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VARIANCE IN MANUAL TREATMENT OF NONSPECIFIC LOW BACK PAIN BETWEEN ORTHOMANUAL PHYSICIANS, MANUAL THERAPISTS, AND CHIROPRACTORS

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ABSTRACT

Objective: The aim of the study was to identify differences in the diagnosis and treatment of nonspecific low back pain among 3 professional groups in the Netherlands: orthomanual physicians, manual therapists, and chiropractors.

Methods: Information was obtained from training materials from professional groups, literature searches, and observation of selected practitioners at work.

Results: In The Netherlands, there are differences in education between the 3 professional groups. The focus of orthomanual medicine is on abnormal positions of components of the skeleton and symmetry in the spine. Manual therapy focuses on functional disorders of the musculoskeletal system. Chiropractic focuses on the musculoskeletal and nervous systems in relation to patients' health in general. Orthomanual medicine considers inspection and palpation the most important diagnostic tools. Manual therapists and chiropractors additionally perform tests to determine functional disorders and manual therapists evaluate psychosocial influences. Chiropractors take radiographs if necessary. Orthomanual physicians apply mobilization techniques using fixed protocols. Manual therapists and chiropractors use various manipulation and mobilization techniques and their manipulation techniques differ in amplitude and velocity.

Conclusions: Diagnostic techniques and treatment methods of the 3 professional groups differ considerably. For more accurate reporting of the efficacy of manipulative and mobilizing therapies, the characteristics of treatments should be described in more detail when reported in studies such as randomized clinical trials. (*J Manipulative Physiol Ther* 2005;28:108-116)

Key Indexing Terms: *Low Back Pain; Manipulation; Mobilization; Chiropractic; Orthomanual Medicine; Physical Therapy Techniques*

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Pain in the low back is very common. Approximately 70% to 90% of adults suffer from low back pain (LBP) at some time during their lives, whereas 5% to 10% suffer for a long period.^{1,2} Nonspecific LBP manifests itself as pain, muscle tension, or stiffness; localized below the costal margin and above the inferior gluteal folds; with or without leg pain; and is not attributed to recognizable pathology.² It is classified as acute, subacute, and chronic, lasting less than 6 weeks, 6 to 12 weeks, or more than 12 weeks, respectively.²

In general, the aim of conservative treatments of LBP is to relieve pain, to improve functional ability (including return to work), and to learn to cope with pain.³ For acute LBP, guidelines for general practitioners aim at preventing unnecessary dependency on medical care. The guidelines for subacute and chronic LBP concentrate on preventing or diminishing dysfunction.⁴

This paper is focused on manipulation and mobilization therapies as treatment methods for patients with nonspecific LBP by different professional groups in the Netherlands. Literature shows various definitions of the concepts mobilization and manipulation. In general, manipulation is characterized by a thrust with high velocity, beyond the

physiological limits of the range of motion of the joint and beyond the control of the patient. Mobilization encompasses low-velocity passive movements within or at the limit of joint range of motion.⁵ The concept of mobilization comprises a wide range of techniques.

In the course of time, several comprehensive systematic reviews on the efficacy of manipulation and mobilization therapies suggest evidence for short-term efficacy of manipulative and mobilizing treatment of chronic LBP and limited or conflicting evidence for short-term efficacy of manipulative and mobilizing treatment of acute LBP.^{3,6} Long-term efficacy is rarely studied.^{3,6} A recent meta-analysis showed that manipulative/mobilizing therapies are more effective than placebo and other ineffective therapies, but not more effective than other effective therapies for acute and chronic LBP.⁷

In the above study, they tried to distinguish between different forms of manual therapy. Trials that used manipulative therapy solely or predominantly were studied separately, and this was also done for trials in which the profession of the manipulator was chiropractic. The results of these subsets of trials did not differ from the other trials.⁷ However, we question whether the treatments have been classified properly, as the characteristics of treatments under study are usually poorly described in method sections of randomized clinical trials and many professional groups apply a combination of manipulation and mobilization techniques. Furthermore, the term *manipulation* is often used when mobilizations are also performed. Therefore, it remains unclear whether the inconsistency in the results of various randomized clinical trials should be partially attributed to the different manipulative or mobilizing treatments used in those studies. Only a more systematic and detailed description of the manual techniques applied can shed more light on potential differences in efficacy.

