

## Credibility of manual therapy is at stake ‘Where do we go from here?’

I read the recent Editorial by Karas et al. titled ‘We need to debate the value of manipulative therapy and recognize that we do not always understand from what to attribute our success’, with great interest and appreciation [1].

The call for debate on the value of manual therapy was of great interest to me. Based on available evidence on the reliability and validity of passive manual examination of joint functions and the effectiveness and efficacy of manual interventions, I have also posed a similar question, asking what the future holds for manual therapy.

### Simple explanation

Finding an answer to this question quickly leads us, as befits the scientist, to systematic review articles and Cochrane Reviews. The latest updates of the Cochrane reviews on manual therapy as a standalone treatment in patients with low back pain date from 2011 [2] and 2012 [3], and in the case of patients with neck pain, from 2015 [4]. Briefly summarized, these reviews conclude that manual therapy in patients with low back pain is not superior to any other first line treatment, and in patients with neck pain, not superior to exercise therapy or oral medicine (analgesics).

In this context, an article by Artus and colleagues is particularly instructive [5]. Based on results from a large number ( $n = 118$ ) of Randomized Controlled Trials (RCTs), these authors show that the trend in pain reduction and improvement of functioning in patients with low back pain is virtually identical, regardless of the type of first-line treatment. The same trend can be observed in patients with neck pain [6]. The most simple and logical explanation for this finding is that improvements in individuals with low back pain and neck pain are simply due to the natural history of these conditions.

### Meaningful explanation

In their Editorial, Karas et al. state that the underlying mechanisms of manual therapy need to be discussed [1]. Passive manual examination and treatment of joint functions has always been at the very heart of the mechanical concept in manual therapy [7]. Passive assessment of the quantity (e.g. range of motion and joint play) or quality (e.g. end-feel, resistance or stiffness) of joint function is seen as the basis of treatment decisions [8,9]. Reflection on assumptions concerning the mechanical mechanisms of manual therapy in relation to mobility and functional disorders, passive movement, and the therapeutic mobilization and manipulation

of joints is essential to the theoretical concept of manual therapy [10]. The underlying mechanisms of manual therapy are complex, multifactorial and poorly understood.

There is also substantial evidence that alternative explanations for the effects of manual therapy, in which neurophysiological mechanisms play a central role, are preferable to mechanical explanations [11–14]. A considerable amount of research is currently focused on examining these ideas and the findings provide a meaningful alternative explanation for the effects of manual therapy [11–14]. It is essential that clinicians not only follow the ongoing paradigm shift from the former ‘impairments of facet joint mobility’ to the contemporary paradigm of ‘mechanical joint stimulation to influence nociceptive processes within the nervous systems’, but that they themselves also develop and investigate new theories. Scientific data suggest that the concept of mechanically eliminating impairments of facet joints and joints of the extremities as the ultimate goal of manual therapy, aimed at improving the mobility of joints, is leading up a blind alley [7–9]. Continuing to cling to invalid paradigms will not improve the credibility of manual therapy. *New avenues therefore have to be explored in order to justify the use of manual therapy.*

### Routinely collected data

Although many evidentiary gaps concerning manual therapy might be better addressed by RCTs of improved quality, studies that use routinely collected data (RCD) represent a good alternative. RCD offers several advantages and disadvantages. Data collection under real-life practice conditions maximizes representativeness and generalizability, minimizes costs and effort, and allows the capture of information from large populations and many clinical practices over long time periods [15].

A concrete example of RCD is the trend analysis of Dutch primary care physiotherapy over the period 2011–2016 (2016: number of patients,  $n = 23,471$ ; number of participating physiotherapists,  $n = 204$ ; number of primary care practices,  $n = 50$ ) [16]. An example of this trend analysis is the rise in the proportion of patients with low back pain visiting physical therapists and the treatments applied. Massage therapy and physical modalities (such as low-frequency electrotherapy) have declined, while exercise therapy and patient education have expanded, in accordance with Dutch guidelines on Physiotherapy and Low Back Pain published in 2005 and updated in 2013.

To understand how RCD can best be used for manual therapy decision-making, we need to discuss the limitations

of RCTs (the gold standard for studying treatment effects) and whether these limitations can best be overcome in clinical studies through improved quality of RCTs or through optimal use of routinely collected data. RCTs are frequently conducted under artificial conditions that differ from routine care. Cost considerations prohibit large studies that would be informative for subgroup analysis. Despite the inherent limitations of interpretation of RCD, these data could plausibly act as preliminary evidence concerning manual therapy and might be used to improve the design of future RCTs. For studies using RCD, the Reporting of studies Conducted using Observational Routinely-collected Data (RECORD) statement sets out standards of reporting [17]. This statement includes 13 items, such as methods of selecting the study population, details of any validation of codes or algorithms, and a list of codes that are used to classify interventions and outcomes. To the best of my knowledge, there are currently no examples of the use of RCD in manual therapy. *In conclusion, while improvement of RCT quality is an important goal, it may be better to broaden our focus to include improvement of accurate documentation in patient records.*

### Treatment without reliable and valid passive manual examination of joints

Research suggests that passively performed segmental movement examinations of the cervical and lumbar spine, and passive movements in upper and lower extremities, show an unacceptably low reliability and validity [18–20]. The value of passive manual examination of joint functions within clinical diagnostics has reached an impasse, further threatening the validity of this approach.

