CLINICALLY EFFECTIVE MANUAL THERAPY FOR THE HIP

Manual therapy (MT) encompasses hands-on techniques for both joints and soft tissues. In this article we will focus on joint procedures and look briefly at how clinical effects may be achieved. Using the hip as an example we will examine several clinically effective MT techniques for this region. This will allow you to understand when and how to use joint-based MT and so to tailor a care package to the specific needs of your patients for the optimum results. Read this article online https://spxj.nl/2LWMwku

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DEFINITIONS

Joint-based manual therapy (MT) may be applied to both the spinal and peripheral joints. Manipulation (thrust) techniques are generally passive (the patient does not move; the therapist applies the force) and applied rapidly (high velocity) to achieve very small movements (low amplitude). Mobilisations are non-thrust techniques that may be applied at a variety of speeds and amplitudes, with or without patient movement. The aim in each case is to reduce pain and improve motion, and several variables are involved in the application of joint-based MT (Table 1).

The description of a joint-based MT technique may also be improved using grading systems, and several systems have been used in the past. In general, higher grade movements involve greater force and are applied at or close to end range of a joint's motion. Maitland described five MT grades, with grade I being a small amplitude oscillation early within a movement range, grades II and III larger amplitude actions further into range, and grade IV an oscillation at end range (2). These four grades represent mobilisation in that they are non-thrust techniques. The grade V action is a thrust technique (manipulation) at full end range. Kaltenborn described three techniques, again of increasing force with grade I taking up slack (neutralising joint pressure), grade II separating the joint surfaces, and grade III stretching the soft tissues of the joint (3). Within the Cyriax Orthopaedic Medicine approach, peripheral techniques are graded as: (A) a mobilisation within the patient's pain-free range; (B) a sustained stretch at the end of the available range; or (C) a small amplitude high velocity manipulation giving overpressure once the joint slack has been taken up (Table 2) (4).

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MEDIA CONTENTS

Set of three videos demonstrating hip mobilisation techniques http://spxj.nl/2LWMwku

TABLE 1: MANUAL THERAPY APPLICATION FRAMEWORK [SOURCED MINTKEN ET AL. (1)]

Variable	Meaning
Speed	Rate at which the MT force is applied – *eg. high velocity*
Location within ROM	Is the force applied at the start, middle or end of the motion range currently available to the subject – *eg. at mid-range*
Force direction	Anatomical and or biomechanical direction of the force – *eg. lateral glide*
Tissue target	Which joint or part of a joint is moving – *eg. spinal level*
Relative movement	Which region is moving and which remaining stable – *eg. tibial glide on femur*
Subject position	Gross body position of subject and limb position – *eg. supine lying with femur flexed, abducted & externally rotated*

MT, manual therapy; ROM, range of motion

TABLE 2: CLASSICAL MANUAL THERAPY GRADING SYSTEMS

Maitland	Kaltenborn	Cyriax
Grade I – Small amplitude rhythmic oscillating at beginning of ROM	Grade 1 – neutralise joint pressure without separating joint surfaces	Grade A – mobilisation within pain-free range
Grade II – Large amplitude rhythmic oscillating in midrange	Grade 2 – separate joint surfaces	Grade B – sustained stretch at EOR
Grade III – Large amplitude rhythmic oscillating to point of limitation in ROM	Grade 3 – stretch soft tissue	Grade C – high velocity/low amplitude manipulation at EOR
Grade IV – Small amplitude rhythmic oscillation at EOR		
Grade V – high velocity/low amplitude manipulation at EOR		

EOR, end of range

> THE EFFECT OF THE JOINT-BASED MANUAL THERAPY IS TO ENHANCE PROPRIOCEPTION AND INCREASE THE PATIENT'S BODY AWARENESS

EFFECTS

When originally described, MT techniques were often claimed to apply various forces and potential movements upon the joint, using a standard biomechanical model. However, scientific studies have often disproved many of these original claims, and our understanding of the method by which clinical effects are achieved has progressed. Many spinal manipulations for example are performed with the joint in close pack position where the joint capsule and collateral ligaments tend to draw the joint surfaces together, so greater movement is unlikely. Cavitation (formation and collapse of bubbles within the synovial fluid) has been demonstrated in both spinal and peripheral joints. However, it occurs both at the level of the manipulation and above or below this point, so is non-specific (5). Alteration in muscle stiffness through a short-term reduction in tone occurs with a rapidly applied force, but no change has been found between different grades of technique (6).

