Abstract

Manual medicine is the medical discipline that deals with diagnosis, treatment, and prevention of reversible functional disturbances in the locomotor system and other related organ systems. The current article illustrates neuroanatomical and neurophysiological fundamentals of the mechanisms of manual diagnostics and treatment. Based on the recent literature and consideration of different scientifically based clinical guidelines, the evidence-based effectiveness of manual therapeutic procedures is presented. Acute and chronic low back pain, cervicogenic headache, neck and shoulder pain, radicular arm pain, dysfunctional thoracic pain syndromes, diseases of the rotator cuff, carpal tunnel syndrome, and plantar fasciitis are included. Clinical case studies illustrate the clinical procedures. The term, the origin, and the clinical presence of “osteopathy” are addressed in detail, and the national and international societies of manual medicine (Deutscher Gesellschaft für Manuelle Medizin [DGMM], European Scientific Society of Manual Medicine [ESSOMM], Fédération Internationale de Medicine Manuelle [FIMMI]) are portrayed lexically. Finally, contraindications to manual intervention are presented and an outlook on the requirements and possibilities of scientific pain analysis is given in accordance with the preambler of the Deutsche Gesellschaft für Orthopädie und Orthopädische Chirurgie (GSOOC) guidelines on specific low back pain.

Keywords
Musculoskeletal manipulations · Osteopathic physicians · Manipulation, spinal · Pain perception · Neurophysiology

Manual medicine is the medical discipline that comprehensively deals with diagnosis, treatment, and prevention of reversible dysfunctions of the locomotor and associated organ systems.

Targeted functioning of different systems of the human body comprises a complex and finely tuned harmony of afferents and efferents. This interaction is under intensive control at the segmental level through descending pathways from higher centers (brain stem and all parts of the brain above it). Ascending paths carry information as feedback from the result of the movement in the sense of cybernetic systems towards the center [19].

If one or more elements of this interaction result in setpoint adjustments due to externally or internally caused disturbance variables, initially reversible—later permanent—malfunctions and ultimately structural changes occur. Numerous clinical symptoms and disorders follow this pathogenetic pattern. In the courses for obtaining the qualification “Additional training in manual medicine,” great importance is attached to this pathogenetic knowledge of these pathogenetic patterns [35].

Why are practitioners of manual medicine and manual therapists working to their limits? Why are prescriptions in orthopedic/trauma practices requested by patients with an emphasis that is second to none? Who does not know the unpleasant discussions with the statutory health insurance?
MOTOR SYSTEM ACTIVATION

Spinothalamic tract (STT)

C fibre, a delta fibre

Dorsal root ganglion

α motoneuron

A alpha fibre motor efference

grey Matter of the spinal cord

Autochthonous musculature at a vertebral joint

Spinal cord dorsal horn

Spinal cord anterior horn

Axon collateral

In his very readable book *Die verlorene Kunst des Heilens* (The lost art of healing), Bernhard Lown (American cardiologist, *1921*) [27] quotes Thomas Lewis, who writes in his book *Youngest Science* [20]: “Touching is the oldest and most effective tool in medical practice.” Lown writes: “The conversation at the first interview is often quite impersonal. But the relationship between doctor and patient often changes dramatically after the physical examination.” Which discipline is still intensively investigating physically today? The examples described below are known to all of us from daily practice. No imaging method really helps with the diagnosis, only secondarily, if at all. Diagnosis is essentially set “manually”!

Clinical examples

- If an inflamed appendix sends persistent nociceptive afferents to the spinal cord, a hypertonicity of the abdominal wall (defensive tension) occurs through reflex interconnection.
- Sends a lumbar intervertebral joint by sudden overload, e.g., “overlifting” or over-rotation, a strong nocifensive to the spinal cord, there is a spastic contraction of the low and intermediate layers of the spinal muscles, that is sometimes a very painful limitation of movement in the segment (blocking in the sense of vertebral protective reflex) [21]
- If dental treatment with subsequent changes in occlusion lead to incorrect loading of the temporomandibular joint, changes in motor patterns and functional disorders in the upper cervical spine can occur via afferents from the masticatory muscles (V3, mandibular nerve) and cause, e.g., neck pain and headaches [14].
– If segmental functional disorders in the lower cervical spine result in minimal delays in activating the supraspinatus muscle in relation to the deltoid muscle, excessive pressure on the supraspinatus tendon with corresponding pain (functional impingement) occurs at the beginning of the abduction [4]. This can lead to chronic inflammation, tendon degeneration, and supraspinatus lesions/ruptures in the long term.