Comparison of international guidelines for LBP shows differences in the recommendation of manipulative and mobilizing therapy.⁴ In most countries these therapies are recommended, mostly for acute LBP. In none of the guidelines a preference is given for a specific manipulative or mobilizing treatment method.⁴ This lack of preference is possibly because of poor descriptions in the literature about the type of treatments under study. The purpose of our paper is to describe the treatment methods of 3 professional groups in the Netherlands who provide manipulative or mobilizing treatment methods, orthomanual physicians, manual therapists, and chiropractors, and examine whether there are differences in the diagnosis and treatment of nonspecific LBP among them.

If the efficacy of a certain drug is studied in a randomized clinical trial, the dose, frequency of administration, and duration of the treatment are presented to characterize the intervention. But when manual therapy is the intervention, the information is usually minimal. Often references to descriptions in articles, handbooks, or professional

documents are missing. This prohibits not only the distinction between different forms of manual therapy, but also prohibits the application and implementation of the interventions, which are shown to be effective in clinical practice. Therefore, adequate descriptions of the manual therapeutic interventions are urgently needed. These considerations led to our initiative to describe the concepts, contents, and practicalities of the treatments of 3 major professional groups involved in manual therapy in the Netherlands. Because there might be international differences, we only focused on the way Dutch practitioners perform their treatments.

METHODS

The professional groups in the Netherlands were asked to supply information and training material. A profession profile or job profile was obtained from each group, as well as additional information such as patient profiles. Furthermore, books advised by training colleges were perused, and web sites of the professional groups were checked for additional information. This information was supplemented by articles found in international literature.

To check whether the profiles correspond to daily practice, a small group of practitioners were observed while at work. These professionals were chosen by the project team as typical and pure representatives of their disciplines, without applying combinations of therapies from different professional groups. They often were involved in training and education of their professional group in the Netherlands and all were experienced. Visits lasting half a day were made by one of the authors (EAvdV) to 3 orthomanual physicians, 3 manual therapists, and 4 chiropractors.

RESULTS

Description of the Professional Groups

Orthomanual medicine. Orthomanual medicine is a medical profession practiced by physicians who have an additional 3 years of full-time study in practicing orthomanual diagnostic and therapeutic techniques. As a basic principle, orthomanual medicine assumes the symmetrical development of the skeleton. The central idea is that misaligned positions of skeletal components can result in movement limitations and pain.⁸

Emphasis of the orthomanual examination is on the 3-dimensional positions of the vertebrae, pelvis, and ribs in relation to each other.⁹ The pelvis is considered to be the fundamental part of the vertebral column and abnormal positions are assumed to have an impact on the skeleton in its entirety. A declined position of the pelvis is denoted as a pelvis distortion. If the distortion is a recent development, it causes misalignments of the above-located vertebrae. If the distortion persists more than 5 years, those vertebrae fixate in rotated and lateroflexed positions.⁸

Orthomanual medicine denotes a fixed displacement as a misaligned position.¹⁰ Different positions are distinguished, based on the most striking misalignments. These positions form patterns with empirically established regularities.

The objective of the orthomanual treatment is to adjust the misaligned positions and thus to diminish the complaints. The treatment goal is an improved position of the skeletal components, in which misaligned positions are no longer present (source: training manual of orthomanual medicine with no publisher or author known). Furthermore, the pelvis as well as the ribs must be in an optimum symmetrical position. Typical of this treatment is that corrections are made in a specific order. When the correct sequence is used not much force is needed and no levers are used.

