Evaluation of Neural Therapy and Comparison with Conventional Medicine: Structure, Process and Outcomes

Dönges A., Fischer L., Widmer M, Herren S., Marian F., Busato A.
Institute for Evaluative Research in Orthopaedic Surgery, University of Bern, Stauffacherstrasse 78, CH-3014 Bern, Switzerland

Introduction

Neural Therapy (NT) has been temporarily added to the benefit catalogue of basic health insurance for primary care in Switzerland in 1999. This interim arrangement ends in 2005 when a political decision will be made either to include or exclude Neural Therapy from basic health insurance. It is not yet known whether this decision will encompass Neural Therapy as a whole, or will be limited to single procedures. However, reimbursements of expenditures are covered only when these methods are provided by physicians with appropriate certification in Neural Therapy approved by the Swiss Medical Association (FMH). A nationwide evaluation was therefore designed to provide a comprehensive evaluation of Neural Therapy and a comparison with conventional procedures in Swiss primary medical care. The specific research question was, does Neural Therapy provides primary care of equal quality to conventional medicine.

Definition of Neural Therapy

Neural Therapy according to Huneke is a treatment which uses precise injections with local anaesthetics for diagnosis and therapy[1-4]. Local anaesthesia is not the main goal (apart from diagnosis): Pathological strains (e.g. vicious circle in pain) are interrupted with specific stimuli[5]. This treatment uses the auto regulatory mechanism of the autonomic nervous system[1 3 5] mainly on two levels: in segmental reflectory processes and in the so-called interference field, which can cause or maintain pathological processes beyond any segmental order[1-4].
Neural Therapy (and diagnostic) is divided into:

1. local therapy (e.g. infiltration of trigger points) and segmental therapy (e.g. therapy of the HEAD-zones, also sympathetic ganglia, nerve roots and peripheral nerves)
2. Interference field therapy. An interference field is an asymptomatic chronic strain of a certain structure (different locations are possible) of the organism[1-4]. Impulses of the interference field may influence every system of the organism beyond of segmental order[1-4 6-10]. Common interference fields develop from pathological changes in the teeth and jaws, chronic (asymptomatic) irritations of the tonsils, paranasal sinuses or scars etc.

1

Main indications for neural therapy are acute and chronic pain, functional abnormalities and autoimmune diseases and so on[1-4]. The mechanism of the effect is derived from the pathophysiology of pain[5][11-15] and from neurophysiological experiments[16][17].

Material and methods

Study design:

Several cross-sectional studies were performed to investigate the quality of care of Neural Therapy within the setting of Swiss primary care. The studies should provide a picture of the normal routine of physicians providing Neural Therapy and/or conventional primary care. They were therefore designed purely observational, without interference into treatment choices of patients and diagnostic and therapeutic procedures applied or prescribed by physicians. The studies followed a concept of structure, process and outcome as outlined by Donabedian[18].

Data collection:

Structural attributes of care were investigated using a questionnaire-based survey aimed at physicians and their practices. A membership list of the Swiss medical association for Neural Therapy (SANTH) was obtained and all members working as primary care providers for at least two days per week were asked to participate. A random sample of primary care providers not listed in any medical society for complementary and alternative medicine was also asked to participate. It was assumed that these conventional physicians (COM) were less motivated to participate in such a project therefore the sample was proportionally higher. A questionnaire with an accompanying letter explaining the purpose of the projects was mailed to all physicians. A reminding letter was sent to non-responders one month later.

The processes of care were evaluated by asking patients and physicians to document consultations. Physicians were recruited on a voluntary basis within the previous investigation aimed at structural attributes. Physicians and their staff were instructed to sample consecutive patients consulting their practices at four given days during a 12-month period in 2002/03 (winter, spring, summer and fall). Sampling days were defined by the study coordination and were equally distributed across weekdays. Patients were informed about the study by leaflets and were asked prior to a consultation to fill out forms aimed at demographic- and health status information and on frequency and reasons of health care utilization. Physicians documented the same consultations with reference to symptoms, diagnoses, duration of problems, co-morbidities, diagnostic and therapeutic procedures. Data recording procedures of patients and physicians data were designed in a way that prevented physicians to have insight of forms already completed by patients.