Manual medicine addresses such functional disorders:

Using suitable techniques, the trained hand of the therapist is able to intervene in the reflex control circuits by generating proprioceptive afferents from various structures.

Pain-inhibiting systems are activated, and it is often possible to break the control loops of nocireactive dysregulation. In exceptional cases, mechanical jamming of certain articulated osseous functional units can be resolved directly. (Note: this mechanism does not apply to the inflamed appendix in the first example).

**Note**

Basic medicine/manual therapy targets the modulation of the pattern of systemic afferents and afferents to eliminate dysfunction in the affected control loops.

**Neurophysiological background of dysfunction and chronification [23, 33]**

Results from various fields of basic research (neurophysiology, neuroanatomy, neuropharmacology, myofascial pain research, anesthesiology, and algiesiology) in terms of translational research are presented, discussed, and consented (at the initiative of the Deutsche Gesellschaft für Manuelle Medizin [DGMM] and the Schweizerische Ärztegesellschaft für Manuelle Medizin [SAMMM]) in international symposia as foundations of manual medical diagnosis and treatment [18, 25].

The following attempted explanations and diagrams on important key pain medicine and functional terms achieve “a degree of simplification that is at the limit of tolerance, but basically the statements remain very close to the scientific content and are reliable” (Walter Ziegglänsberger, Max Planck Institute for Neuropharmacology, Munich).

The author of the present article and numerous long-time experienced manual physicians have internalized this content into daily diagnostic and therapeutic activities, and thus achieved an advanced specification of the differential diagnoses and, above all, an improvement in detailed differential therapeutic planning. This also and above all includes finding the indication for manual medical interventions.
**Motor system activation**

The organism reacts to nociceptive stimuli via metameric and central interconnections in the sense of nocireactive motor system activation ([Fig. 1](#fig1)).

Clinically, there is a pain-related motor coordination disorder (e.g., abdominal muscular defense, protective extremity reflex, gait disorder with activated coxarthrosis, malposition with lumbar spine blockage, signs of muscular imbalance).

**Sympathetic system activation**

Axon collaterals of the posterior horn neurons also excite sympathetic origin neurons in the thoracic lateral horn and generate vegetative efferents ([Fig. 2](#fig2)).

Clinically, the following can occur: changes in skin blood flow, piloerection, increased sweat secretion, tachycardia, increase in blood pressure, etc. There are also routes of parasympathetic dysregulation via the vagus and the pelvis nerves. An extreme form of sympathetic system activation is the complex regional pain syndrome 1 (CRPS 1, formerly Sudeck dystrophy).

**Convergence**

At the multi receptive dorsal horn neuron (MRHHN), not only afferents from the respective vertebral joints converge, but also afferents from various regions that are each assigned to a segment, i.e., afferents from skin, muscles, tendons, and internal organs ([Fig. 3](#fig3)).

According to this, nociafferents from non-vertebral structures in the common final path of motor system activation can also lead to vertebral dysfunctions, for which there are numerous clinical examples (lung cancer, thoracic spine blockage, adenexitis, lumbar spine obstruction, prostatitis, sacroiliac joint blockage, etc.).

**Clinical note:** the first symptom of pancreatic cancer can be a recurrent thoracic spine obstruction.

**Peripheral sensitization**

If a nociceptor is permanently stimulated above the threshold by a sustained noxious stimulus (e.g., UV radiation, me-
Mechanical overload of a joint or vertebral joint, or compression of the nerves, changes its biochemical behavior (Fig. 4). It secretes neurokinins (substance P, calcitonin gene-related peptide, etc.) into the extracellular space, which in turn triggers the so-called inflammatory cascade.

Phospholipase A2 (PLA2) dissolves arachidonic acid from the membranes, cyclooxygenase 2 (Cox 2) converts arachidonic acid into prostaglandin E2, which attaches to receptors of the same nociceptor and increases the sensitivity of the nerve there. Thereby, the threshold of the nociceptor is lowered at the skin contact and the joint, movements are painful. The neurokinins also produce vasodilation (rubor) and extravasation (tumor), and, thus, in addition to lowering the stimulus threshold (dolor) and occasionally converting proprioceptive into nociceptive afferents (functio laesa), create the full picture of inflammation, namely neurogenic inflammation. In the case of neurogenic inflammation, manual medical interventions do not work; preparatory pharmacotherapy is required here. Clinical/therapeutic side glance: PLA2 is inhibited by steroids, Cox 2 is inhibited by non-steroidal anti-inflammatory drugs (NSAIDs).