Manual therapy. The emphasis of manual therapy is on dysfunctional joints in the broadest sense of the word. According to the International Federation of Orthopaedic Manipulative Therapies, manual therapy is a specialization within physical therapy. In the Netherlands an additional 4 years of part-time training (24 weekends a year) of the theory and practice of manipulation and mobilization techniques is followed after graduation as a physical therapist.

The diagnostic examination and treatment of manual therapy are aimed at pathoneurophysiology and pathokinetics, as well as the recognition and interpretation of tissue and organ-specific dysfunctions on a local and segmental level.^{11,12} During the diagnostic examination, the individual movement system is analyzed while accepting asymmetrical morphology and function, and respecting the related individual preference of function. A biomechanical assessment is used to obtain detailed information of the relevant joints, muscles, and surrounding soft tissue and to determine whether manual therapy will be beneficial.¹³ The assessment includes 3-dimensional tests within or at the limit of the range of motion of the joints.

Manual therapists correlate their findings of the examination with the nature and distribution of the offending symptoms to arrive at a diagnosis and proceed to select a course of treatment. Treatment aims at stimulating natural recovery and adaptive processes in relation to functionality of movement in a biopsychosocial perspective. Furthermore, objectives of the treatment are to diminish pain, to influence and increase the level of activities and participation of the patient, and to prevent recurrences.^{11,14}

Chiropractic. The treatment of disorders of the neuromusculoskeletal system is the heart of chiropractic.¹⁵ The chiropractor completes a 6-year full-time education in chiropractic college to become a doctor of chiropractic. The emphasis is on manual techniques, including joint adjustment (chiropractic manipulation). Moreover, the curriculum includes substantial education in the use of radiography.^{15,16}

The profession, defined by the World Federation of Chiropractic as a health profession, is concerned with the diagnosis, treatment, and prevention of disorders of the

musculoskeletal system and the effects of these disorders on the function of the nervous system and general health.¹⁵ This implies a broad scope, comprising the etiology, pathogenesis, diagnostics, therapeutics and prophylaxis of functional disturbances, pathomechanical states, pain syndromes, and other neurophysiologic effects.¹⁷

For a treatment plan, guidelines or standards from literature will be used when relevant.¹⁷⁻¹⁹ The chiropractor works toward normalization of disturbed physiology, recognizing that health problems can occur because of psychosocial, physiological, and mechanical factors from inside or outside the body. Another objective is to enable the body to use its capacity for self-recovery. The therapeutic approach may incorporate dynamic manual treatments, designed to release joint restrictions directly or indirectly (reflexively), and other procedures designed to enhance the healing process. These procedures include reflex techniques, exercise, physiological therapeutics, nutritional supplementation, and counseling about exercise, posture, diet, relaxation, and stress reduction.¹⁷

History Taking for LBP

The 3 professional groups use the regular method of taking a history with standard questions. Contraindications and other pathologies, which can influence the treatment or need for other treatment, are examined. To some extent, there is a difference in emphasis and extensiveness of the history taking between the professional groups. Patients who visit a manual therapist are referred by their general practitioner or other health care provider, whereas for treatment by chiropractic and orthomanual physicians no referral is needed. Thus, these professionals have a broader diagnostic scope to distinguish nonspecific LBP from other disorders.

Orthomanual physicians concentrate on nonspecific and specific disorders of the musculoskeletal system, particularly of the spine. Manual therapists strongly focus the history taking on the functioning of the musculoskeletal system including possible psychosocial influences. Chiropractors focus on the neuromusculoskeletal system in relation to the patients' health in general.