Outcomes were measured using a questionnaire mailed to patients three to four weeks after the initially documented consultation. Outcomes specifically assessed included fulfillment of expectations, satisfaction with treatments, presence of adverse effects and quality of the patient-doctor relationship using the EUROPEP questionnaire. This

questionnaire has 23 questions each with a five point answer scale ranging from poor to excellent and covers the following dimensions:

- Relation and communication   (6 questions)
- Medical care   (5 questions)
- Information and support   (4 questions)
- Continuity and cooperation   (2 questions)
- Facilities availability and accessibility   (6 questions)

A SF-36 questionnaire[19] was also incorporated in order to obtain generic estimates of quality of life in the two patient populations. Mental and physical health scores were calculated according to Ware and Kosinski[19] in addition to the eight items of quality of life that are included in the SF-36 questionnaire.

All questionnaires used in this project were developed in close cooperation with an expert group of Swiss primary care providers specialized in conventional and/or complementary medicine. Questionnaires were either provided in German, French or Italian depending on mother tongue of patients and physicians. All patients and physicians participated on a voluntarily basis and physicians were reimbursed with 500 Swiss Francs (330 €) for their expenditures. The ethics committee of the Kanton Bern raised no objection to the study.

Data management and data analysis:

All data were recorded using a relational database. Forms filled out by patients and physicians were coded and recorded manually. Questionnaires mailed to patients one month after the initially recorded consultations were designed machine readable and recorded by the Swiss Federal Office of Information Technology using OCR (Optical Character Recognition) procedures.

Data analysis was performed in two steps. A first step included descriptive analyses using tables and graphs. Analytical procedures were applied in a second step. Continuous target variables were analyzed with multivariate linear models. Ordinal outcomes were reduced to two level scales with the most favorable answer category coded as one and all other non-missing categories as zero. These data were analyzed using multivariate logistic regression models. Co-variables of multivariate models were defined a priori and were aimed to adjust for demographic factors of patients and physicians. All analytical procedures accounted for non-independence of observations at the practice level using Taylor series expansion procedures; 95% confidence intervals (95% CI) of means proportions and odds ratios were calculated accordingly. The level of significance was set at $p < 0.05$ throughout the study and SAS 9.1 (SAS Institute Inc., Cary, NC, USA) was used for all calculations.

3

Results

Evaluation of structure: physicians and practices

Table 1 gives the structural characteristics of physicians and practices. The total sample includes 191 practitioners using exclusively conventional medicine (COM) and 30 practitioners who are certificated in Neural Therapy (NT). No differences between the proportions of female physicians and years since graduation patients were seen between groups.

The geographic distribution of NT physicians shows significant differences with respect to language regions and a tendency to higher urbanisation of the practices. However differences were not statistically significant. NT physicians are exclusively situated in the German speaking part of Switzerland. Concerning the practice structure differences between NT and COM are not significant, although a tendency of higher proportion of single practices is observed in NT. Furthermore no NT physicians worked in a group practice with pooled billing. The amount of technical equipment in practices shows differences between the two groups. NT physicians have significantly less laboratory equipment, less ECG and less X-ray, whereas no difference between groups was found for ultrasound equipment. Physicians' supply was analysed through work load, amount of consultations per week, waiting lists and it's extend as well as waiting time to receive first appointments at physician and referral-rates from other colleges.

No significant differences between groups were found for fulltime and part-time working, total working hours as physician (incl. administration) and working hours with patients (i.e. direct patient-physician contact) as well as amount of consultations per week. Opposite more and longer waiting lists were found in NT physicians, reflecting the longer waiting time for first admissions in NT. Admission rates for new patients were respectively lower in NT physicians but differences were not statistically significant. Frequencies of referrals from other colleges are significantly higher in NT physicians (Table 1).

