

Diagnosis and Interventional Pain Treatment of Cervical Facet Joint Pain

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Chapter 12

Valorization

In this thesis we define the clinical diagnosis of cervical facet joint pain and explore the effectiveness of RF treatment which is a minimally invasive interventional pain treatment procedure. A major conclusion of this thesis is that two interventional pain treatment strategies for cervical facet joint pain, application of a long acting local anaesthetic at the nerves that innervate the cervical facet joints and RF denervation of those nerves, show a clinical relevant improvement after 6 months in over 50 % of patients (chapter 9).

RF denervation of the cervical facet joints has a longer effect than application of a local anaesthetic alone (chapter 4,10).

How should these findings be translated in terms of valorization ?

Valorization is a broad concept encompassing knowledge transfer from the research sector to other sectors for personal, social and economic value. ¹

The impact of chronic pain represents a huge burden to society associated with high costs; financial and in terms of degraded quality of life for the patients, their family and those immediately around them. ²

Therefore the impact of our findings on the personal (psychosocial) level and on the societal and economic level will be addressed.

Patient level:

The quality of life of patients with chronic musculoskeletal pain is notably reduced. ^{3,4}

More than 1/3 of patients with chronic neck pain are affected in their physical and social functioning. ⁵

Neck pain existing for a period longer than 3 to 6 months is not a self-limiting disease. A majority of patients have persistent complaints. ^{6,7}

The negative impact of chronic neck pain is a burden on the patients but also on their families. Pain and pain-related symptoms can have a profound effect on spousal relationships, caring for family members (children, spouses) and intimacy. Social and recreational activities with friends can become negatively affected. ²

If neck pain persists despite conservative first line treatment, there are only limited medical treatment options. If patients with chronic neck pain are indeed not likely to recover, this is a signal for improvement of diagnosis and treatment to all medical disciplines. ⁸

The prevalence of neck pain in the Netherlands is 14.3 % ⁵

Cervical facet joint pain is one of the possible contributors for neck pain. The prevalence of cervical facet joint pain in the general population is difficult to establish because it is a diagnosis mainly based on history and physical examination by a trained medical professional. For patients visiting a Pain Clinic, the cervical facet joints are considered as a frequent source of neck pain with estimated prevalence rates of 36% to 60 %. ⁹⁻¹²

We define cervical facet joint pain as a clinical diagnosis based on the history, the radiation pattern of pain (axial neck pain without neurological signs), and the sign of paraspinal pain on palpation. The usefulness of diagnostic blocks with local anaesthetics is questioned as we show that local anesthetic blocks may have a considerable long-standing effect. Paraspinal pain on pressure is considered as an important clinical sign for the diagnosis cervical facet joint pain.^{13 14} However “paraspinal pain on pressure“ is ill defined in the literature. We describe a standardized and reliable manual examination procedure to define paraspinal pain on pressure as part of the clinical diagnosis of cervical facet joint pain and to estimate the painful cervical segmental level to target interventional pain treatment for cervical facet joint pain. (chapter 6)

In interventional pain medicine one of the treatment options for patients with cervical facet joint pain is therapeutic cervical medial branch blocks with local anesthetics. RF treatment of the nerves that innervate the cervical facet joints is another interventional treatment modality with a probable longer effect.

High quality effectiveness studies in interventional pain medicine are important to adequately inform and to treat patients based on reliable results, to support medical practice guidelines and to support healthcare decision makers in their resource prioritization.^{15,16}

Health gain after medical interventions is an important goal for patients and treating physicians and an increasingly prominent issue for health organization policies.¹⁷ According to the International Consortium for Health Outcomes Measurements (ICHOM), health gain can best be measured with standardized sets for different medical conditions.^{18 19} However, there is no proposed ICHOM set for neck pain. A by the author adapted set of the standardized set for low back pain is shown in figure 1. In our presented research we registered complications, duration of effect, pain medication, disability, neck pain and quality of life. Both interventional treatment strategies (injection of local anesthetic and RF) decrease neck disability and pain intensity and increase the quality of life. RF treatment decreases the use of pain medication (chapter 9). Therefore, we consider the two described interventional pain treatment strategies as a health gain for patients with cervical facet joint pain with a duration of 6 months or longer.

