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Short Communication

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Osteoarticular Maneuvers for Pain Relief and Restoration of Wrist and Hand Mobility

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Abstract

Distal radius fractures are among the most common upper limb injuries, accounting for 17.5% of all skeletal fractures, with higher prevalence in children (5–14 years), adults (40–60 years), and elderly women due to osteoporosis. While low-energy trauma (e.g., falls) predominates in older individuals, high-energy trauma (e.g., sports injuries) affects younger populations. Associated complications include tendon injuries, stiffness, and reduced joint function due to immobilization, which can impair synovial fluid production and muscle strength. Rehabilitation strategies, including passive, active-assisted, and active joint mobilizations (based on Maitland and Mulligan principles), aim to restore range of motion, reduce pain, and prevent stiffness. This scientific communication provides a concise guide for physiotherapists, outlining techniques to optimize recovery while emphasizing individualized assessment and application.

Keywords: range of motion, physical therapy modalities, manual therapy.

Introduction

Distal radius fractures, which occur up to 3 cm from the articular surface between the radius and the proximal row of carpal bones, are among the most common injuries of the upper limbs. They represent approximately 17.5% of all fractures of the human skeleton and account for one sixth of all fractures treated in emergency situations. In children and adolescents, the prevalence is highest between the ages of 5 and 14, in adults between the ages of 40 and 60 and among the elderly, the incidence in women is two to three times that observed in men, this being due to the menopause, which can increase the risk of osteoporosis, a significant risk fator [1,2,17].

In the elderly, fractures usually occur as a result of low-energy trauma, such as falls with hyperextension of the wrist. In younger people, high-energy trauma, such as car accidents and sports injuries, occur in 3 to 9% of cases, and can reach 25% depending on the sport practiced. When trauma occurs, there can be associated injuries such as dislocations, tendon ruptures and sequelae such as tendinopathy, carpal tunnel syndrome and De Quervain's syndrome. Most of the time, these injuries require the limb to be immobilized for some time, which leads to changes that can make it difficult to function the upper limb completely [3,11,15,18,19].

Immobilization of the wrist can affect the movement of the metacarpophalangeal, thumb carpometacarpal, mediocarpal, interphalangeal, radiocarpal, intercarpal, humeroulnar and humeroradial joints. In other words, this lack of movement can affect the joints closest to the injury as well as the more distal ones. Immobilization can lead to a reduction in the production of synovial fluid, changing its viscosity and thus increasing the risk of joint stiffness. It can also lead to muscle hypotrophy, fibroadip proliferation and this lack of mechanical stress can generate a loss of bone mass. It is important to note that these effects vary according to the duration and type of immobilization Applied [5,12,13,14].

It is recommended to mobilize not only the affected joint directly, but also the adjacent joints, in order to preserve range of motion and prevent complications. Manual therapy has the potential to help reorganize tissue, facilitating the repair process, influencing the structure and mechanical behaviour of tissues, reducing the proliferation of fibrotic tissue, reducing the formation of collagen cross-bridges and adhesions of the tendon to the surrounding tissues. It also influences fluid dynamics, which helps to reduce the accumulation of inflammation by-products and thus reduces pain. Joint mobilizations stimulate mechanoreceptors, which inhibit the transmission of nociceptive stimuli at the level of the spinal cord, resulting in a reduction in pain through the sluice gate theory, thus making it possible to improve range of motion faster and return to function sooner [7,8,9,16,20].

The purpose of this scientific communication is to serve as a quick reference guide for physiotherapists, based on illustrations and explanations of the maneuvers applicable to the wrist and hand. It is important to note that these are basic mobilizations, with possible variations and alternatives, which should be applied after a prior and individualized assessment of each patient. To simplify understanding, the techniques have been organized into tables divided into passive, active-assisted and active mobilizations, where “ST” means stabilize and “SL” represents the slide to be performed.

Passive joint techniques (Figure 1) are defined by oscillatory and rhythmic accessory movements, classified from I to IV by Maitland [6], respecting the anatomical joint limit. The patient’s role is simply to relax, avoid blocking the movement and allow the physiotherapist to do the work. Mobilizations I-IV should be performed in 4 to 6 sets of 20 seconds to 2 minutes each [3].

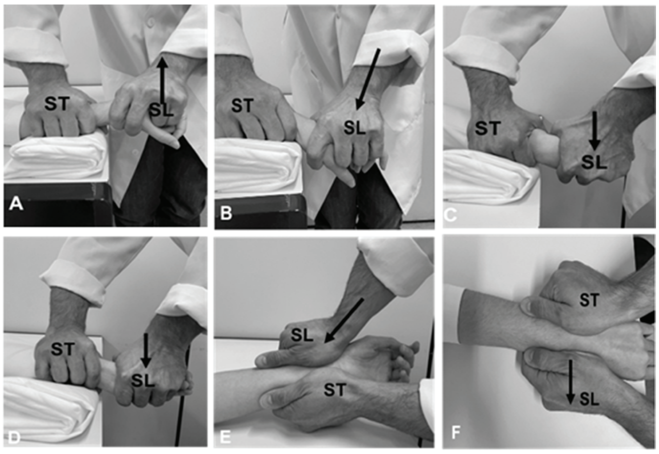

Figure 1. Passive mobilizations. ***A*** *– Mobilization to gain wrist flexion: the therapist stabilizes the wrist with one hand and the other performs a posterior slide of the radiocarpal joint.;* ***B*** *– Mobilization to gain wrist extension: one hand stabilizes the distal portion of the forearm and the other performs anterior sliding of the radiocarpal joint;* ***C*** *– Mobilization to gain ulnar deviation: one hand stabilizes the radius and the other performs radial sliding of the radiocarpal joint;* ***D*** *– Mobilization to gain radial deviation: one hand stabilizes the radio-ulnar joint and the other performs ulnar sliding of the radiocarpal joint.;* ***E*** *– Mobilization to gain supination; one hand stabilizes the ulna and the other performs a dorsal slide of the distal part of the radius in supination;* ***F*** *– Mobilization to gain pronation: one hand stabilizes the ulna and the other performs anteroposterior sliding of the radius.*