Evaluation of processes:
a) Demographic attributes and self-perceived health status (patients view)

Table 2 shows the baseline demographic data and the self-rated health status of the participating patients. There were 84 COM physicians and 19 NT physicians who recruited 3263 (74.3%) respectively 1127 (25.7%) patients. 103 of NT patients were children (<16 years) compared to 185 children in COM patients. Significant differences of gender were observed between patient groups, with higher proportions of female patients in the NT group. However, additional age stratified analyses indicted significant differences in adult patients whereas no differences were found in children. Average age differed significantly in overall comparison as well as in children and in adult population indicating younger patients in NT.

The following results are limited to adult patients (≥16 years). Results from younger patients will be presented separately. Significant differences were observed for educational levels between groups of patients. However, differences between groups disappeared when adjusting for gender and age.

Patients were asked to rate their general health on a five-point Likert scale ranging from excellent to poor. Answer patterns indicate significant differences in self-perceived health status between patient groups (Table 2). For logistic regression the Likert scale was dichotomized into "excellent/very good/good" and "less well/bad". Differences remained significant after adjusting for age and gender indicating a lower self-rated general health in NT patients. Patients recorded the duration of their main health problem. Using a logistic regression model, significant differences of the gender and age adjusted proportion of chronic patients (>3 month) were observed across groups; indicating a longer disease duration in NT patients (Table 2).

Patients were further asked to rate the severity of their main health problem using a three level scale (minor, moderate or serious). Significant differences of severity scores were observed between groups. The highest proportion of patients considering their main health problem as serious was found in the NT group (Table 2). Multivariate logistic regression of self-reported disease severity (answer level minor coded as 0 and levels moderate and serious coded as 1) indicated that severity of problems remained higher in NT after adjusting for gender and age.

Patients and physicians rated severity and duration of disease the same day. Kappa values of agreement were low between patients and physicians in both groups: Kappa values of disease severity were 0.51 for NT group and 0.56 for COM group. Kappa values for disease duration were even lower in both groups (NT 0.23, COM 0.25) Comparison of ratings indicate that physicians of both groups tend to downgrade disease severity and duration. However, the low level of statistical agreement between physicians and patients is similar in COM and NT groups.

b) Diagnostic and therapeutic procedures, referrals, morbidity (physicians view)

The frequency of the six most frequent main diagnoses divided in ICD-10 chapters is listed in Table 3 according to their frequency. The distribution in COM and NT is not the same. Yet the forefront is the ICD-10 M (diseases of the musculo-skeletal system and connective tissue) in both groups but nearly twice as frequent in NT group. ICD-10 Diseases of the circulatory system and diseases of the respiratory system are more frequent in the COM group, whereas ICD-10 Symptoms and signs, not elsewhere classified and diseases of the nervous system are more frequent in the NT group. Almost 60% of all main diagnoses are within the mentioned 6 ICD-10 chapters (Table 3). NT physicians characterize patient's disease as longer lasting (defined as disease duration more than 3 months) compared to COM physicians. A logistic regression model with adjustment for age and gender shows an almost two and a half time elevated probability to care for a patient with chronic disease in NT compared to COM (OR 2.4). One aspect of disease severity is the physicians' allocation of the main health problem. The severity (minor, moderate or serious) of patients' main health problem was not equally distributed in COM and NT. NT physicians had statistically significantly more seriously ill patients than COM physicians. After adjusting for age and gender the probability to have a severe condition in NT is more than thrice compared to COM (OR 3.1). Another aspect of severity is the concomitance of co-morbidities, we therefore counted their number. The distribution of the quantity of co-morbidities is shown in Table 3. There is no statistically significant difference between COM and NT.