Long-term nociceptive influx also causes sensitization processes in the spinal cord, which are essentially comparable to the processes at the nociceptor during peripheral sensitization (Fig. 5). The processes in the spinal cord can be regarded as much more complex and complicated, since microglia, mast cells, astrocytes, and neurovascular complexes are also involved to a large extent. Here, too, the starting point of these processes is the secretory activities of the afferent fibers, and the central, non-inducible Cox 2 also plays an essential role in the synthesis of the centrally active prostaglandin E2.

The contemporary terminology for sensitization of the spinal cord is neurogenic neuroinflammation according to Sandkühler [36]. Clinical significance: nociceptive influx is intensified, pain-inhibiting mechanisms are weakened, nociceptive receptive fields increase (pseudoradicular radiations, Head’s zones, referred pain), inhibitory receptive fields are reduced, and the psychoaffective components of pain perception are intensified: fears and dysphoric states increase [1, 36].

In terms of treatment, the focus here is on centrally effective NSAIDs, acupuncture, and suitable proprioception produced by manual medicine.

**Note**

Mechanisms of peripheral and central sensitization are seen as chronification factors and essentially determine the clinical symptoms as well as differential diagnostic and therapeutic considerations.

**Inhibitory systems**

In addition to the opioidergic and serotonergic descending inhibitory functional systems, the GABAergic inhibition system plays an important role in manual medicine (Fig. 6). By generating proprioceptive afferents (touch, massage, physiotherapy, movement in a pain-free space, manipulation, and mobilization), pain-inhibiting action potentials are generated in GABAergic interneurons, which reduce the level of activity of the multi-receptive dorsal horn neurons and thus weaken the conduction of nociceptive excitations.

In addition to the possibility of manually releasing mechanical deadlocks, this manual medical possibility of intervening in neurophysiological pain regulation is likely to play an even more important role in explaining manual medical effects. This does not only seem to have a segmental effect, since a corresponding study has shown an increase in the pressure pain threshold even in places far from the manipulation.
The neurophysiology of pain inhibition in general has been known for a very long time [35], but has only recently found its way into differential treatment planning [15, 24]. Clinically, all functional methods also target the pain-relieving systems.

Basicall, manual therapy always has three components that cannot be separated from one another, since the subsystems are intensively networked with one another.

1. Mobilizations, manipulations and massages induce an afferent pattern which, if it is intense enough, actify the pain-inhibiting systems.

2. Likewise, blood circulation is promoted (massages, mobilizations, etc.), the milieu of the interstitial space is antinociceptively influenced by the blood circulation, thereby also changing the inflammatory situation, triggering immunological reactions, stimulating the signaling substance production of the fibrocytes, triggering the myocytes to release neurotransmitters. All of these active components were also “previously” causes of inflammation and obviously not adequately controlled by an intervention.

3. For example manipulations, … eliminate functional disorders at least partially or, at least for a certain time, completely. This depends on whether the coordination is treated in parallel or whether there are already maladaptive changes in the joint and movement segment structures.

Every treatment technique triggers both the activity of the pain-inhibiting systems (afference pattern) and the peripheral nociceptive causes.

Any therapy that focuses on pain will/should have an intensity-dependent antinociceptive effect. High intensities are necessary for this. At the same time, it will and should reduce the causes of pain.

Note: The nociceptive afferents must be removed from the brain in order to react structurally and functionally in a reorganizational manner [37].

Osteopathy

In the present context, it is necessary to critically appraise the term “osteopathy”
as a component and extension of manual medicine [7]:

Definitions and rules

There is no clear, globally accepted defini-
tion for terms such as “osteopathy,” “osteop-
pathic medicine,” and “osteopathic treat-
ment.” In the USA there is the Doctor of
Osteopathy (DO) profession, which corre-
sponds to that of the German physician
with all rights and obligations after com-
pleting an ultimately equivalent degree in
medicine. There is no other comparable
title anywhere else in the world.