The scientific literature in general does not support a biomechanical explanation for MT (7), leading to the development of a neurophysiological model (8). The mechanical force imposed through MT can be seen as a noxious stimulus which initiates a cascade of neurophysiological reactions invoking analgesia (pain relief) at local, spinal, brainstem and higher centre levels. Subjects receiving MT have reduced cytokine levels (blood and serum) and pain biomarkers compared to controls. In addition, temporal summation (a measurement of pain sensitivity) is lessened. A laboratory-induced stretch reflex (H reflex) is decreased following MT suggesting a brief inhibition of the motoneuron pool. Changes in cortical excitability have been observed (9), as has alteration in cerebral blood flow (10). The effects described above point to a reduction in pain (pain modulation) and muscle spasm. In addition, where MT is applied with movement (mobilisation with movement, or MWM techniques), non-associative learning may occur. Here, the response to a stimulus is changed by altering the movement pattern – for example, allowing a greater motion range in the presence of pain. The effect of the MT is to enhance proprioception and increase the patient's body awareness.

Although research shows that these effects are *statistically* significant, the therapist must determine whether they are *clinically* relevant, and superior to other treatment modalities that could be used. A continual process of *clinical reasoning* is therefore essential (11). The barrier to recovery must be identified, and treatment aimed at this. Initially the patient may simply require reassurance that their condition will progress along a standard healing timescale for example. They may require neuroscience education to dispel myths about 'hurt and harm' – the belief that the amount of pain experienced is directed related to the degree of tissue damage. Where deconditioning has occurred, strength or mobility training may be required. Where the barrier to recovery is biomechanical, pain, or reduced body awareness, a MT method may help but not usually in isolation. The approach is to use sound clinical reasoning to apply an escalation of care.

Video 1:
Longitudinal glide mobilisation for the hip

Video 2:
Lateral glide mobilisation for the hip

Video 3:
Lateral glide MWM for the hip

APPLICATION

When originally described, MT was often used as a single blanket approach to treatment, taking a biomechanical model of effect (joints moved, tissue stretched for example). As our understanding of therapeutic effect has changed from a classical mechanistic model to a biopsychosocial model of healthcare (considering *psychological* and *social* influences interacting with *biological* factors), MT is seen as part of a total care package that emphasises rehabilitation and patient-led management. Using the hip (coxa-femoral) joint as an example, three techniques will be considered to illustrate the breadth and effectiveness of MT in the hip region.

Technique One: Longitudinal Mobilisation/Distraction

The longitudinal glide or distraction mobilisation (caudal glide) is best used when the patient describes their symptoms increasing with prolonged standing or full weight-bearing activities (Video 1). Often during subjective examination (questioning), patients will say that they 'want someone to pull their leg'. The patient lies on their back in a relaxed position (support under the head if required). An open or loose pack position is chosen for the hip (open pack occurs when the joint surfaces are naturally apart as the soft tissues surrounding the joint are

relaxed). The leg is positioned in slight flexion (30–40°), abduction, and lateral rotation and a caudal glide is imposed by gripping the leg as the therapist leans backwards. There are two considerations to this technique. Firstly, if the grip is on the shin, although this is easier for the therapist as the hands surround the limb, glide will also be imposed on the knee joint in addition to the hip. Where a patient has a knee problem as well (co-morbidity) this may be unsuitable. Gripping above the knee eliminates the knee effect but is more difficult for the therapist as their hands do not surround the limb. Further, there is a tendency to increase grip power by digging the fingertips into the patient's muscle bulk, which is obviously painful for them. An alternative is to use a *figure four* grip. For this, the therapist stands facing the patient's head, and when treating the left leg places their left arm beneath the patient's thigh, to grip the leg beneath their axilla. They hook their left hand over their right forearm and press down on the top of the patient's thigh with their right hand, locking the leg. The lock is maintained as the therapist leans back to apply a distraction to the hip joint (Fig.1). The figure four grip is often more comfortable for the patient as the surface area of contact is greater. The grip is also better for the therapist, as less hand strength is required.

Technique Two: Lateral Glide Using Seatbelt

This lateral distraction technique begins with the patient's hip flexed to 90° and abducted slightly (maximum 30°). The therapist stands facing the patient's greater trochanter and grasps their hands over the upper thigh close to the joint line. A lateral glide is imposed by pulling the thigh towards the therapist using a force perpendicular to the greater trochanter. Larger distraction forces are imposed using a seatbelt technique (Video 2).

A webbing belt (5–7cm width) is used, with the belt wrapped in a towel for padding. The belt is placed into the patient's groin crease close to the hip joint line. The belt passes behind the therapist in a long loop, going below their buttocks to avoid slipping. The action is to create the distraction (lateral glide) force by leaning backwards and pulling through the belt while guiding and refining the movement using the hands placed over the belt. An oscillation may be performed early within the range (grade I or II) to target pain or at end range (grade IV) to emphasise mobility. In addition, the lateral glide may be used as part of an MWM technique described below.