Diagnostic Examination for LBP

Orthomanual medicine. The practitioner uses palpable points of reference for the orthomanual examination, such as the posterior inferior iliac spine and anterior superior iliac spine, the iliac crest, margins of muscles, spinous processes of the vertebrae, and others. The anatomical axes and planes serve as a frame of reference and are used to describe the positions and possible malpositions of the vertebrae, pelvis, and ribs, with regard to their normal anatomical position and their normal range of movement. The results of the examination are recorded in a notational system specific to orthomanual medicine (source: training manual, unknown publisher or author).

For inspection and palpation, the predominant position is when the patient sits on the table in a forward bent position. This enables palpation of points of reference in a posture in which surrounding muscles are relaxed, without disturbance from possible discrepancies in leg length. A prone or supine position is used for additional information or verification. For the assessment of the position of the pelvis, the level of the iliac crest and the positions of the iliac spines are palpated, and it is noted whether or not the pelvis is raised on one side. The examination of the spine and ribs is carried out by 2-sided, simultaneous palpation of the spinous and transverse processes and ribs. Misaligned positions of vertebrae can cause deviations of ribs relative to a horizontal line, resulting in different intercostal spaces and a high or low position of those ribs.

Options for additional tests are active, passive, and resistance tests; passive movements through the range of motion; extensive neurologic tests or medical tests; and imaging techniques for underlying or other problems. Different combinations of misalignments of vertebrae and ribs may point to different malpositions in vertebral joints, costovertebral or costocorporeal joints. Some malpositions can only be diagnosed after the correction of other malpositions.

Manual therapy. The diagnostic examination focuses on joint function, stability, movement patterns, range of movement, and the severity of disorders. The skills and disabilities of the patient and the relationship between stress on the body of the patient and its ability to endure stress are also assessed.¹¹ As any structure innervated by pain fibers can be a potential source of symptoms, a biomechanical assessment of tissues that either underlie or refer to the symptomatic areas is performed.¹³

The position of the joints is considered to be essential to the performance of diagnostic tests. Manual therapists use different basic positions, such as standing, sitting, supine, prone, or side posture.¹¹ The joints are tested and treated from these positions in a position different from neutral. Palpation is directed to specific pain locations such as tender points, myofascial trigger points, and tendomyositis.¹¹ Techniques are static palpation of the paraspinal tissue and osseous structures, and palpation of passive accessory and passive intervertebral movements. The results yield information as to tenderness (pain), restricted intersegmental motion (stiffness), and spasm (muscle tension).¹³

The extensive amount of neurologic tests used can be grouped into tests for syndromes, sensibility, and segmental function. In practice, manual therapists do not perform a complete neurologic evaluation, but choose appropriate tests.

The biomechanical assessment includes general, regional, and segmental techniques.²⁰ General techniques consist of the execution of active movements with instruction. Regional and segmental assessments comprise several techniques. Guided active, resistance, and provocative tests are carried out. Provocative tests consist of the execution of spring action with gapping and compression; traction in the

cervical region; and rotatory tests in the thoracic and lumbar regions.²⁰ Manual therapists use specific combinations of techniques such as rolling/gliding and traction/translation.^{14,20} Objectives of the assessment are determination of abnormal maneuvers in a movement pattern, resistance and quality of end-feel, joint play, and effects on other segments. In this way, information on willingness to move, strength, coordination, and pain is obtained.

Chiropractic. The standard physical examination is conducted to establish a clinical diagnosis from a differential diagnosis and to determine whether chiropractic care is indicated for the patient's complaint. First, the patient's general health is examined with tests that include blood pressure, gait analysis, standing balance, and neurologic tests. Then, the chiropractor looks at the area of the complaint(s). This comprises inspection; observation; palpation; active and passive range of motion; provocation tests; and orthopedic, neurologic (eg, reflexes, pin-wheel testing), and vascular examination.²¹ The components of the physical examination, which are not related to the musculoskeletal system, are only practiced when necessary.¹⁶

Testing of the low back is carried out with the patient standing, seated on a motion palpation stool, prone, and supine. The patient is seated to stabilize the pelvis or in a standing position with the shoulders or neck stabilized by the chiropractor.