*The large majority of studies investigating the reliability of passively performed movement examinations have a design that relies on the outcome of a single test or use of a univariable approach, thus neglecting the multivariable character of the clinical reasoning process [18–20].* One approach to overcoming this impasse in manual therapy is by introducing analytical strategies and applying them based on clinical reasoning, with the context of the patient as the starting point [21]. Manual therapists apply, similarly to many care professionals, a hypothetical-deductive form of clinical reasoning, combined with a narrative way of collecting data during history taking and physical examination [22]. Passive manual examination of the joints is therefore in no way a single test, but is part of a multivariable, hypothesis-based diagnostic reasoning and decision-making process. Manual therapists in Canada reported a similar approach to diagnostic reasoning and decision-making with regard to the application of manual mobilization or manipulation of joints [23].

The consequence of persevering with invalid single tests of joints is that manual therapeutic interventions are conducted without the support of an appropriate diagnostic reasoning and decision-making process. This applies not only to the individual treatment of patients but also to patients who participate in an RCT. *Beyond the generally applicable inclusion and exclusion criteria, manual therapy interventions based on a broadly accepted diagnostic clinical reasoning and decision-making process are rarely considered*

*as an indication for participation in RCTs that purport to investigate the effectiveness and efficacy of these interventions.* This is in itself a peculiar course of events in which the effectiveness and efficacy of an intervention is examined without a prior adequate indication of manual therapy interventions.

Furthermore, the effectiveness of manual therapy is often expressed in primary outcomes such as pain relief (i.e. Visual Analogue Scale [VAS]), functioning (i.e. Neck Disability Index [NDI]), and in secondary outcomes such as global perceived effect (GPE), coping (i.e. Pain Coping Inventory [PCI]), and fear avoidance (i.e. Fear Avoidance Beliefs Questionnaire –[FABQ]), rather than in specific outcomes such as range of motion, muscular coordination and stability, tenderness of myofascial trigger points, and cervical proprioception, which are representative of the application of manual therapeutic treatment techniques [4,6,24,25].

### Preferences and expectations

In addition to paradigm shifts in conceptual explanations of underlying mechanisms and in diagnostic clinical reasoning and decision-making, other factors appear to play a role in the outcomes of manual therapy interventions. These appear to be mostly psychological factors such as preference and expectation [26]. In an RCT, patients are assigned by chance to one of the study groups without taking into account a patient's preference for a particular treatment, and without assessing expectations regarding the course and outcome of the proposed treatment. For example, an individual might have a preference and positive or negative expectation of outcome based on an earlier, comparable episode of complaints. A patient might therefore expect a positive outcome with a manual therapy intervention, but still be assigned to another group in an RCT. *A high or low expectation of recovery is a recognized prognostic factor for recovery in patients with neck pain seeking manual therapy intervention [27].*

Methodologically this procedure can be justified, but practitioners wrestle with these methodological principles in daily practice, and preference and expectations, in addition to attitudes and beliefs, apply equally to the manual therapist [28–31]. When treating a patient with low back pain or neck pain, a physiotherapist who follows or has received training in manual therapy is likely to prefer a manual therapeutic treatment, and, in turn, expect a favorable outcome. The manual therapist is often unaware of whether this preference and expectation match that of the patient, and vice versa. If possible, the preferences, expectations, beliefs and attitudes of both therapist and patient should be discussed before starting treatment so that cognitive dissonance between patient and manual therapist can be avoided [32–34]. Cognitive consonance about the high or low expectations of recovery is one of the conditions for an optimal treatment outcome.

The degree of influence of these and other psychological factors on the result of individual treatment (individual outcome) on the one hand, and the outcome of RCTs (average outcome) on the other, is not yet known. It is assumed that these factors contribute both individually, and at the group level, to the non-specific effects of treatment, and thus to a

more or less generally applicable trend in outcome, regardless of the nature of treatment.

## Obstacle to implementation - terminology of manual therapy

It has been my privilege to follow the scientific advancement of manual therapy for the last three decades. Despite an ever-increasing number of peer-reviewed articles, no first-line treatment has emerged that is superior for treating patients with low back pain and neck pain. One of the obstacles to implementation of the best available evidence in primary care practice is the lack of description of manual therapy interventions in an internationally accepted nomenclature [10]. Ideally, amongst this profusion of research, an emphasis should be placed on data that are specific to manual therapy interventions, including the description of the intervention itself. An interesting proposal for an unambiguous terminology for describing the characteristics of manual therapeutic techniques has been made by the American Academy of Orthopedic Manual Physical Therapists [35]. Recently, international consensus guidelines were drawn up that provide a clear definition of the description 'spinal manipulative therapy' as used in publications on the effectiveness and efficacy of manual therapy [36]. At the very least, this provides us with a clear guide to the content and application of manual therapy, and manual therapy becomes more than just the two words 'mobilization' and 'manipulation', or simply 'spinal manipulative therapy'.

## Manual therapy at the crossroads

Anno 2018, manual therapy stands at a crossroads and its very credibility is at stake. The future does however offer fresh prospects, thanks to the promising application of manual therapy as a mechanical stimulus that triggers a cascade of neurophysiological responses from the peripheral and central nervous system. These responses are considered one of the most plausible explanations for the positive outcomes resulting from manual therapy. A further promising development is explicit clinical reasoning and decision-making in the context of a 'manual therapy assessment', combined with systematic registration of practice data using the RECORD statement.

*In conclusion, these are clearly changing times, and outdated concepts and paradigms for which there is no scientific evidence must now make room for the new.*

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