The Dutch Society of Anesthesiologists (NVA, Nederlandse Vereniging van Anesthesiologie) are implementing registration of Patient Reported Outcome Measures (Proms) for Pain Clinics in the Netherlands.^{20 21} Quality registration systems can compare treatment results and will possibly be able in the future, to reproduce our findings in different Pain Clinic settings.²²

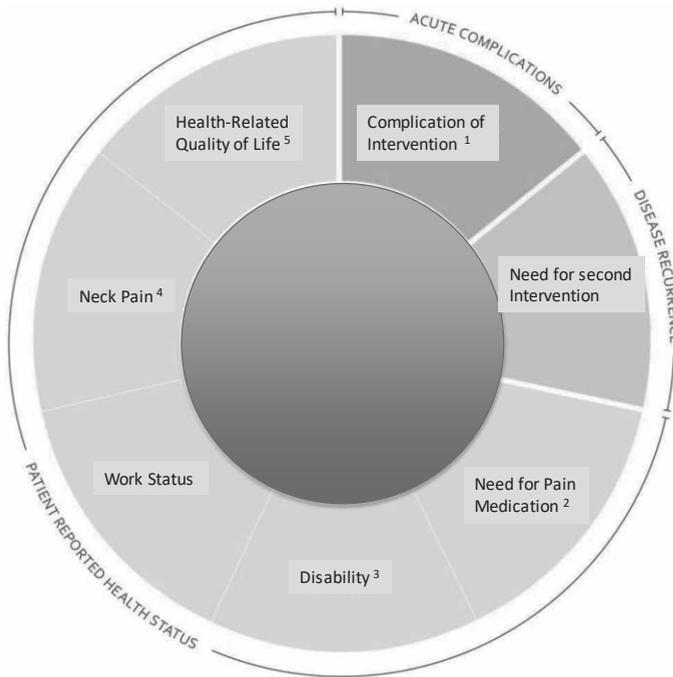


Fig 1. A possible set of outcome measures to determine health gain in daily practice after interventional treatment for cervical facet joint pain. Note that this is not a standardized set of the ICHOM, but a by the author adapted set from the proposed standardized set for low back pain. (see <http://ichom.org>).

The outcome measures as described in the RCT compared to a possible standard to measure health gain

- 1) potential complications are infection, dural leak, nerve or spinal cord damage, hematoma formation. In our RCT (n= 76) no complications occurred.
- 2) Need for pain medication measured with the Medication Quantification Scale (MQS).
- 3) Disability measured with the Neck Disability Index (NDI)
 - Work status: not recorded in the RCT
- 4) Neck pain measured with NRS scale (0-10)
- 5) Health-related Quality of Life measured with RAND36

Societal and Economic level

Chronic neck pain is defined as pain lasting for more than 3 months. The complaints of patients with chronic neck pain result in medical consumption, absenteeism from work and disability. Out of the 328 disease and injury conditions studied in the burden of disease study 2016, neck pain was found to rank 6th in terms of years lost to disease.²³

In a study on the economic burden of chronic neck pain in the Netherlands (1997) the total costs of chronic neck pain were initially estimated at USD \$ 686 million and later

on (with adding lacking components like use of medication and unpaid work) at USD \$ 1.3 billion with a mean cost per patient of USD \$ 3.573.^{8,24}

The share of this costs was about 1% of total health care expenditures. The majority of these costs (75-84%) are indirect costs (lost productivity due to work absenteeism or work loss). Disability compensation accounted for the largest proportion of indirect costs (57%). This shows the importance of preventing patients from becoming chronic and the need for reintegration in case of disability.

6% of patients with neck pain had work leave for more than 4 weeks and the total number of sick leave days for neck pain in the Netherlands was 1.5 million days annually.²⁵

In 1996, 2.5 % of the population in the Netherlands received disability pension in relation to the neck pain.

Limited economic evidence base is available in the literature for the two treatment modalities “Interventional Diagnostic Procedures” (e.g. facet joint blocks) and “Electro-thermal and Radiofrequency Therapies” (e.g. radiofrequency denervation) for neck pain according to the Research Agenda for Health Economic Evaluation (RAHEE) project. Therefore strong conclusions about the cost-effectiveness of neck pain treatments cannot be made.²⁶

In the United States the cost utility analysis of therapeutic cervical medial branch blocks in the treatment of chronic neck pain, non-responsive to conservative management, demonstrated clinical effectiveness and cost utility at USD \$4,261 per one year of quality-adjusted life year (QALY).²⁷ In this cost utility analysis it was assumed that the patients had an improvement per procedure of around 16 weeks which is remarkably shorter than the duration of effect in our study (median treatment effect 42 months and 12 months for RF treatment and local anesthetic application, respectively, chapter 10).