The examination of "joint play" is customary. Joint play can be defined as the degree of passively allowed distension, which cannot be achieved through voluntary effort.¹⁷ The patient is not able to influence this small accessory movement within the joint. Besides standard chiropractic procedures, motion palpation is used to detect restricted joint play and the end-feel per segment.^{17,22} This examination for limited motion is done by carrying the segment through its normal range of motion. The palpating fingers should be on the active and at least 1 adjacent segment. Then, movements are carried out on the spine by using various parts of the hand or fingers. The movements consist of pushing and releasing pressure, which gives an impression of the mobility of vertebrae during flexion, extension, rotation, and lateral flexion. A similar procedure can be performed on the sacroiliac joint with the patient standing or in prone position.

The use of imaging techniques, such as radiographs, computed tomography scan or MRI, and blood tests is additional to the diagnostic examination. Radiographs can be taken by the chiropractors themselves.²³ Radiographs are used for the examining for (contra)-indications for chiropractic treatment or for predicting the prognostic outcome of treatment and for localization and type of treatment.^{3,16} Often it is possible to use previously taken radiographs requested from the general practitioner or medical specialist.

Treatment of Nonspecific LBP

Treatment of a patient with LBP comprises several sessions. In orthomane medicine, usually 4 to 6 sessions

of treatment are needed, once a week at maximum.⁸ The Dutch guidelines for manual therapy state a number of 6 sessions per indication to be sufficient for recovery of function of the joint.¹⁴ Chiropractors use 4 to 12 sessions of treatment before the practitioner switches to maintenance care or the prevention of recurrences, if indicated.¹⁶ The length of time in between sessions is not prescribed for manual therapy or chiropractic. In practice, 1 session per week is customary, although there is a large variation between practitioners.

Orthomanual medicine. The positioning of the patient is focused on the relaxation of muscles, opening of the joint, or a slight form of traction. Most frequently used is a prone position or side posture, with the head on a pillow and both knees pulled up or one knee pulled up, and the other leg stretched out.⁹ Variations and slightly different positions are practiced for treatment of a specific location or to create traction or a force in a desired direction.

Orthomanual medicine practitioners label their therapeutic actions as manipulation. However, according to the standard definitions of manipulation and mobilization it should be labeled as mobilization. It can be described as a direct force, used on an osseous structure of the spine with a malposition or malfunction, using a short lever within a segment in the direction of the natural position or function. The force applied is pulsating or with a fast impulse. Orthomanual physicians do not apply high-velocity thrusts (HVTs). The length of time spent on orthomanual mobilizations during a treatment session is considerable and almost no other techniques are used. Some practitioners use rocking movements or vibrations preceding the mobilization.

The mobilization is carried out by pushing with the thumb, forefinger, or hypothenar against a spinous or transverse process.¹⁰ While adjusting the pelvis or ribs, different parts of the hand are used. Orthomanual physicians use different forms of mobilization: with the fingers, with other parts of the hand, with a drift or by pushing the vertebra in the “wrong” direction, resulting in a spontaneous replacement. The use of the drift supplies an axial force; the use of the thumb or other fingers supplies a more radially directed force.

The treatment sequence per session of pelvis, vertebrae, and ribs is set down in strict, experience-based guidelines. In practice, there is a limit to the number of adjustments possible in one session.⁹ Seldom will the practitioner decide to deviate from the guidelines. The guidelines prescribe the moment of treatment of a skeletal component in a particular session out of the series, the sequential relation to other skeletal components, and the number of vertebrae or ribs that can be treated per session.

Manual therapy. The patients’ positioning is focused on obtaining a nonneutral joint position.^{11,14} Most positions are used to create space in the joint. Sometimes traction is performed.