Physicians documented general diagnostic procedures (anamnesis, physical visit, X-ray /ultrasound, laboratory test /ECG and Others) as well as specific diagnostic procedures (procedures specific to some CAM and COM methods) being all applied at physicians'.
Comparing the general diagnostic procedures no differences appeared except for procedures not further classified (Table3). The specific diagnostic procedures show that COM physicians apply in over ninety percent mainly COM procedures. NT physicians apply in over fifty percent COM procedures and in twelve percent Neural Therapy alone (Table 3).
On the other hand the therapeutic procedures were rated describing the type of therapy (medication and non-medication) as well as the used type of method (CAM or COM). Again we find that COM physicians use mainly COM procedures (87%). NT physicians use COM and NT to each a third of therapeutic procedures. The comparison of medication and non-medication methods between groups shows significant differences in medication, which is used twice as much in COM physicians. Differences remain significant for non-medication therapies being twice as high in NT physicians. In cases of a combination of medication and non-medication therapies differences are not significant. Non –medication therapies were specified using free text answers. All answers where classified after data entry into a 10 level scale based on an adoption of the NCCM therapy code (Table 4). The most frequent non-medication therapies in COM physicians were counseling, minor surgical procedures, physiotherapy and diet, whereas the most frequent applied methods in NT physicians were: electrotherapy, counseling, manipulative methods and minor surgical procedures.

The total referral rates are apparently higher in COM (13.2) than in NT (10.8). After exclusion of referrals to dentists leading to an anyway necessary dental treatment, which isnot reimbursed by basic health insurance, differences are even more pronounced 13.1% in COM and 8.7% in NT. The most frequent medical units being referred to are listed in Table 4. COM physicians issue significantly more work incapacity certificates than NT physicians (age and gender adjusted) (Table 4). Duration of consultation is 2.5 minutes longer in NT physicians compared to COM physicians (NT LSM 20.7, COM 18.2) (Table 4).

Evaluation of outcome (patients view after one month of treatment)

The follow-up questionnaire for patients after one month includes questions about health status after one month, adverse side effects and treatment effects in general, treatment causality of symptom amelioration, fulfilment of expectations, general satisfaction with treatment. Furthermore, it includes the SF-36 questionnaire (health related quality of life) and the EUROPEP (European Task force on patient evaluation of general practice) aimed at patient satisfaction.

Crude comparison of answer frequencies of severity (main health problem) after one month, rated from "not any" to "unbearable" shows significant differences in distribution patterns between groups. Complete disappearance of disease severity ("not any") is more frequent in COM and "rather low" and "middle-rat" disease severity is more frequent in NT patients (Table 5). Treatment casualty was analysed asking patients to what degree they estimate symptom amelioration being a consequence of treatment. Significant answer distribution patterns indicate higher casualty of treatment in comparison of crude answer frequencies (Table 5). The majority of COM (81.9%) and NT (86.9%) patients did not report treatment-related adverse effects. Significantly fewer adverse side effects were observed in chronic NT patients. The same tendency was observed in acute patients but differences were no longer significant. However, after adjusting for gender and age differences disappeared in a logistic, age and gender adjusted regression model. Treatment effects in general indicate further treatment related effects not concerning disease severity. Positive effects were twice as frequent in NT patients whereas negative effects and no effects were found more frequently in COM patients. Answer distribution patterns differed significantly between patient groups (Table 5).

Patients were asked about fulfillment of expectations and general satisfaction with the treatments performed by the respective physicians. Significant differences of patterns between groups of patients were observed for both outcomes. The fulfillment of expectations with reference to the treatment was rated using a four point Likert scale ranging from complete fulfillment to not at all. Crude comparison of frequency indicate higher fulfillment of expectations in NT patients. However differences disappeared after analyzing proportions of complete fulfillment in a logistic regression model (Table 5).

General satisfaction with treatments was rated from very satisfied to not at all show significant differences between groups. Age and gender adjusted frequencies of very satisfied answers remain significant indicating higher treatment satisfaction in NT patients (Table 5).

The SF-36 includes the eight dimensions physical function, role physical, bodily pain, general health, vitality, social functioning, role emotional and mental health. These

7

dimensions are summarized in a Physical and a Mental Component Summary (PCS and MCS). Seven of eight dimensions (except bodily pain) show higher/better outcomes in NT patients in crude comparison of frequencies. However, age and gender adjusted differences, summarised in the PCS, disappeared. In contrary, differences remained significant in MCS after adjustment, indicating better mental health in NT patients one month later (Table 5).

