing but also include speaking and singing behaviors, and even extend to emotional expression and impulsive reactions <sup>[2]</sup>. Temporomandibular disorder (TMD) is a collective term for a group of diseases that involve the temporomandibular joint and the masticatory muscle system, presenting a series of related clinical problems. Specifically, these clinical issues include pain, joint clicking, and limited opening range <sup>[3]</sup>. For TMD patients, conservative and reversible treatments are commonly adopted, including physical therapy, the use of dental appliances, and behavioral therapy <sup>[4,5]</sup>. Joint mobilization specifically targeting the temporomandibular joint has demonstrated significant therapeutic effects. It not only effectively relieves stiffness in the temporomandibular joint and tension in the masticatory muscles but also plays a positive role in improving pain issues in the craniocervical junction tissue, which includes cervical joints and muscles <sup>[6]</sup>. According to research conducted by Lin *et al.* <sup>[7]</sup>, combining joint mobilization with acupuncture therapy can significantly improve pain conditions and temporomandibular functional activities in patients with temporomandibular disorder syndrome, and can increase their maximum mouth opening, demonstrating remarkable treatment effectiveness. Additionally, research by Hu *et al.* <sup>[8]</sup> found that for patients with chronic temporomandibular disorder, upper cervical joint mobilization can improve their maximum mouth opening and mandibular function while also effectively reducing pain symptoms.

## 4. Shoulder joint disorders

In the field of rehabilitation therapy, joint mobilization techniques are widely used clinically, especially for the treatment of shoulder joint disorders. Shoulder periartthritis, a common clinical disease, can be categorized as a bi syndrome in traditional Chinese medicine, and the wind-cold-dampness syndrome is one of its more common syndromes <sup>[9]</sup>. When applied in practice, shoulder joint mobilization techniques can achieve effects such as relieving muscle spasms, improving joint function, and reducing pain through various operational methods such as rotation, pushing, and pulling with different amplitudes. However, relying on this single treatment approach has certain limitations in terms of clinical efficacy, such as difficulty in completely curing the disease and a high recurrence rate <sup>[10]</sup>. Joint sports injuries are a common type of joint injury in clinical practice. Common types of injuries involving the shoulder joint include shoulder joint dislocation, proximal humeral fractures, rotator cuff injuries, calcific tendinitis of the rotator cuff, long head of biceps tendonitis, and injuries to the joint capsule around

the shoulder joint<sup>[11,12]</sup>. Currently, clinical treatment for shoulder joint sports injuries typically involves developing targeted treatment plans based on the severity of the injury. These plans specifically include oral administration of non-steroidal anti-inflammatory and analgesic drugs, application of anti-inflammatory and analgesic plaster, manual reduction, surgical treatment, and rehabilitation training<sup>[13]</sup>. Numerous related studies have further confirmed the advantages of combination therapy. The study by Wu *et al.*<sup>[14]</sup> showed that the use of round-tipped needles with umbrella-shaped acupuncture combined with shoulder joint mobilization for the treatment of patients with the wind-cold-dampness type of shoulder periarthritis can effectively reduce pain symptoms in the shoulder joint area, significantly improve the range of motion of the shoulder joint, and effectively promote the recovery of shoulder joint function, thereby enhancing the overall treatment effect. Similarly, Wang *et al.*<sup>[15]</sup> found in their study that the application of joint mobilization combined with extracorporeal shock wave therapy is more effective than the use of joint mobilization alone in the treatment of patients with shoulder joint sports injuries. This combined treatment approach can effectively increase the range of motion of the shoulder joint, significantly reduce pain perception, and thereby improve the functional level of the shoulder joint.

## 5. Knee joint disorders

The knee joint is one of the crucial joints in the human body, and its flexion and extension functions play a pivotal role in daily activities. Knee osteoarthritis, a degenerative joint disease, is particularly common among the elderly population. Patients often experience symptoms such as knee swelling and tenderness, and some may also suffer from issues including cartilage damage and joint effusion<sup>[16]</sup>. With the accelerating aging of the population in China, the incidence of knee osteoarthritis in clinical settings is continuously rising<sup>[17]</sup>.