Manual therapists use a multitude of techniques. Customary are myofascial techniques, stretching, instructions,

exercises, and advises in activities of daily living. Manual techniques specific for manual therapy are predominantly mobilizations.¹¹ Mobilizations attempt to recover the full, painless functioning of joints by rhythmic, repeated passive movements.²⁴ There are 2 principal mobilization techniques: passive oscillatory movements within the restricted physiological range of the joint, and sustained stretching with or without oscillations at the limits of the range.¹³ The techniques consist of traction, translation, rolling, rocking, gliding, and spinning movements, tilting movements, and compression.¹¹ Characterizing features of mobilizations are the movement section, range of motion, number of repetitions, velocity of action, rhythm, and handling of the body. Variability in the use of these parameters results in variation of intensity of the treatment. During the application of mobilizing techniques, patients can report on the effects, thereby putting the action within their control.

Manipulation is a passive maneuver in which a specifically directed force is applied to vertebral articulations. It is a precise, single, and fast movement with small amplitude and a regional or localized effect, dependent on the positioning of the patient. The movement is not necessarily forceful and is finished before the patient can stop it.²⁴ The lack of the ability to stop the application by the patient is a difference between mobilization and manipulation.

A manipulation can be delivered in 2 forms: long-lever manipulations and short-lever manipulations. Long-lever manipulations consist of a high-velocity force exerted on a point of the body some distance away from the area where it is expected to have its beneficial effect. Short-lever manipulations are HVTs directed specifically at an isolated joint.¹³ In a survey, the use of one or more HVT techniques was reported by 36% of the practitioners during every session and intermittently by 40%.²⁵

Manual therapists use neuromuscular techniques as well. These muscle energy techniques use contractions at various intensities from controlled positions in specific directions against a distinctly executed counterforce. Proprioceptive neuromuscular facilitation uses specific manual contact to enhance the direction, strength, and coordination of a motor response.¹³

In general, manual therapy is directed primarily to the complaints, particularly the main complaint. In the Dutch guidelines, the treatment sequence of disorders is not prescribed.¹² In practice, techniques with a neuroreflexive effect will be used first, followed by mobilizations with increasingly specific effects.¹⁴

Chiropractic. Patients are treated in supine position, side posture, prone position, with or without the use of pads or supports to “open” the joints.^{26,27} Chiropractic treatment comprises manipulation, mobilization, exercises, and instructions for rehabilitation, as well as advice, preventive instructions, and information.¹⁵ In the Netherlands, chiropractors also often use Cox flexion-distraction technique, trigger point therapy, and traction. Indirect functional

approaches, such as cutaneous reflex techniques, vibration, isometric or isotonic contractions, or massage, are often used when the cause for fixation is determined to be essentially muscular or when any form of manipulation would be contraindicated.¹⁷

Manipulation or HVT technique is the most characteristic action of chiropractors.¹⁵ This technique is the application of a specific pressure or force in a specific guided direction on a blocked joint. It is a short, direct, thrusting movement, acting on a spinous or transverse process, which is used as a lever.¹⁵ Chiropractors report the use of the HVT technique “often” to “always” in a session.¹⁶ In the practices observed for this study, HVT is applied singularly or only a few times per session.

There is an extensive amount of variation of manually or mechanically applied interventions within the range of manipulation and mobilization techniques. Various parameters characterize the techniques, such as applied force (low, medium, high), duration of the force (brisk or sustained), amplitude or distance of articular motion (short, medium, long), and direction of drive (straight, oblique, or curving to the articular plane). Furthermore, techniques have a slow, moderate, or abrupt thrust onset.¹⁷

Several different thrusts are practiced by chiropractors. Recoil thrusts are performed with the use of the spring support of the table, in which the tension is released and the hands recoil away from patient’s spine. For a body-drop thrust, the adjuster uses his body weight in a dropping movement. Multiple thrusts have a gradual increase in force and permit the application of a force equal to or greater than used in a single thrust. Extension thrusts are a distraction of joint surfaces and elongation of soft tissues, so that articular pressure is reduced to a minimum at the moment of joint movement. Rotatory thrusts apply a lateral force on the contralateral side of a lateral flexion fixation. Leverage moves use counterpressure or contralateral stabilization.