The EUROPEP questionnaire comprises 23 questions on evaluations of specific aspects of general practice summarized in five dimensions. It is using a five-point answer scale ranging from "poor" to "excellent". Age and gender adjusted proportion of best answers were analyzed in logistic regression.

The first six questions of the EUROPEP questionnaire are aimed at the following aspects of relation and communication: (1) consultation time, (2) interest in personal situation, (3) facility to speak about problems, (4) shared decision-making, (5) listening (6) confidentiality

Five aspects related to medical care were assessed: (7) relief of symptoms, (8) coping, (9) thoroughness, (10) physical examination and (11) prevention.

Four aspects related to patient information and support were assessed: (12) purpose of test and treatments, (13) Information about illness (14) coping with emotional problems (15) understanding advices

The dimension continuity and cooperation was assessed with two questions: (16) physicians remember of precedent consultations, (17) preparing patient for.

Six aspects of the facilities availability and accessibility were assessed: (18) helpfulness of the staff (19) getting an appointment, (20) getting through the phone, (21) being able to speak to the practitioner on the phone (22) waiting time in the waiting room and (23) providing quick services for urgent health problems.

With the exception of answer 11 all the sixteen answers aimed on relation and communication, medical care, information and motivation as well as continuity and cooperation reveled a consistent pattern of higher best answer proportion in NT patients. However, only difference in answer 9 (thoroughness) was statistically significant. Differences of answer patterns of facilities availability and accessibility (6 answers) were neither statistically significant different nor consistent (Table 6).

Discussion

Evaluation of structure
Structural characteristics: physicians and practices

The high amount of NT physicians being mostly situated in the German speaking part of Switzerland seems to have the following historical background: Neural Therapy was developed in Germany and particularly taught in Germany and Austria. German and Austrian instructors of Neural Therapy came not before the 80ies to Switzerland. The tendency of higher urbanization of NT practices matches with the fewer technical equipment being more easily available in urban areas and thus not necessarily part of a practice. As a result referrals to diagnostic institutes (XR, laboratory) would rise in urban areas. Other reasons for low technical equipment are found in the higher amount of referrals form other physicians. Referred patients tend to have passed already more diagnostic work-up, reducing thus further diagnostic procedures. Further there is evidence[1,3,5,20] that NT is not only a therapy but also a diagnostic method: Special manual investigations and diagnostic injections bring up clear diagnostic results, reducing thus certain conventional diagnostic procedures[1,3,20]. These issues are confirmed in this study indicating that NT is applied as diagnostic procedure in more than 15 % (Table 3).

NT physicians have significantly higher rates of referred patients. The question emerge whether patients are referred to neural therapy either because their disease is resistant to any conventional medical therapy or that NT is considered as the better alternative than COM indicating an indirect measure of evidence for effectiveness.

Higher rates of waiting lists with bigger extent, lower admission rates for new patients with longer waiting times to receive first appointments in NT practices could be rated as indirect signs of effectiveness and as a high demand of neural therapy treatment.

The tendential even higher workload (consultations and-working hours per week) in NT physicians could point against an expansion of basic medical services.

Evaluation of processes
a.) Demographic attributes and self-perceived health status (patients view)

Perceived health status of patients was based on self-reported subjective assessments that have been proved to be valid measures of health in general populations[21,22]. An important finding in this context is that NT patients (at baseline) considered their main health problem as well as general health more severe than COM patients. The differing perceptions of severity of illness may on one hand be linked to different frequencies of major ICD-10 diagnosis in patient populations of the study but may also be related to different adjustments and coping strategies with disease in patients seeking COM or NT. The worse health status is furthermore combined with higher diseases chronicity[23-26], matching with the fact, that NT-physicians receive a higher amount of patients upon referral than COM-physicians. It seams obvious, that if the COM-treatment resulted in a satisfactory effect, referral wouldn't have been necessary[20]. On the other hand patients are seeking help themselves in neural therapy also without referral from their physicians

and we assume, that these are patients with serious and long lasting diseases[20] which may be resistant to COM-therapies.