Osteopathy in the sense of combining
diagnostic and therapeutic methods is
practiced in different European countries
and also worldwide by different profes-
sional groups (doctors, physiotherapists,
masseurs, alternative practitioners, and
also lay therapists). Training courses,
qualifications, and application standards
are therefore highly heterogeneous.

In Germany, the German Medical Asso-
ciation regards “osteopathy” as a com-
ponent and extension of manual medicine
and, with the report “Scientific evaluation
of osteopathic procedures” formulated in
2009 [7], set standards for medical train-
ning and medical practice of osteopathic
procedures. Osteopathic medicine and
osteopathic procedures are used by spe-
cialists after additional training in manual
medicine and billed by private doctors.
They are not part of the statutory health
care provision within the framework of
the Uniform Assessment Standard (EBM)
in Germany.

Many physiotherapists and masseurs
apply diagnostic and therapeutic osteo-
pathic techniques on medical prescrip-
tion at their own responsibility. However,
primary access to the patient (for non-
doctors) requires a professional license as
a non-medical practitioner.

The essence of osteopathy

The term was introduced to the medical
arts in the US by the American doctor
Andrew Taylor Still in the second half of
the century before last. The osteopathic
philosophy is based on three principles:
1. All the different functional systems
   within the body are combined closely
   and cannot be considered in isolation.
2. Medicine has to concentrate very much
   on the self-healing powers of the
   organism and promote them.
3. Exclusively the hands are used diag-
   nostically and therapeutically.

The term “philosophy” in connection with
medicine is understood semantically much
more narrowly in American than the term
“philosophy” in Europe. The medical pro-
The pattern training regulations (PTR) of the German Medical Association [9] formulated for the diploma “Additional training in manual medicine” have the following definition:

In addition to specialist medical expertise, the PTR Manual Medicine includes the detection and treatment of reversible functional disorders of the movement system including their interactions with other organ systems by means of manual examination and treatment techniques.

Minimum requirements according to § 11 of PTR:

Specialist certification in an area of immediate patient care—320 h of advanced training in manual medicine in accordance with section 4, paragraph 8, or 12 months of further training under authorization at further training institutions (only implemented in this way in a few regional medical associations). 

**Terminology**

In osteopathic terminology, three different systems are essentially described:

The parietal concept. This includes bones, joints, fasciae, muscles, and connective tissue and the associated peripheral vessels and nerves.

The visceral concept. This includes the internal organs and their connective tissue suspensions.

The craniosacral concept. This includes central nervous structures, cranial sutures, meninges, and spinal cord membranes based on the assumption of specific inherent rhythms of the human organism.

Global scientific literature [7] was able to demonstrate satisfactory evidence only for the parietal concept. Evidence for visceral and craniosacral concept is scarce.

The term “parietal concept” also corresponds fully to what maps the contents of the pattern course book Manual Medicine in the educational system of the Federal Medical Council [9]. The evidence for the visceral concept is much weaker.

Messlinger in Erlangen recently found nerve fibers that run from the meninges in the inside of the skull through the cranial sutures to the outside, e.g., into the temporalis muscle [34]. Probably clinically relevant in headache and craniofacial dysfunction.

In addition, osteopaths within the group of health professions, often after several years of full-time training, have similar impressive skills as physicians using manual techniques in the sense of the integral assessment of symptomatic dysfunction and they have great manual skill in influencing the organism therapeutically. This is why their quite respectable success in the treatment of painful dysfunctions for many patients is understandable.

A real demarcation from manual medicine is not possible. Significantly, the leading standard textbook of US osteopathy is named Greenman’s Principles of Manual Medicine [11].

**Conclusion**

Osteopathy is part and an extension of manual medicine [7].

**Treatment techniques** [2, 38]

The following techniques are mainly used:

– Massage, special massage
– Axial and vibratory traction of the spine and joints
– Mobilization
– Manipulation
– Muscle energy techniques, (post-isometric relaxation) muscle stretching
Excessive passive expectation of treatment – Florid radicular symptoms – Hypermobility – Osteoporosis – Structural instability of the spinal segment

Relative contraindications:
- Osteoporosis
- Severe degenerative changes in the spine
- Hypermobility
- Florid radicular symptoms
- Excessive passive expectation of treatment and a lack of cooperation in a complex treatment regimen with the need for the patient to assume responsibility

Treated disorders and diseases

The following presents a small selection with reference to current studies.

