Manipulation for Podiatrists.

Author: Tom Brett, DO, BSc(Hons), LLM (Medical Law),
Master Bonesetter, Podiatrist and Master of Laws.
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This article considers manual therapy and its relationship to the prescription of orthotics. Manual therapy includes massage, mobilisation and manipulation. Tom Brett's main clinical interest is manipulation. It is hoped that this article helps to clarify the issues facing podiatrists and the issuing of prescription orthotics to patients.

Introduction.

Since 1993 and 1994 osteopaths and chiropractors have been enthroned as statutory tribes with a mandate to establish and promote their professions. The main therapeutic content of these two professions is manipulation. Manipulation has become somewhat of a sacred cow to the Department of Health and Her Majesty's Government as being in need of specific statutory regulation. If the Osteopaths Act 1993 and the Chiropractors Act 1994 established a permanent status quo, the osteopaths and chiropractors would have retained the training, validation and regulation of manipulation. Instead two developments have occurred. The first is the emergence of the clinical interest group of the HPC registered physiotherapy manipulation group. The second development is the establishment of an incorporated regulator for bonesetters, Unified Bonesetters Limited (UBL). Both these two groups have manipulation as the main therapy.

In recent years members of these four professions have been offered training in the fitting of instant orthotics by a retailer of proprietary orthotics. It is therefore possible for an osteopath, chiropractor, physiotherapists or bonesetter, who has participated in one of these courses, to correct a structural deformity and fit instantly a custom made orthotic.
The positive therapeutic principle in correcting a structurally deformity and supplying immediately a made to measure device is that it stabilises the corrected structure. A course in manipulation for podiatrists would place the complete process of correcting a structural deformity and fitting a custom made orthotic entirely in the hands of the podiatrist. A podiatrist capable of manipulation could also avoid the situation where a prescription device reinforces a structural abnormality that could be corrected by mobilisation or manipulation.

Two protocols have been prepared as a basis for podiatrists to study and achieve competence in manipulation and also acceptance with UBL as registrants. Beginning in 2007 a pilot course in manipulation of the joints of the lower limb was undertaken by a small group of podiatrists. The results of this pilot study appear to indicate it will be possible to train a podiatrist to manipulate the joints of the lower limb on two separate days and ideally with one or two weeks between the day courses. Qualified podiatrists should, after participating in such a course and qualifying, be able to compete on an equal basis with the other manipulation professions in the market place with all the consequent benefits.
Terms.

Examination.

Joint examination looks at the quality and quantity of movement in the joint. In the foot, examination also looks at the relevant position of the component areas. The main philosophy for normal and abnormal positions was developed in the open chain, static model, by Root et al. The tissue stress type model such as that proposed by McPoil and Hunt introduces the study of function and brings life to clinical practice.

Mobilisation.

A definition of mobilisation is:

Specific passive movements to a joint, either oscillatory or sustained, to reduce pain and stiffness affecting movement and to restore normal joint motion.

This passive movement is performed by the therapist at a speed slow enough that the patient can stop the movement.

It may be applied with an oscillatory motion or sustained stretch intended to decrease pain or increase mobility.

Manipulation.

Manipulation moves adjoining bones to correct displaced or fixated joints. Manipulation uses a wide range of techniques, at one end of the scale the high velocity low amplitude thrust, at the other end of the scale energy techniques requiring no application of force. High velocity thrust or counter thrust techniques move the joint to the limit of its physiological range of movement and apply a thrust in the direction of the fixation with a high velocity and low amount of travel. They do not move the joint through its osseus anatomical barrier.
Therapeutic objectives.

Therapeutic objectives of mobilisation.

Mobilisation is used to increase the range of motion of a joint. Small movements, known as 'joint play', must be present before gross movements can be attempted. These techniques can be used after surgery along with other techniques.

Similar hand holds can be used to mobilise joints as are used to examine a foot. Mobilisation is more favourable in correcting misaligned metatarsal heads because of the flexible nature of the distal or forefoot transverse arch.

Therapeutic objectives of manipulation.