Currently, joint mobilization is a commonly used method to treat this disease. This therapeutic approach employs professional techniques like pressing, toggling, and rolling to massage relevant areas. Its goals are to enhance muscle elasticity, effectively relieve joint pain and stiffness, and significantly improve joint range of motion<sup>[18]</sup>. Numerous studies have confirmed the efficacy of joint mobilization.

According to research by Tang *et al.*, patients who underwent joint mobilization therapy in combination with sodium hyaluronate injection showed a significant reduction in visual analog scale (VAS) scores for pain compared to those who received only sodium hyaluronate injection. Additionally, their knee joint function scores improved significantly<sup>[19]</sup>. Liu's study also demonstrated the remarkable effectiveness of combining silver needle heat conduction with joint mobilization in treating knee osteoarthritis. This combined therapy not only improved various clinical indicators but also enhanced patients' quality of life and treatment satisfaction<sup>[20]</sup>.

Knee joint dysfunction can arise from various causes, with postoperative immobilization being a common one. Hu and Xu investigated the use of joint mobilization to treat knee flexion dysfunction. The results indicated that the treatment group exhibited significantly better outcomes in terms of active range of motion, passive range of motion, and VAS scores compared to the rehabilitation-only group. Furthermore, there was a notable improvement in the "Time Up and Go" (TUG) test<sup>[21]</sup>.

In summary, knee joint disorders, particularly osteoarthritis, are a significant health concern, especially among the elderly. Joint mobilization, as a therapeutic approach, has shown promising results in treating these disorders, improving joint function, and enhancing patients' quality of life.

## 6. Lumbar injuries

Lumbar disc herniation is a condition caused by a combination of multiple complex factors. Tears in the fibrous ring and degenerative changes in the intervertebral discs are common etiologies among patients. In this pathological state, the sciatic nerve is often affected, and sciatica pain is closely associated with lumbar disc herniation. This type of pain is typically concentrated in the L4–L5 or L5–S1 regions, and its intensity can cause significant distress to patients <sup>[22]</sup>. A study conducted by Deng *et al.* <sup>[23]</sup> demonstrated that combining neural mobilization with joint mobilization and medium-frequency pulsed therapy can effectively treat sciatica pain. Through this integrated treatment approach, patients' pain symptoms were significantly alleviated, showing good clinical application value.

Furthermore, lumbar facet joint dysfunction, also known as lumbar facet joint subluxation, primarily refers to acute posterior lumbar joint synovial entrapment. It is often caused by mild acute lumbar sprain that leads to twisting of the articular processes, resulting in the synovium being trapped in the facet joints, ultimately causing limited spinal mobility and severe pain <sup>[24]</sup>. Lumbar facet joint dysfunction has become one of the important causes of pain in the lower back and leg. Relevant statistics show that the incidence of this disease among patients with low back and leg pain is approximately 57% to 65%. Additionally, this disease has distinct age characteristics, mostly occurring in people over 40 years old, accounting for up to 86% of cases <sup>[25]</sup>. A study by Jia *et al.* <sup>[26]</sup> employed the lumbar dynamic joint mobilization (Mulligan) technique combined with the proprioceptive neuromuscular facilitation technique to treat lumbar facet joint dysfunction. The results of the efficacy observation indicated that this combined treatment approach was significantly better than the simple manual lumbar dynamic joint mobilization (Mulligan) technique, more effectively improving patients' symptoms and enhancing treatment outcomes.

## 7. Conclusion and prospects

Joint mobilization has demonstrated excellent clinical efficacy in the treatment of joint dysfunction. Through its application to different joint areas and conditions, it effectively adjusts joint positional relationships, improves range of motion, and reduces pain, thereby bringing positive impacts to patient rehabilitation. This fully proves its value as a rehabilitation therapy method. With the continuous development of rehabilitation medicine, further standardization of the operational procedures and criteria for joint mobilization is needed to ensure the precision and consistency of treatment. At the same time, efforts should be made to expand its application scope so that it can benefit more patients with various types of joint dysfunction. Additionally, active exploration of deep integrations with other rehabilitation therapies, such as physiotherapy and exercise therapy, should be pursued to form comprehensive treatment plans. This will further enhance treatment effects, improve patient outcomes, and allow joint mobilization to play a more significant role in the field of rehabilitation.

## Disclosure statement

The author declares no conflict of interest.

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