The so-called “active-assisted” techniques (Figure 2) are based on the principles described by Mulligan. During the proposed exercise, the physiotherapist must accompany the movement by applying a facilitating joint glide (mobilization with movement - MWM) and assess whether there has been an improvement in the patient’s symptoms. If the response is positive, the positioning is maintained and the patient must collaborate by applying additional pressure at the end of the range of movement (overpressure). If there is no change or if symptoms worsen, the professional should adjust the sliding until they find a way to optimize joint kinematics and relieve symptoms, or choose not to use the technique. This “test” to determine the ideal treatment plan (glide) should be performed up to a maximum of 10 repetitions, followed by performing the MWM in 3 to 4 sets of 10 repetitions when symptom remission is noted in the evaluation [3].

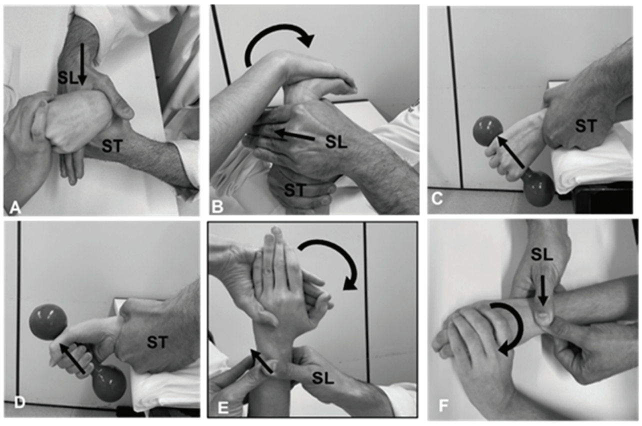

Figure 2.Active-assisted mobilizations. ***A*** *– Mobilization to gain wrist flexion: the therapist stabilizes the distal portion of the ulna with one hand and with the other performs medial-lateral sliding on the carpus, while the patient himself performs forced wrist flexion;* ***B*** *– Mobilization to gain wrist extension: one hand stabilizes the forearm and the other performs latero-medial sliding of the carpus, while the patient performs forced wrist extension.;* ***C*** *– Mobilization to gain ulnar deviation: the therapist stabilizes the wrist with one hand and the patient, holding a dumbbell, performs ulnar deviation;* ***D*** *– Mobilization to gain radial deviation: therapist stabilizes the wrist with one hand and the patient, holding a dumbbell, performs radial deviation;* ***E*** *– Mobilization to gain supination: therapist performs an anterior postero-posterior glide of the ulna, while the patient supinates forcebly;* ***F*** *– Mobilization to gain pronation: the therapist performs an anterior posterosuperior glide of the radius, while the patient performs a forced pronation.*

Active joint techniques (Figure 3) are guidelines developed and tested during physiotherapeutic care, which should be incorporated into the patient’s routine, so that symptoms improve and the patient can reproduce them accurately [10].

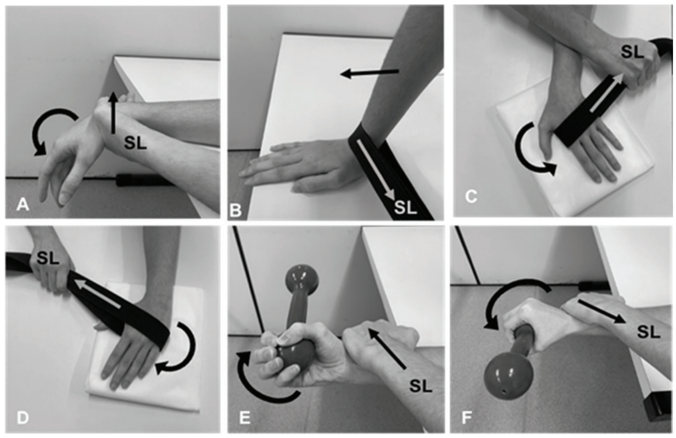

Figure 3. Active mobilizations. ***A*** *– Mobilization to gain wrist flexion: the patient performs a medial-lateral carpal glide, while performing active flexion;* ***B*** *– Mobilization to gain wrist extension: the patient performs a lateromedial carpal glide, with the help of a rigid tape and performs wrist extension on a surface;* ***C*** *– Mobilization to gain ulnar deviation: patient performs a medial-lateral slide with the help of a rigid tape, while performing an active ulnar deviation;* ***D*** *– Mobilization to gain radial deviation: the patient performs a lateromedial slide, while performing an active radial deviation;* ***E*** *– Mobilization to gain supination: the patient performs an anteroposterior slide of the radius while actively supinating, holding a dumbbell;* ***F*** *– Mobilization to gain pronation: the patient performs an anteroposterior slide of the ulna and performs active pronation with the help of a dumbbell.*

Conclusion

This scientific communication is not intended to delve into the study of the Maitland, Mulligan and McKenzie approaches, but rather to provide a quick reference guide for physiotherapists, focusing on illustrating and describing the techniques applicable to the wrist. It is important to emphasize that these techniques are only part of the treatment and do not constitute a definitive solution. The application of these approaches should be based on the specific needs and condition of the patient, and therefore requires a prior and detailed assessment of each case.

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