Manipulation is used to achieve an intended neuro-biomechanical effect by increasing the quantity and quality of joint motion. In the case of displaced bone, which alters the pull of muscle, the muscle will not maintain its full contractile power. For example, a prolapsed cuboid will alter the pull of the peroneus longus muscle and its effect as a stirrup on the mid foot joints.


Examination / Mobilisation / Manipulation.

General.

Examination can be a mobilisation treatment but lacks the intent to mobilise, thus mobilisation can be an unintended consequence of the examination technique. If the intention is to examine for normal and abnormal foot shapes, within the Root et al. concept that the subtalar joint and the foot are in neutral position between midstance and heel-off during walking and the examination involves inverting and evert ing the rearfoot, then it is possible that mobilisation of the joints in that area occurs.

Certain authors differentiate between manipulation and mobilisation by claiming that manipulation is the act of moving a joint into its paraphysiological range. The active range is when the patient moves using the muscles. The physiological range is in effect the range of passive movement. The paraphysiological range is the extra range of movement gained by a manipulation technique.

Whether to manipulate or to mobilise is a key question for any clinician to answer.

No hard and fast rule can be laid down; each case must be considered on its own merits. 5

One condition that merits manipulation has been specified as:

... the diagnosis of a displacement and the absence of contraindications. 6
The risks of manipulation are that the act of manipulation damages permanently the tissue involved in the manipulation. For that reason techniques should be selected, which involve minimum force, amplitude and velocity. The technique must be selected for a clearly determined therapeutic objective. The patient must be informed prior to the treatment.

**Functional efficiency criteria for the examination of the lower limb.**

The anatomy study, which relates to Root Orien and Weed's concepts of normal and abnormal in the static foot open chain model could be considered lifeless when compared with the kinetic model.

Closed kinetic chain evaluation with a 1 sec change from pronation to supination suggests that the tissue stress model of McPoil and Hunt would be more appropriate to evaluate the need for mobilisation or manipulation. The complexity of the functional model can be seen in the *The Arches of the Foot.*

The key concepts of McPoil and Hunt are that the tissues are not overloaded to the extent that they cannot recover and breakdown occurs in the form of osteoarthritis, exostoses or other tissue damage. This is a criteria for functional efficiency and is embodied in the tissue stress model.

- The identification of tissues being excessively stressed based on the history of symptoms and other subjective information provided by the patient.
- Applying controlled stress to the tissues identified by the patient through the use of weight bearing and nonweight bearing tests, as well as palpation, range of motion and muscle function and strength assessment.
- Determine if the cause of the patient's complaint is secondary to excessive mechanical loading.
Detailed examination.

- Consider the anatomical shape.
- Isolate the joint.
- Move the joint in its functional range to the physiological limits.
- Observe abnormalities by pain response, limitation of movement, joint space or inadequate function.
- Differentiate the cause.
- Record findings.
- Relate findings to adjoining anatomy and anatomy, which is functionally affected.
- Report to the patient.

The diagnosis.

- The cause of the reported pain.
- The cause of the loss of function.
- The primary pathology.

The therapeutic choice - mobilise or manipulate.

A basic principle in the selection of a technique is that mobilisation will always be preferred to manipulation. That is because mobilisation is the least invasive, the patient is in charge of the process and presents less risk to the patient of tissue damage.

The key issue in the decision making process is that abnormalities are observed by pain response, limitation of movement, joint space or inadequate function and the causes of any of these dysfunctions are differentiated.
Prescription orthoses and structural correction.

General therapeutic principle.

Traditionally the prescription orthotic device or functional orthotic (FO) is designed and provided with a view to restore function to a dysfunctional foot or to prevent further damage. When manual therapy, in the form of structural correction, is introduced into the treatment programme, the role of the FO changes to that of providing a remedy to prevent the corrected dysfunction or structural problem from reoccurring.

The positive therapeutic principle.

The key positive principle being proposed is that the use of FO's and the correction of skeletal integrity by either mobilisation or manipulation increase muscle strength by realigning the line of muscle pull to the optimum position and thus restore normal function.

The negative therapeutic principle.

An FO should not be fitted, which reinforces a structural abnormality that could be corrected by mobilisation or manipulation. Not reinforcing a correctable structural abnormality is a negative therapeutic objective with a positive outcome.