Tension headache

Manual therapies (soft tissue techniques and neuromobilization) can significantly reduce the frequency, duration, and intensity of chronic recurring tension headache, ideally in a combination of both procedures [13]. In non-drug therapy of chronic tension headache, there is good evidence for manual therapy. A series of six treatments of 15–20 min appears to be sufficient and also economical.

Cervicogenic headache

In a small but very correctly conducted study [8], the verum and placebo groups showed clear improvement in clinical symptoms after 3 months of manual therapy and performed better than the control and placebo groups. The work of Goadsby impressively depicts the anatomical and neurophysiological basis of cervicogenic headache and also explains the manual therapeutic effects [10, 14].

Case study: water sports

A 38-year-old French teacher came to the practice because of repeated pain in the thoracic spine at a certain point, often in connection with the feeling of "circulatory weakness" radiating into the left thorax, occasionally with nausea and the feeling of cardiac arrhythmias. Cardiologic, pulmonologic, and abdominal surgical examination was performed several times without any pathological findings. MRI of the thoracic spine was without pathological findings. Physiotherapy, training therapy, medication, acupuncture, and hypnosis treatment had no effect on the symptoms, which were repeatedly aggravated by long periods of sitting.

When asked in detail about the start of the pain, an accident while water skiing was reported, where the patient was immersed in the water at high speed. Thereafter, several days of nausea and slowly increasing pain in the middle thoracic region ensued, then several months of pain-free interval, which is why the connection was no longer seen.

Clinic. Full picture of a painful movement disorder with signs of hyperalgesia in the thoracic spine was without further pathological findings orthopedically and neurologically.

X-ray thoracic spine. No pathological findings.

Treatment. Decision to attempt a manipulative remobilization, strong looseness phenomenon, complete disappearance of all symptoms within 1 week after intervention.

Comment. Clinically relevant dysfunctions of single spine sections can persist for years and, as in the present case, be accessible to a single manual medical intervention.

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Infobox 3

**Contraindications to manual medical interventions:**

Absolute contraindications:
- Fresh trauma
- Osteoporotic fracture
- Bacterial inflammation
- Destructive or stability-threatening tumor
- Systemic inflammatory disease in the episode
- Structural instability of the spinal segment

Relative contraindications:
- Osteoporosis
- Severe degenerative changes in the spine
- Hypermobility
- Florid radicular symptoms
- Excessive passive expectation of treatment and a lack of cooperation in a complex treatment regimen with the need for the patient to assume responsibility

- Strain/counterstrain technique
- Myofascial release technique
- Visceral techniques

**Treated disorders and diseases**

The following presents a small selection with reference to current studies.

**Trigeminal neuralgiform pain conditions in the face**

Cervicotrigeminal convergences repeatedly lead to neuralgiform pain in the area where the trigeminal nerve spreads and can be favorably influenced by manual regulation of the upper cervical spine [14].

**Neck pain, cervicobrachialgia, cervicodorsalgia**

A three-arm randomized controlled study with 88 test persons [6] was able to show that grip strength in chronic cervical arm pain improves significantly after a single manipulation. The pain could not be improved with one treatment; conditions with signs of central sensitization (pain radiation not radicular) require multiple treatments in the multimodal concept.

The positive influence on grip strength, however, shows a positive influence on the phenomenon of central sensitization and thus also, as numerous personal experiences show, on the processes of central pain amplification.

**Radicular arm pain**

According to the German S2k guideline “Cervical Radiculopathy” (registration no.: 030/082) of the AWMF [31], after imaging and neurophysiological exclusion of nerve compression with motor deficits, treatment should be multimodal conservative. In addition to analgesia, physiotherapy, and pain management training, this approach also includes manual techniques: manual traction and mobilization of the cervical spine can be used after the exclusion of contraindications. Impulse manipulations should not be used in cervical radiculopathies caused by degeneration. The consensus confirms the finding that manual techniques in chronic degenerative diseases rather than monotherapy, but essentially should be applied as multimodal combination treatment for a mean period of several weeks.

**Chest pain and back pain**

Acute thoracic spinal dysfunction and/or rib dysfunction can cause dramatic pain conditions, which naturally can also be very scary with corresponding emotional pain amplification. A short-term exclusion of internal causes of pain is imperative (including cardiac, pulmonary, or abdominal). If manual functional diagnostics then reveal the cause in the thoracic spine, manual therapy with mobilization or manipulation is promising [3].

