Making Inhibition Measurable Between Two Somatic Dysfunctions

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Curriculum vitae

Kathy Lemburg was born in Hamburg in 1976.
After graduating from high school, she began her training as a physiotherapist in 1996.
From 2002 to 2007 she studied osteopathy at the Osteopathie Schule Deutschland (OSD).
This was followed by a second basic study program at the College Sutherland Hamburg from 2010 to 2014.
Since 2015 the author has been teaching Strain-Counterstrain, GOT, Integration and Clinic in the undergraduate program and since 2024 Strain-Counterstrain and inhibition in postgraduate courses.
From 2016 to 2018, the author completed her training in equine physiotherapy and osteopathy.
Kathy Lemburg has been teaching Strain-Counterstrain and inhibition for equine postgraduate osteopaths since 2020.
From 2022 to 2025 she has been studying for a Master of Science degree at the Vienna School of Osteopathy and the Danube University Krems.
Kathy Lemburg has been working in her own practice in Hamburg since 2005.

Abstract

Aim

The aim of the study is to prove the relationship between two somatic dysfunctions in order to structure and customize osteopathic treatments through inhibition.

Research design

The study is designed as basic research, as no studies with similar measurements have been conducted in osteopathy to date. The number of participants is 25.

Methods

The participants are individually examined osteopathically. This examination is based on Chauffour's “Lien Mechanique Osteopathie” (LMO) system and extended to include the tender points (TePs) of Strain-Counterstrain (SCS). In the next step, all TePs found are inhibited against each other by palpation for pressure pain. As a result of this inhibition, only the strongest and the second strongest TeP remain on the whole body, which in turn are inhibited against each other to decide where the algometer should be applied for measurement. The Pressure Pain Threshold (PPT) is measured at the second strongest TeP, following the example of Conditioned Pain Modulation (CPM). The first measurement is conducted without any impact on the strongest TeP; in the second measurement, the pain threshold is measured again while the strongest TeP is palpated for pressure pain.

Results

The PPT increased by 47.95% from the first to the second measurement.
This corresponds to $p < .002$***.

Pain intensity, measured using the verbal numerical pain scale (vNSS), decreased by 11.93%. This corresponds to $p = .022$**.

Discussion

The highly significant improvement in PPT and the significant improvement in pain intensity indicates that testing the relationship between two TePs may be helpful in determining the dominant somatic dysfunction and customizing treatment for individual patients.

Keywords: inhibition tests, tender points, pressure-pain threshold, nociception, algometer

Introduction

The aim of the study is to prove the relationship between two somatic dysfunctions in order to structure and customize osteopathic treatments through inhibition. Searching for the dominant somatic dysfunction (SD) is basic for a person-centered osteopathy (Tozzi et al., 2017; Tramontano et al., 2021). Inhibition tests (ITs) are often used to balance between two dysfunctions (Bicalho et al., 2020; Chauffour et al., 2010).

The central question is: How can we measure that inhibiting two dysfunctions is performing the way we assume it would. What are possible underlying mechanisms and which details in anatomy and physiology make inhibition work. .

Tenderpoints (TePs) of strain counterstrain (SCS) provide altered tension, asymmetry, restricted range of motion and tissue texture changes (TART) (Dvorak et al, 2008). With these characteristics they represent an SD and provide features of all five of the five models (Tozzi et al., 2017).