b.) Diagnostic and therapeutic procedures, referrals, morbidity (physicians view)

Parallel to several studies[24 25 27-30] on CAM we found that diseases of the musculoskeletal system and connective tissue (ICD-10 M) are the most frequent diagnoses in both groups but even nearly twice as frequent in the NT. Because the most important field of NT is the treatment of pain of musculoskeletal system and connective tissue[1-4 31], this result isn't surprising: Effectiveness of NT with reference to these problems is well documented[2 31-36] and corresponds with the pathophysiology of pain[5 11-13 15 17] as an integral part of NT.

COM physicians apply diagnostic COM procedures in 90%, NT physicians in 50%. For the rest of diagnostic procedures, NT physicians use mostly Neural Therapy. (For example diagnostic infiltrations to differentiate between a dysfunction of the iliosacral joint and intervertebral joint L5/S1 or identification of musculoskeletal chest pains with infiltration of trigger points in m. intercostalis etc[20]. Therefore diagnostic and therapeutic aberrations may be prevented and the charges may decline[20]. Clear differences were also observed in therapeutic procedures.

NT physicians use NT in over 30% as therapeutic procedures. As a possible consequence, data indicate that NT physicians use nearly 50% less drugs compared to COM (Table 4). Main indications for NT are pain-diseases and certain inflammations[1-3]. The result is a significant saving of medication, e.g. analgetics, NSAR (non steroid antirh.), antibiotics, antiherpetics etc[20].

Referral rates to other physicians (radiologist, orthopedic surgeon, cardiologist, and psychiatrist) are lower in NT than in COM. (8.7% versus 13.1%). The lower referral rate of NT physicians is due to the special training of NT physicians, which contains specific diagnostics and therapies (especially within the musculoskeletal system diseases), so they have to send fewer patients to specialists like radiologists, rheumatologists and orthopedic surgeons etc. Furthermore NT physician treat more patients referred from other physicians. This fact is an additional explanation for the lower referral rates of NT physicians. NT physicians order significantly less work incapacity than COM although their patients show more severe and chronic diseases. This fact seems paradox and is most certain multidimensional. Nevertheless it might be an indirect sign of evidence for effectiveness of neural therapy.

Evaluation of outcome

Patients view after one month of treatment

One month after baseline evaluation treatment was assessed indicating similar health status with respect to severity of main health problem and significant better health in mental health score of SF-36 of NT patients. Tendencies of fewer side effects in NT patients are statistically not significant. No differences of fulfilment of treatment expectations were found between groups but higher positive treatment effects as well as significantly higher treatment satisfaction in NT patients compared to COM patients.

10

Latter finds its confirmation in a constant tendency of higher patient satisfaction in EUROPEP measurements. Further NT patients tend to relate beneficial treatment effects stronger to the accomplished care than do COM patients.

Comparing health status in baseline questionnaire (at the beginning of evaluation) we find worse health status (disease severity of main health problem, general health, higher chronicity of main health problem) in NT patients. One month after treatment, disease severity of same main health problem was rated again, showing this time only little differences between groups. After one month however, severity of main health problem rated as complete symptoms-restitution was higher in COM, aligning with the significantly higher rates of acute diseases in this group. Opposite, rather low and middle-rate disease severity was higher in NT patients matching with more chronic patients in this group. Comparing baseline severity of main health problem and severity of main health problem after one month, we find stronger amelioration of disease severity in NT patients indicating higher treatment success in the NT group. Further NT patients indicate significantly better mental health scores (SF-36) after one month.
Other findings of this study such as:
-   Higher patient satisfaction with physician in general (EUROPEP) in NT patients
-   Higher positive treatment effects in NT patients
-   Higher treatment satisfaction in NT patients
-   Higher relation of beneficial treatment effects to the accomplished care in NT patients -
might have strong influence on outcomes such as amelioration of disease severity. On the other hand these factors are directly influenced by treatment success experienced by patients. In considering this, it is difficult to estimate to what extent higher treatment success in NT patient is due to Neural Therapy itself, witch accounts only for 30% of therapeutic procedures. Factors such as socio-demographics, co-therapies, frequencies of consultations, motivations, attitudes and beliefs of patients need further considerations and will be presented later.