The main complaint will be treated first if the patient presents with several disorders. Treatment of remaining complaints follows in order of priority or, if possible, simultaneously.¹⁵ Active and passive care in relation to the participation of the patient is included. Active care, such as exercises, rehabilitation, and lifestyle adaptation, is completed along with passive care focused on relaxation, reduced muscle tension, and relief from pain.

DISCUSSION

The 3 Dutch professional groups in this study resemble each other with their strong emphasis on diagnosis, the explicit construction of a treatment plan, and the practice of a number of manipulative or mobilizing techniques during treatment.

The differences become apparent when looking at the basic principles and objectives of the professions. Ortho-

manual physicians primarily focus on the abnormal posi-

tions of components of the skeleton, and then the realization of optimal symmetry in the spine. Manual therapists aim at disorders of the musculoskeletal system and accept asymmetry and an individual preference of function. Chiropractors focus on the musculoskeletal system as well as the nervous system in relation to the patients’ health in general. The differences between the 3 professional groups in the history taking are less than in the techniques of diagnostic examination (Table 1). Ortho-

manual medicine considers inspection and palpation as the most important diagnostic methods, focused on determination of malpositions of vertebrae and other osseous structures. Manual therapy focuses the diagnostic examination on determining disorders in function of anatomical structures and joints. The diagnostic examination of the chiropractors resembles that of manual therapy to a large extent, but chiropractors focus on the patients’ health in general, using a medical diagnosis where relevant, in part for the exclusion of contraindications.

Each professional group has a treatment plan in which several techniques can be included. Treatment evaluation occurs after each session, based on the patients’ problems, disabilities, examination results, side effects of therapy, dedication to therapy, and reconsideration of the diagnostic process. Readjustment of this circular process and the resultant treatment plan is performed in all 3 professional groups. Common methods such as giving advice or instructions are not specific either. Table 1 presents the aspects of the methods and techniques. Ortho-

manual physicians practice mainly the ortho-

manual mobilization technique as described by the professional group. Manual therapists and chiropractors practice multiple manual techniques. Consequently, ortho-

Table 1. Comparison of characteristics of manual treatment by 3 professional groups