Legal liability.

If the negative therapeutic principle becomes widely known among the podiatry profession, Bolam may not be an acceptable defence to an action against a practitioner under the law of tort.
How to fit functional orthotics after structural correction.

This is a recommendation based on the need to provide stability to the corrected structure.

The way to do that is:

- Immediately after manipulation or mobilisation and
- before weight bearing
- provide support for the structures in order that they are supported in the functional position.

Not recommended:

- No support.
- Footwear only as a support.
- Chiropody felt.

It is not appropriate that the patient uses the functional orthotics (FO's) for a couple of hours and then removes them for whatever reason. The patient is receiving support for an adjusted foot, which could be unstable for forty eight hours. The FO's should therefore be worn continually for at least that period. Resting the lower limb from weight bearing should be part of the treatment plan.

This fits in with the examination and management scheme proposed by McPoil and Hunt:

Institute a management protocol to emphasise:

- Reduction of tissue stress to a tolerable level through rest, footwear and foot orthoses.
- Tissue healing through modalities and soft tissue mobility techniques.
- The restoration of flexibility and muscle strength to permit the resumption of daily activities.
Please note that McPoil and Hunt do not mention osseus mobilisation or manipulation in their management scheme.

**Research into the efficacy of manual therapy.**


Vaillant et al investigated the effect of a therapeutic manipulation of the feet and ankles on postural control during quiet standing in elderly adults. The subjects stood barefoot on a force platform and were asked to sway as little as possible. Part of the experiment involved vision suppression by closing of the subjects' eyes. Centre of feet pressure displacements along the mediolateral and anteroposterior axes were recorded. The results suggested that the therapeutic manipulation of the feet and ankles allowed the elderly adults to partially compensate for the destabilising effect induced by the suppression of vision.  

None of the subjects presented any musculoskeletal problems, defects in the peripheral sensory system of the lower extremities, vascular pathology, neurological disorders or vestibular impairment. Finally, all subjects had normal or corrected-to-normal vision.

The manipulation was not a specific manipulation to correct a structural deformity and improve function but involved manual massage of the feet and mobilisation of both the feet and ankle joints.

The massage itself may have been sufficient to bring the changes claimed for the experimental treatment by stimulating the exteroceptors in the cutaneous plantar surface. The experiment did not test for this and therefore does not justify the mobilisation of every joint in the foot. This presents a significant problem in applying the results of the experiment in a clinical situation.
Another problem with this research is that no definition was included to differentiate between manipulation and mobilisation in the text. There is also ambiguity between the object of the experiment, which was to assess the effect of therapeutic manipulation and what was described as being done, which was to mobilise all the joints of the foot after a foot massage.

**Conclusion.**

The value of the experiment is that it suggested:

- Benefits in balancing when healthy elderly adults adapt to vision suppression after massage and mobilisation of the ankle and foot joints.

The experiment does not confirm:

- Benefits on adaptation of the proprioceptive system after a treatment to adjust a specific structural abnormality.

The experiment did not investigate:

- The underlying neurophysiological mechanisms and the sites of these effects.
- The overall duration of the observed benefits.
- The most efficient characteristics of a training/rehabilitation program that would include this kind of treatment.

The experiment therefore does not:

- Prescribe a specific manipulative treatment based on the need to restore structural integrity and thus improve function.

The most likely case for mobilisation would be after surgery or as a conservative treatment for a subluxated or restricted joint prior to manipulation.

Nield et al investigated the effects on dorsiflexion range of movement at the ankle joint on asymptomatic subjects. The hypothesis that a single talocrural manipulation alters the dorsiflexion range of movement was not supported.  

Conclusion.

Clinically there is no justification for the application of manual therapy in the form of manipulation or mobilisation for an asymptomatic subject. So the investigation is not applicable to indicate treatment or evaluate the effect of treatment.
Research into the effects of orthotics.

Tomaro and Burdett (1993).