General considerations

The data suffer from number of limitations common to this type of research. These include selection bias, non-representative sampling, low sample on the physicians' level for NT physicians and effects of confounding variables unaccounted for. Recall bias with reference to previous appointments and treatments may additionally have affected results of self-reported health and health care by patients and physicians. However, it remains impossible to assess indications of differential recall bias with reference to patient groups in our study. Another limitation is the mainly cross-sectional nature of the survey, which limits the investigation of cause-effect relationships. The strengths of the study include the availability demographic data obtained from health insurers providing estimates of validity with reference to patient demographics and resource utilisation. It appears therefore that elderly people were either less willing or not able to participate in the study and consequently, average patient-age in the sample was lower than the overall patient population of the participating physicians. However, little data are available that would allow further comparisons and external validation.

11

Conclusion

As also in another place published[1][3][5][20][31][36] in the majority of cases NT (diagnostic and therapeutic) can not be considered in most cases as an addition to COM but as an effective – and with certain indications more effective   alternative. This is also demonstrated by the fact, that NT uses less medication than COM, although their patients show a higher amount of serious and chronic diseases. Patient-rated amelioration of disease severity in NT is at least at high as in COM. Medication and work incapacity is lower in NT patients (in comparison to COM).

References

1. Barop H. *Lehrbuch und Atlas der Neuraltherapie nach Huneke.* Stuttgart: Hippokrates, 1996.
2. Dosch P. *Lehrbuch der Neuraltherapie nach Huneke.* Heidelberg: Haug, 1995.
3. Fischer L. *Neuraltherapie nach Huneke. Grundlagen, Technik, praktische Anwendung.* 2. A ed. Stuttgart: Hippokrates, 2001.
4. Huneke F. *Das Sekundenphänomen in der Neuraltherapie.* 6. A ed. Heidelberg: Haug, 1989.
5. Fischer L. Pathophysiologie des Schmerzes und Neuraltherapie. *PRAXIS* 2003;92: 2051-9.
6. Adler E. *Störfeld und Herd im Trigeminusbereich.* 4. A ed. Heidelberg: E. Fischer, 1990.
7. Breebart A, Bijlsma J, van Eden W. 16-year remission of rheumatoid arthritis after unusually vigorous treatment of closed dental foci. *Clinical and Experimental Rheumatology* 2002;20: 555-7.
8. Iida M, Yamaguchi J. Remission of rheumatoid arthritis following periodontal treatment. A case report. *Nippon Shishubio Gakkai Kaisha* 1985;27 (1): 234-8.
9. Paunio Kea. Missing teeth and ischemic heart disease in men aged 45-64 years. *Eur Heart J* 1993;14: 54-6.
10. Pohle S. Odontogene Störfelder als Ursache für periphere Erkrankungen - Eine neuraltherapeutische Studie. *Ärztez f Naturheilverf* 1992;33 (7): 559-64.
11. Baron R, Jänig W. Schmerzsyndrome mit kausaler Beteiligung des Sympathikus. *Anästhesist* 1998;4-23.
12. Melzack R, Wall P. Pain-mechanisms. A new theory. *Science* 1965.
13. Schattschneider J, Wasner G, Binder A, Siebrecht D, Baron R. Das Symptom „sympathisch unterhaltener Schmerz". *Schmerz* 2003.
14. Zieglgänsberger W. Chronischer Schmerz: Physiologie, Pathophysiologie und Pharmakologie. *Ganzheitsmed* 2002;1 (15): 21-5.
15. Zimmermann M. *Die Neuraltherapie im Licht neuerer Erkenntnisse der neurobiologischen Forschung In: Seithel R. Hrsg.* Stuttgart: Hippokrates, 1984.
16. Ricker G. *Pathologie als Naturwissenschaft - Relationspathologie.* Berlin: Springer, 1924.
17. Speranski A. *Grundlage einer Theorie der Medizin. Ins Deutsche übertragen von Roques KR.* Berlin: Sänger, 1950.
18. Donabedian A. The quality of care. How can it be assessed? *Jama* 1988;260(12):1743-8.
19. Ware JE, M. K. *SF-36 Physical & Mental Health Summary Scales: A Manual for Users of Version 1.* Second Edition ed: QualityMetric Incorporated Lincoln, Rhode Island, 2001.
20. Fischer L, Barop H, Maxion-Bergemann S. Health Technology Assessement Neuraltherapie nach Huneke. Programm Evaluation Komplementärmedizin. Schweiz. 2005.
21. Miilunpalo S, Vuori I, Oja P, Pasanen M, Urponen H. Self-rated health status as a health measure: the predictive value of self-reported health status on the use of