In our RCT on the effectiveness of interventional pain treatments different outcome measures are used. One of the outcome measures was the Neck Disability Index.^{28,29} We found an improvement on the Neck Disability Index from baseline 20.4 to 15.7 at 6 months follow up, with a score of less than 15 defined in the literature as a “recovery” cut-off.³⁰

What this means in terms of return to work or changes of disability compensation was beyond the scope of our research questions and cannot be answered. However, the likelihood to return to work depends not only on worker level factors (health status, pain levels) but also on job-level factors and on workplace-level factors.³¹

A subgroup of patients with a positive workplace might benefit more from interventions.³² Involving workers’ health-care providers in the design of return-to-work programs that accommodate workers’ pain levels and medication use may be helpful. Returning injured or disabled workers may be taking pain medication in order to cope with job demands.³³

A cross sectional population study in the Netherlands showed that about 27.4 % of subjects with neck pain (with 50% of respondents with reported contact with a health professional) used pain medication.²⁵

In the Netherlands 5 % of patients with chronic pain use strong opioids (strong and weak opioids 20%).³⁴

Pain medication for chronic pain, especially opioid use, has become a prominent issue in the medical literature, in the conversations of those responsible for public health, and in written and broadcast media. The harsh lessons learned from the population-based “experiment” of prescribing opioids for long-term non-cancer pain have been seen most prominently in North America where the prescribing of opioid medicines has led to an undoubted public health crises of opioid-related harms including addiction, unintentional overdose and death .^{2,35}

There is less liberal prescribing of opioids for chronic pain in Europe compared to North America (regional average Defined Daily Dose (DDD)/million inhabitants 8.3 and 38.9 respectively- a fourfold difference). However, the Netherlands (with DDD/million inhabitants of 14.3) are still placed number 9 in global ranking.³⁶

Therefore, a decrease of medication use after RF treatment of cervical facet joint pain as measured with the Medication Quantification Scale (MQS) is a favorable outcome.

In conclusion. interventional pain treatment is one of the treatment options for patients with chronic neck pain, refractory to first line conservative treatment and diagnosed with cervical facet joint pain. When diagnosed according to our clinical definition of cervical facet joint pain and with our described interventional pain management technique it causes health gain in a substantial amount (>50 %) of patients. To be able to make strong conclusions about cost-effectiveness of our investigated pain management techniques for cervical facet joint pain, more research is necessary.

References

1. Finne, H. A Composite Indicator for Knowledge Transfer Report from the European Commission's Expert Group on Knowledge Transfer Indicators. 1–50 (2011).
2. Eccleston, C., Wells, C. & Morlion, B. *European Pain Management*. (Oxford University Press, 2018). ISBN 978-0-19-878575-0
3. Lamé, I. E., Peters, M. L., Vlaeyen, J. W. S., Kleef, M. V. & Patijn, J. Quality of life in chronic pain is more associated with beliefs about pain, than with pain intensity. *European Journal of Pain* **9**, 15–24 (2005).
4. Picavet S. *Health related quality of life in multiple musculoskeletal diseases: SF-36 and EQ-5D in the DMC3 study*. Thesis, 2001 Wageningen
5. Bala, M. *Epidemiology of Chronic Pain in the Netherlands*. (Kleijnen Systematic Reviews, 2011).
6. Borghouts, J., Janssen, H., Koes, B., Metsemakers, J. & Bouter, L. M. The management of chronic neck pain in general practice A retrospective study. *Scand J Prim Health care* **17**, 215–220 (1999).
7. Vos, C. J., Verhagen, A. P., Passchier, J. & Koes, B. W. Clinical course and prognostic factors in acute neck pain: an inception cohort study in general practice. *Pain Medicine* **9**, 572–580 (2008).
8. Borghouts, J. A. *Neck Pain in General Practice*. Thesis VU Amsterdam 2000 ISBN 90-5669-043-4
9. Yin, W. & Bogduk, N. The nature of neck pain in a private pain clinic in the United States. *Pain Medicine* **9**, 196–203 (2008).
10. Falco, F. J. E. *et al.* An updated review of the diagnostic utility of cervical facet joint injections. *Pain Physician* **15**, E807–38 (2012).
11. Manchikanti, L. *et al.* Prevalence of facet joint pain in chronic spinal pain of cervical, thoracic, and lumbar regions. *BMC Musculoskelet Disord* **5**, 15 (2004).
12. Manchikanti, L., Singh, V., Rivera, J. & Pampati, V. Prevalence of cervical facet joint pain in chronic neck pain. *Pain Physician* **5**, 243–249 (2002).
13. Cohen, S. P. *et al.* Factors predicting success and failure for cervical facet radiofrequency denervation: a multi-center analysis. *Reg Anesth Pain Med* **32**, 495–503 (2007).
14. Cohen, S. P. Epidemiology, diagnosis, and treatment of neck pain. *Mayo Clin. Proc.* **90**, 284–299 (2015).
15. Van Zundert, J., Patijn, J., Hartrick, C., Lataster, A., Huygen, F., Mekhail, N., van Kleef, M. *Evidence-based Interventional Pain Medicine*. (Wiley-Blackwell, 2011)
16. Van Zundert, J., Huygen, F., Patijn, J. & van Kleef, M. *Praktische richtlijnen anesthesiologische pijnbestrijding gebaseerd op klinische diagnoses*. Pijn Kennis Centrum Maastricht ISBN 978-90-7741-04-09
17. *Sturen op gezondheidsdoelen*. Advies door de Raad voor de Volksgezondheid en Zorg aan de Minister van Volksgezondheid, Welzijn en Sport. 1–69 (2011).
18. <http://www.ichom.org>.
19. Porter, M. E., Larsson, S. & Lee, T. H. Standardizing Patient Outcomes Measurement. *N. Engl. J. Med.* **374**, 504–506 (2016).
20. <https://www.anesthesiologie.nl/wat-we-doen/kwaliteitsregistratie-pijngeneeskunde/opzet-kwaliteitsregistratie>.
21. Black, N. & Tan, S. Use of national clinical databases for informing and for evaluating health care policies. *Health Policy* **109**, 131–136 (2013).
22. de Meij, N. *Quality indicators for the assessment of pain clinic care: a step forward? Quality from professionals and pain patients' perspective (QiPPP)*. Thesis Maastricht 2018 ISBN 978 94 6295 926 2
23. GBD 2016 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* **390**, 1211–1259 (2017).
24. Borghouts, J. A., Koes, B. W., Vondeling, H. & Bouter, L. M. Cost-of-illness of neck pain in The Netherlands in 1996. *Pain* **80**, 629–636 (1999).