Technique Three: MWM

The lateral glide technique may also be used with a hip flexion movement aiming to increase pain-free range. The action is a MWM, a technique originally pioneered by Mulligan (12). Initially the therapist assesses the patient's quality and range of motion into hip flexion. Where pain occurs, or movement is limited (compared to the non-symptomatic side) a lateral glide is applied using a seatbelt as above, and the hip is once again moved into flexion (Video 3). Where the motion range increases and/or pain reduces the MWM technique is appropriate. The action is performed to repetition (5–10 times) and the original movement reassessed. The technique may be repeated two or three times providing symptoms continue to change.

An MWM may also be applied using rotation at the hip (Fig. 2). The start position is with the hip and knee at 90° flexion, with the therapist gripping the tibial to impose a rotation movement. A lateral glide is imposed using the seatbelt technique above. The hip is passively moved into medial rotation (foot outwards) and lateral rotation (foot inwards), again aiming for symptom modification to re-test.

> "THE BARRIER TO RECOVERY MUST BE IDENTIFIED, AND TREATMENT AIMED AT THIS"

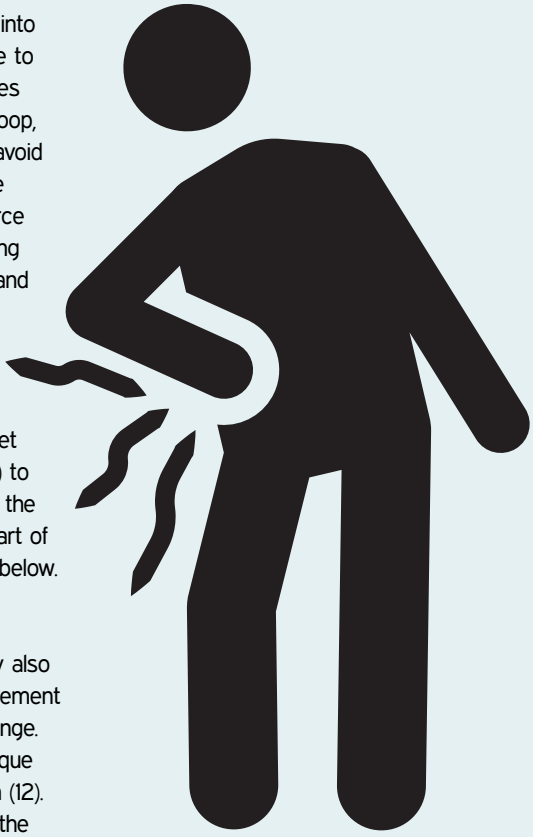

Figure 1: Figure four grip for longitudinal distraction of the hip

Figure 2: MWM for hip rotation

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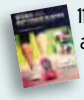

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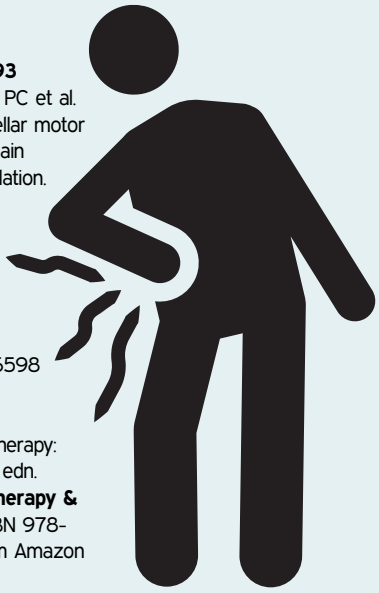

KEY POINTS

- Manipulation (thrust) techniques are applied rapidly to achieve very small movements.
- Mobilisation (non-thrust) techniques can be applied at different speeds and amplitudes.
- The aim of both manipulation and mobilisation techniques is to reduce pain and improve movement.
- Grading systems are also used to improve the description of joint-based manual therapy (MT) techniques.
- The effect of the MT can be to enhance proprioception and increase the patient's body awareness.
- The therapist must continually use clinical reasoning to decide on the best treatment approach.
- Longitudinal distraction is often used when the patient notices that their symptoms increase with full weight-bearing.
- A figure four grip is useful for longitudinal mobilisation at the hip to eliminate any unwanted effects at the knee.
- The lateral glide technique is used when the patient describes a snagging in the hip, particularly with prolonged sitting.
- The use of a seatbelt makes the lateral glide technique more effective and reduces the use of the therapist's hands.

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DISCUSSIONS

- **What is the aim of using manual therapy (MT) mobilisation and manipulation techniques?**
- **Thinking about the 'total care package' for the patient. How would you decide when and when not to use MT?**
- **With regards to the three techniques described, how would you perform them (a) for the maximum benefit of the patient and (b) for the least detriment to your own health?**

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