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Lumbar and lumbosacral dysfunction and pain

For acute, non-radicular loin pain (so-called simple lumbago), more and more high-quality examinations show that manual therapy (with or without impulse) is a useful, effective treatment with rare side effects [5, 30]. One treatment is usually sufficient.

The updated National Care Guideline

The updated national care guideline for non-specific low back pain based on systematic Cochrane reviews speaks of a "can" recommendation for manual therapy, exercise therapy, and acupuncture. All other non-drug, non-invasive therapies are explicitly not recommended [8].

Literature search and discussions confirm the long experience which has been observed in outpatient practice, namely that many painful disorders of the postural and locomotor organs, including functional disorders of the sacrum joints and chronic low back pain in multimodal assessment, can be based on reversible changes.

Case study: a misstep

History: 56-year-old patient (examination December 2020) reports about 6 months of recurring, load-dependent, sometimes over longer periods (several weeks) persistent lower back pain, especially when walking, standing, and under loads. Sitting and lying down were without any problems. So far occasionally short-lasting lower back pain with overexertion, no relevant concomitant illnesses. In the past few weeks there had been repeated radiating pain to the outside of the thigh on the right to above the knee joint.

When jogging on the sandy beach in July, one leg got stuck in the soft sand and there was a jerky pull on the right leg with a tearing pain in the right back. Severe pain for 3 days, continued on vacation with ibuprofen, low back pain has never completely gone away since.

Clinic. Straight-leg raise test (SLRT) and Braggard negative, sensitivity, motor skills, reflexes normal, severe paravertebral tenderness L5/S1 right, left rotation sensitivity L5, skin hyperalgesia in the lumbosacral region.

X-ray lumbar spine in two planes. Discrete spondylodesis L5 and S1, interruption of the interarticular portion L5 on the right, first-degree spondylarthrosis lumbosacral.

Diagnosis. Persistent, load-dependent lumbar pain with lumbosacral instability due to unilateral spondylolysis L5 on the right and persistent segmental lumbosacral dysfunction after axial traction-distortion trauma.

Treatment. After muscle stretching of the quadratus lumborum and unspecific rotational mobilization of the lumbar spine, manipulative right rotation of L5. L5 rendered a loosening phenomenon followed by a subjectively significant improvement of mobility after three days an return to the state before jogging on the beach.

Comment. Substantial structural changes can also cause persistent dysfunctional pain conditions based on the neuroregulatory processes that are accessible to manual therapy. This also applies to disorders of movement reflexes in spondylarthrosis, intervertebral disc protrusions, and spinal stenosis, although no claim is made to successfully treat the underlying disease manually. Often, however, a noticeable clinical and functional improvement of the symptoms can be achieved by eliminating the accompanying dysfunction ([29]; Fig. 7 and 8).

Detailed instructions and illustrations of the most common manual techniques can be found in [2, 38].

Note

The indication for manual therapy always follows the criteria of "good clinical practice" in the sense of full medical specialist responsibility.

- Detailed medical history
- Subtle clinical, functional, and neurological examination
- If necessary, imaging and other apparatus-based diagnosis
Pain analysis. The diagnosis of painful disorders of the spine and extremities should always follow the rules of systematic pain analysis:
1. Identification of the nocigenerator
2. Identification of motor and autonomic and mental reflex response
3. Degree of activation of the chronification mechanisms
4. Condition of the inhibitory systems

considering the patient in his overall psychosocial context [16, 22, 26].

Manual therapy on extremity joints
Movement restrictions and painful movement disorders in extremity joints are a daily challenge for all disciplines dealing with the locomotor organ. Such changes can occur post-traumatically, post-inflammatoryly, and degeneratively, and require rehabilitation treatment.

Pathogenetically, shrinkage of the joint capsule, osseous deformation, and reactive muscle shortening are the cause, individually or in combination. The forced attempt to improve functional movement usually leads to pain and a reactive increase in the restriction of movement. Manual therapy therefore deviates to the field of joint play movements and seeks atraumatic improvement in the area of functional movements by means of an increased mobility in joint play ([4], Fig. 9 and 10).

Mobilization in the space of the joint play movements allow an expansion of the entire range of motion of a joint and thus bring about an improvement of the functional movement without stimulation of nociceptive afferents.