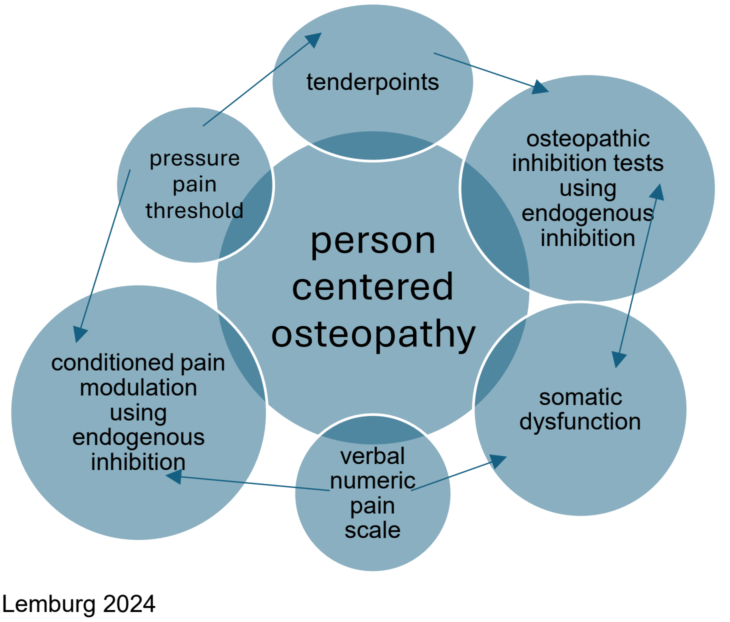
Quantitative sensory testing (QST) as psychophysical assessment was performed on TePs with the result that especially Aδ- and C-fibers are present in them (Lewis et al., 2010). Research has used measurements of the pressure pain threshold with algometers in TePs in different studies (Hutchinson, 2007; Lewis et al., 2010; Meseguer et al., 2006; Perreault et al., 2009).

Conditioned pain modulation (CPM) as another psychophysical assessment is performed to examine patients' personal capacity for endogenous pain inhibition (Arendt-Nielsen et al., 2018; Le Bars & Willer, 2010; Youssef et al., 2016). Measuring the PPT is the most used method with good validation in determining endogen inhibition (Ibancos-Losada et al., 2020; Kennedy et al., 2016).

Verbal pain scales are valid in common and in use with TePs (Karcioglu et al., 2018; Wong & Schauer, 2004)

Figure 1:

all elements of this study



Source: Kathy Lemburg 2024

Material and Methods

The study is designed as basic research, as no studies with similar measurements have been conducted in osteopathy to date. The number of participants is 25.

Inclusion criteria are any symptoms in the musculoskeletal system and an age between 18 (Zohsel, 2007) and 65 years (Pinter et al., 2021) to avoid inaccurate pain reports.

Exclusion criteria are use of pain medication (Enggaard et al., 2001; Ruan et al., 1996), high consumption of coffee or alcohol (Overstreet et al., 2018; Thompson et al., 2017), as well as fresh trauma or high stress levels (Wiech & Tracey, 2009).

Process

The participants are individually examined osteopathically. This examination is based on Chauffour's "Lien Mechanique Osteopathique" (LMO) system (Chauffour et al., 2010; Hafen, 2019) and is extended to include TePs.

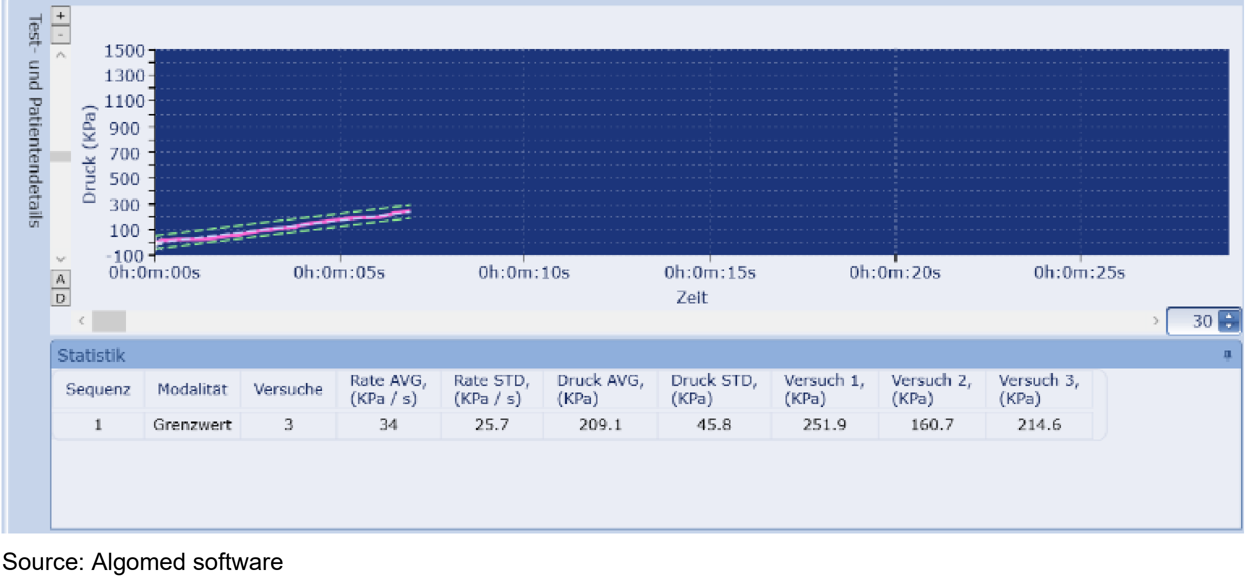
In the next step, all TePs found are inhibited against each other by palpation for pressure pain. As a result of this inhibition, only the strongest and the second strongest TeP remain on the whole body, which in turn are inhibited against each other to decide where the algometer should be applied for measurement.