A study was conducted to examine the effects of foot orthotics on the electromyographic (EMG) activity of the tibialis anterior, peroneus longus and gastrocnemius muscles during walking. The study suggests that foot orthotics had minimal effects on the muscles studied and that further research is necessary to determine the effectiveness on the EMG activity on other leg muscles. 10


Six different areas of how orthoses were evaluated:

- Patient satisfaction.
- Pain and deformity.
- Plantar pressure.
- Position and motion.
- Muscle activity.
- Oxygen consumption.

Clinicians have interests in all these aspects but the clear areas of interest for this protocol are pain and deformity and muscle activity,

In the case of pain and deformity it was stated that the studies reviewed did not compare orthoses to other forms of treatment and summarised that further research is needed to compare treatments.

In the case of muscle activity it was stated that the work of Tomaro and Burdett was the only work to date and suggested work on the tibialis posterior muscle. 11
Conclusion.

Because the literature did not compare the application of orthoses to other forms of treatment such as manipulation or a combination of manipulation with the application of orthotics to control the corrected structural deformity, the review indicates there is no research available for the subject of orthotics and manual therapy.

Note.

*Italics* have been used where the authors have not defined exactly that a prescription orthotic device or functional orthotic was used.
Research versus Clinical Observation.

The review of available research literature indicates the difficulty in using such work to justify treatment. Even in the world of specific mobilisation and manipulation techniques without the aid of orthotics to support the adjustments, firm research is lacking.

The mobilisation and manipulation techniques employed throughout the bonesetter, chiropractic, osteopathic and physiotherapy professions rely on clinical observations, ie I did this and the resulting benefit was this. With the treatments being based on mechanical principles.

Such principles include:

- If part of an arch has been displaced out of the overall alignment, the arch is weakened and could collapse.
- If you pass a rope over a pivot point, the force within the rope increases because of the change of direction and the resultant friction forces.

Consider this:

- The base (cuboid) of a half arch has collapsed and it is manipulated dorsally, after which it is supported by an orthotic. The patient's hip pain on the ipsilateral side reduces by 50% immediately.

This is an example of clinical observation, which cannot be expected to be backed up by research.
Summary.

The study of function brings life to clinical practice and can justify the use of a tissue stress type model such as that proposed by McPoil and Hunt rather than the static model of Root et al in evaluation and treatments.

Mobilisation increases the range of motion of a joint using various passive motion techniques.

Manipulation moves adjoining bones to correct displaced or fixated joints. Manipulation uses a wide range of techniques, at one end of the scale the high velocity low amplitude thrust, at the other end of the scale energy techniques requiring no application of force.

Both mobilisation and manipulation need to be carefully selected from a clearly determined therapeutic object.

The introduction of manual therapy in the form of mobilisation and manipulation in treatment involving the use of orthotics is already widely practised. The podiatry profession is in a 'catch up' situation. The use of manual therapy by podiatrists is therefore not revolutionary but evolutionary.

A rapid fit and constant use supporting orthotic is essential to support an unstable adjusted foot.

There does not appear to have been any research into the use of orthotics with manual therapy to adjust joints for increased movement or correct displacement. The present benchmark for evaluating the effect of orthotics and manual therapy is the comparative manual assessment of joint function before and after the use of adjustment techniques.
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Other sources.

Unless sources are specified, all information used in this article is copyright material taken from: Brett's Protocol for the Lower Limb - Part I and II.
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About Tom Brett.

Twenty years as an engineer in the petrochemical industry.
Qualified with a diploma in osteopathy in 1989.
Qualified in Podiatry with a BSc(Hons) in 2002 at Northampton School of Podiatry, which is funded by the NHS.
Qualified in law with a master's degree in medical law in 2006.
Practises a range of therapies including joint manipulation, general footcare and insole therapy.
Publishes medicolegal work on http://www.brettom.com

In addition to medical training, martial arts practitioner for over thirty years and has gained hands on experience in injuries such as muscle tears and joint dislocations.
Currently practises as a Registered Podiatrist under the Health Professions Council and as a Master Bonesetter under the governance of a UK limited company, Unified Bonesetters Ltd.
Master Bonesetter title awarded for development of a cervical manipulation procedure, which uses no force or amplitude.
Lectures to medical professionals on topics such as medical negligence, risk management, consent, expert witnesses issues and manipulation.

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