In addition, a mobilizing movement close to the joint gap at 1 Hertz causes:
– Detonation of the muscles,
– Better cartilage nutrition
– Increase in synovial fluid
– Soothes nociception
– Decrease in nociafference
– Expansion of the joint play room
– Consecutive improvement of functional movement
– Induction of a “long-term depression” (pain-inhibiting mechanism in spinal cord neurons) of the central nervous system (CNS) [36].

Shoulder pain
In rotator cuff syndromes, local manual mobilization with exercise therapy was significantly superior to other therapies (medication, electrotherapy, kinesiology tape, spinal manipulation) [17].

In summary. Meta-analysis of all systematic reviews and RCTs for five shoulder diseases that are common in practice resulted in the highest relative evidence (“moderate to good”) for repeated manual therapy in supraspinatus impingement diagnoses [28].

Carpal tunnel syndrome
Randomized controlled trial. 100 patients, complaints longer than 6 months, hypesthesia, Tinel and Phalen signs triple positive. Group 1: 50 classical surgery
Plantar fasciopathy

In a critical review of all RCTs evaluating their quality, six RCTs of high quality were identified, which were brought together in a meta-analysis. The best results were achieved with a very strong soft tissue treatment such as myofascial relaxation, especially of the calf and the plantar fascia, whereby local pain points in the muscles were also treated with pressure until they disappeared. Joint mobilizations were less effective. Plantar heel pain can be successfully treated manually if the functionally connected area of the calf muscles and their fascia together with the plantar fascia are relaxed by manual pressure treatment (fascial release technique) [32].

Conclusion for practice

The methods of manual medicine (MM) are among the most effective evidence-based forms of treatment for disorders and pain of the spine and limbs. The use of MM follows all the rules of good clinical practice (anamnesis, clinical examination, imaging, laboratory, and special examinations if necessary). MM is only efficient and safe in the hands of specially trained specialists and appropriately trained therapists. MM may only be applied in compliance with all differential diagnostic considerations and observance of the contraindications for MM. Correctly used, MM has a high compliance among patients and is an indispensable part of the diagnostic and therapeutic portfolio of all subjects dealing with the locomotor organ.

Conclusion

Conservative therapy for carpal tunnel syndrome with manual therapy is equivalent to surgery [12].

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Zusammenfassung

Manuelle Medizin, manuelle Therapie. Wissenschaft, klinische Anwendung, Evidenz

Manuelle Medizin ist die medizinische Disziplin, die sich umfassend mit Diagnose, Therapie und Prävention reversibler Funktionsstörungen am Bewegungsorgan und anderen damit verbundenen Organsystemen befasst. Der Beitrag beleuchtet neuroanatomische und -physiologische Grundelemente der Wirkungsweisen manualmedizinischer Diagnostik und Therapie. Anhand neuester Literatur und Betrachtung verschiedener wissenschaftlicher Leitlinien wird die evidenzbasierte Wirksamkeit manuellemedizinischer Verfahren dargestellt. Berücksichtigt werden akute und chronische Lumbalgie, zervikogener Kopfschmerz, Schulter- und Nackenschmerzen, radikulärer Armsschmerz, dysfunktionelle thorakale Schmerzsituationen, Erkrankungen der Rotatorenmanschette, Karpaltunnelsyndrom und Plantarfaszitis. Fallbeispiele veranschaulichen die klinische Vorgehensweise. Die Begrifflichkeit, die Provenienz und die klinische Präsenz der „Osteopathie“ werden ausführlich gewürdigt, und die nationalen und internationalen Vereinigungen und Gesellschaften der manuellen Medizin (Deutsche Gesellschaft für Manuelle Medizin [DGMM], European Scientific Society of Manual Medicine [ESSOMM], Fédération Internationale de Medicine Manuelle [FIMMI]) werden lexikalisch dargestellt. Abschließend finden sich Kontraindikationen und ein Ausblick auf die Erfordernisse und Möglichkeiten der wissenschaftlichen Schmerzanalyse, wie sie in der Präambel der Leitlinie „Spezifischer Kreuzschmerz“ der Deutschen Gesellschaft für Orthopädie und Orthopädische Chirurgie (DGÖOC) postuliert werden.

Schlüsselwörter
Muskeloskeletale Manipulationen · Osteopathische Ärzte · Wirbelsäulenumobilisation · Schmerzschmerzannahme · Neurophysiologie

Einer einer rationalen Differenzialtherapie. Praxisrelevante Assessments auf dem Boden grundlagenwissenschaflicher Erkenntnisse. Orthop Prax 46(2):57–74.
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