25. Picavet, H. S. J. & Schouten, J. S. A. G. Musculoskeletal pain in the Netherlands: prevalences, consequences and risk groups, the DMC(3)-study. *Pain* **102**, 167–178 (2003).
26. van Dongen, J. M. *et al.* Best Practice & Research Clinical Rheumatology. 1–13 (2017). doi:10.1016/j.berh.2017.09.001
27. Manchikanti, L., Pampati, V., Kaye, A. D. & Hirsch, J. A. Cost Utility Analysis of Cervical Therapeutic Medial Branch Blocks in Managing Chronic Neck Pain. *Int J Med Sci* **14**, 1307–1316 (2017).
28. Vernon, H. & Mior, S. The Neck Disability Index: a study of reliability and validity. *J Manipulative Physiol Ther* **14**, 409–415 (1991).
29. MacDermid, J. C. *et al.* Measurement properties of the neck disability index: a systematic review. *J Orthop Sports Phys Ther* **39**, 400–417 (2009).
30. Nederhand, M. J., Ijzerman, M. J., Hermens, H. J., Turk, D. C. & Zilvold, G. Predictive value of fear avoidance in developing chronic neck pain disability: consequences for clinical decision making. *Archives of Physical Medicine and Rehabilitation* **85**, 496–501 (2004).
31. Franche, R.-L. *et al.* A multivariate analysis of factors associated with early offer and acceptance of a work accommodation following an occupational musculoskeletal injury. *J. Occup. Environ. Med.* **51**, 969–983 (2009).
32. Steenstra, I. A., Franche, R.-L., Furlan, A. D., Amick, B. & Hogg-Johnson, S. The Added Value of Collecting Information on Pain Experience When Predicting Time on Benefits for Injured Workers with Back Pain. *J Occup Rehabil* **26**, 117–124 (2016).
33. Institute for Work & Health. Easy-to-use tool measures benefits and costs of OHS initiatives. 1–8 (2010).
34. Breivik, H., Collett, B., Ventafridda, V., Cohen, R. & Gallacher, D. Survey of chronic pain in Europe: prevalence, impact on daily life, and treatment. *European Journal of Pain* **10**, 287–333 (2006).
35. Gwira Baumblatt, J. A. *et al.* High-risk use by patients prescribed opioids for pain and its role in overdose deaths. *JAMA Intern Med* **174**, 796–801 (2014).
36. *International Narcotics Control Board Report 2015*. <https://www.incb.org/en/narcotis-drugs.html>