The PPT is measured with the digital algometer from MEDOC at the second strongest TeP.

The patients report the intensity of pain with the verbal numeric pain scale (vNPS) for each measurement of PPT. The first measurement was conducted without any impact on the strongest TeP.

figure 2:

curve of a measurement without inhibition



Source: Algomed software

In the second measurement, the PPT is measured again while the strongest TeP was palpated for pressure pain.

figure 3:

curve of measurement with inhibition

Source: Algomed software

Three measurements give results for PPT and vNPS and the average is taken of these values. The data of both parameters are proven for normal distribution and a two-sided t-test was performed for both.

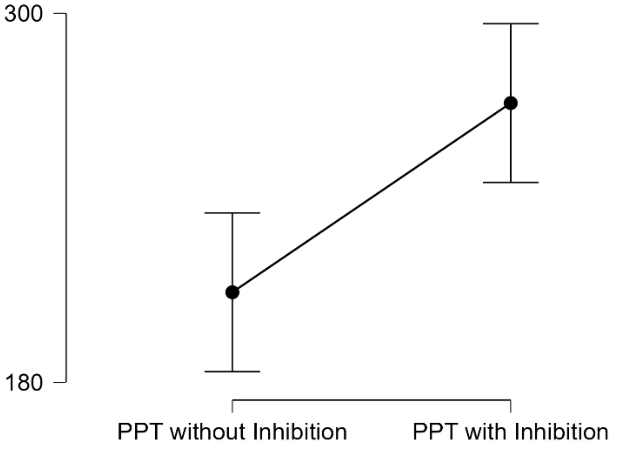
Results

The PPT increased by 47.95% from the first to the second measurement.

This corresponds to $t(24)$ = 3,48 p < of .002*** with a 95 % confidence interval.

figure 4:

PPT without and with inhibition

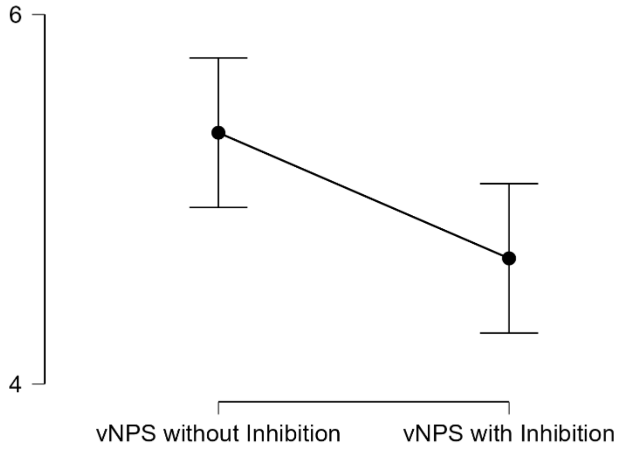


Source: JASP Team (2024). JASP (Version 0.18.3)[Computer software]. PPT in kPa

Pain intensity, measured with the verbal numerical pain scale (vNPS), decreased by 11.93%. This corresponds to a p-value of .022 with a 95 % confidence interval.

figure 5:

vNPS without and with inhibition



Source: JASP Team (2024). JASP (Version 0.18.3)[Computer software].