	Orthomanual therapy	Manual therapy	Chiropractic therapy
Primary focus	Symmetrical development of the skeleton	Disorders of function of the musculoskeletal system, including psychosocial influences	Disorders of function of neuromusculoskeletal system and patients' health in general
Education	Three years of training in mobilization skills and background of spinal disorders after graduation as medical doctor	Four years of training in manipulative and mobilizing skills and background after graduation as physical therapist	Six-year training in chiropractic college focused on medical knowledge, emphasis on manual techniques. X-ray use is trained.
Diagnostic examination			
1. Objectives	1. Three-dimensional positions of vertebrae, pelvis, ribs	1. Joint function, stability, movement patterns, range of movement, and the severity of disorders	1. Patients' health in general and area of complaint
2. Patients' position	2. Sitting in forward bent position, prone or supine	2. Standing, sitting, supine, prone, or side posture; joints in nonneutral position	2. Standing, sitting, supine, or prone
3. Palpation points	3. Osseous structures	3. Palpation of pain locations	3. Motion palpation
4. Palpation techniques	4. Two-sided simultaneous palpation	4. Static palpation and palpation of passive accessory and intervertebral movements	4. Joint play and end-feel
5. Biomechanical assessment	5. Little or no functional assessment	5. General, regional, and segmental techniques with and without activity of the patient and provocative tests	5. Tests for joint function
6. Additional tests	6. Active, passive, and resistance tests, passive movements, extensive neurologic tests, medical tests, imaging techniques	6. Neurologic tests	6. Orthopaedic, neurologic, and vascular examination and radiography
Treatment			
1. Objective	1. Adjustment of deflecting positions of components of the skeleton	1. Adjustment of dysfunctional joints; stimulating natural recovery and adaptive processes	1. Normalization of disturbed physiology, release joint restrictions, stimulating self-recovery
2. Patients' positions	2. Prone or side posture with traction on the joint	2. Nonneutral position	2. Supine, prone, or side posture, to open joints
3. Manipulation techniques	3. No manipulations	3. Long- and short-lever HVT techniques, variable force	3. HVT techniques: recoil thrust, body-drop thrust, extension thrust, rotatory thrust, variable force
4. Mobilization techniques	4. Mobilizations of osseous structure using fingers, hand or drift, with a low and often pulsating force	4. Passive oscillatory movements and sustained stretching; traction, translation, rolling, gliding, spinning movements, tilting, and compression	4. Various techniques, for example, Cox flexion-distraction technique, trigger point therapy, traction, cutaneous reflex techniques, vibration, massage, and various other techniques
5. Scale of use	5. Only orthomanual mobilizations	5. Predominantly mobilizations, HVT to a moderate extent	5. One or a few HVT per session, in 95% of all sessions
6. Neuromuscular techniques	6. Not used	6. Regularly	6. Incidentally
7. Treatment sequence	7. Set down in experience based guidelines	7. Main complaint with priority	7. Main complaint with priority, others simultaneously if possible
8. Number of sessions	8. Four to six sessions, once a week	8. Six sessions	8. Four to twelve sessions
9. Protocol	9. Fixed protocol	9. Protocol is mostly used, argued deviations	9. Protocol is used where relevant, therapy patient-adapted

Considerable differences in manipulation and mobilization techniques are found in amplitude and velocity. Orthomanual physicians practice the least amplitude by “pushing” against a vertebra without using a movement section. Their concept of velocity applies to the application of force or pressure and implies the use of an impulse. It is a pulsating technique applied a multiple of times. It is not a HVT technique. Variation in the orthomanual mobilization is obtained by nuances in force and direction of application.

The HVT technique of manual therapy and chiropractic is a singularly applied technique where the thrust may vary in amplitude but applied with high velocity. There are a number of different techniques and the chosen HVT technique can be different within manual therapy and chiropractic. The chosen technique depends to a large extent on the preferences of individual practitioners.

Apart from the manipulations and mobilizations, considerable difference in the application of remaining interventions between orthomanual medicine compared to manual therapy and chiropractic is noted.

In addition to the techniques used, the chosen sequences during the treatment contribute to the contrast between the professional groups. Orthomanual physicians use fixed sequences and procedures for treatment. Manual therapists initially treat the main complaint, but the methods of treatment, the chosen mobilizations, manipulations, or other interventions depend on the degree of disorder and the way the patient is handling the complaint. Chiropractors treat the main complaint with priority and other disorders sequentially or more or less simultaneously.

CONCLUSIONS

In summary, we conclude that there are relevant differences in diagnostic techniques between orthomanual medicine compared to manual therapy and chiropractic in the Netherlands. No substantial differences between manual therapy and chiropractic are found between available diagnostic tests and techniques, although there is a difference in the extent of their use. However, the treatment techniques are clearly different between the 3 professions.

Most systematic reviews of the efficacy of manipulative and mobilizing therapy have paid little attention to diagnosis and treatment methods applied in the included studies. This might be due to the inadequate description of the protocol and the interventions reported.²⁸ To properly document the effective component in each study, detailed descriptions of the diagnosis and treatment methods should be included.

We invite other professional groups and manual therapists in other countries to describe their treatments in similar detail. Through an appropriate description of the interventions used in research studies on manual therapy, a better examination and understanding of the differences in the efficacy of manipulative and mobilizing therapies can be achieved.

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