Discussion

Examining with painful palpation does not suit every patient. There are side effects of wind-up phenomena in some participants (Arendt-Nielsen et al., 2018; Eide, 2000) and even limits in the function of endogen pain inhibition in others. The recommendation is to not repeat this kind of examination in the same way. If repetition is necessary, exclusion criteria should be extended to exclude patients with more than one accident, operations, cancer treatment and migraine, to avoid participants without functioning endogen inhibition (Arendt-Nielsen et al., 2018) or with stronger wind-up phenomena. This could be helpful for the protection of participants and for more consistent data.

Concentrating on reporting pain from one TeP while another is pressed is more difficult than anticipated. The solution is to start pressing the strongest TeP 10 seconds before starting to measure the PPT. After 5 seconds the first pain fades and it is possible to concentrate on the pain of the algometer measurement. Reasons for this first reaction can lie in different possible biochemical or neurophysiological backgrounds (Peng et al., 2001a; Schleip, 2003a, 2003b; Willis, 1999).

The dorsal-root-reflex with secretion of gamma-aminobutyric-acid (GABA) is one possible mechanism (Peng et al., 2001b; Willis, 1999). Schleip (Schleip, 2003a, 2003b) suggests a different possible mechanism. Particularly the ruffini-corpuscels react on tangential pressure and convey relaxation using the γ-motoneurons. Fascia is rich in interstitial receptors and myofibrils. The autonomic nervous system (ANS) could lead to the relaxation of this myofibrils (Mense, 2021). This first immediate answer could be endogenous pain inhibition organized by the dorsal periaqueductal grey (PAG) (Wright, 1995). It uses noradrenalin and reduces substance p.

Stopping the measurement using the patients' button when the pressure starts getting painful is another challenge for the participants. Perhaps one appointment for training patients before measuring would be useful for more consistent results.

It is certainly interesting that the most painful TePs are found at the feet, while the most common symptom in the population is headaches.
It is an open-box examination with just the documentation of the discovered results. Dvorak and Eisenreich (2008; 2012) suggest to look for quiet TePs that are not located in the most painful areas of the patients conscious perception. Quiet TePs are very painful when palpated, while patients report no pain in that area. Jones (2005, S. 27) noted that it could be useful to look for the strongest TeP independent of the patients' pain perception and to start treating the strongest first.
The regional interdependence model suggests to look for descending or ascending chains (Bialosky et al., 2008; Deal et al., 2020; McCoss et al., 2017). In osteopathy this is a well-known idea, supported by the work of Myers (2022) with his anatomical trains and the latest fascia research.

Conclusion

The highly significant improvement in PPT and the substantial improvement in pain intensity indicate that the relationship between these two TePs is not random, and it could be helpful in determining the dominant somatic dysfunction and customizing treatment for individual patients.
These results are only valid as far as palpation for pressure pain is used. Actual suggestions for the function of osteopathic inhibition are neurophysiological and biochemical processes of the endogenous inhibition called conditioned pain modulation (Le Bars & Willer, 2010).
There are two possible ways of inhibition. The dorsal PAG inhibits using noradrenalin reducing substance p. The ventral PAG uses serotonin to reduce somatostatin.
There are many other and different ways to use ITs (Bicalho et al., 2020). Further research is necessary to measure the validity of other ways to inhibit two SDs. For example, using pressure to explore changes in tension could be examined with a tissue-tensiometer (Buchmann et al., 2007).
Inhibition through position of comfort could be the next step for osteopathic research. A possible explanation for working with this inhibition comes from Standley and Meltzer (Standley & Meltzer, 2008). They found decreasing inflammatory cytokines using indirect techniques.
When all options to inhibit have been properly researched, there could be a ranking of the reliability of inhibition.

Disclosure

The author has no personal financial or institutional interest in any of the materials or devices described in this article.

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