physician services and on mortality in the working-age population. *J Clin Epidemiol* 1997;50(5):517-28.

22. Hunt SM, McKenna SP, McEwen J, Williams J, Papp E. The Nottingham Health Profile: subjective health status and medical consultations. 1981;15(3 Pt 1):221-9.

23. Kersnik J. Predictive characteristics of users of alternative medicine. *Schweiz Med Wochenschr* 2000;130(11):390-4.

24. Astin JA. Why patients use alternative medicine: results of a national study. *Jama* 1998;279(19):1548-53.

25. Shmueli A, Shuval J. Use of complementary and alternative medicine in Israel: 2000 vs. 1993. *Isr Med Assoc J* 2004;6(1):3-8.

26. Bürgi M, Sommer JH, R. T. *Alternative Heilmethoden: Verbreitungsmuster in der Schweiz*. Chur-Zürich: Rüegger, 1996.

27. Eisenberg DM, Davis RB, Ettner SL, Appel S, Wilkey S, Van Rompay M, et al. Trends in alternative medicine use in the United States, 1990-1997: results of a follow-up national survey. Use and expenditure on complementary medicine in England: a population based survey. Surveys of complementary and alternative medicine: part I. General trends and demographic groups. *Jama* 1998;280(18):1569-75.

28. Bausell RB, Lee WL, Berman BM. Demographic and health-related correlates to visits to complementary and alternative medical providers. *Med Care* 2001;39(2):190-6.

29. Bernstein JH, Shuval JT. Nonconventional medicine in Israel: consultation patterns of the Israeli population and attitudes of primary care physicians. *Soc Sci Med* 1997;44(9):1341-8.

30. Palinkas LA, Kabongo ML. The use of complementary and alternative medicine by primary care patients. A SURF*NET study. *J Fam Pract* 2000;49(12):1121-30.

31. Barop H. Klinische Studie über den Wirksamkeitsnachweis der Neuraltherapie nach Huneke (basierend auf Praxis-Dokumentation H. Barop). *Erfahrungsheilkunde* 1991;3: 158-61.

32. Barbagli P. Therapy of articular and periarticular pain with local anesthetics (neural therapy a. t. Huneke). Long and short term results. *Minerva Anesthesiol* 1998;64 (1-2): 35-43.

33. Becke H. Neuraltherapie und Kreuzschmerzen. Überlegungen zur Ursache und Ergebnisse einer Behandlungsstudie. *Natura-med* 1995;10 (6): 33-9.

34. Eder M. Neuraltherapeutische Aspekte vertebragener Schmerzsyndrome. *Erfahrungsheilkunde Acta Medica Empirica* 1983;7: 421-7.

35. Haaks T, Tackmann W. Neuraltherapeutische Behandlung der schmerzhaften hemiparetischen Schulter. *Biologische Medizin* 1999.

36. Von Orelli F. Die Behandlung chronischer Schmerzen mit Procaininjektionen. *Der informierte Arzt/Gazette Medical* 1999;20: 353-7.

Tables

Table 1: Structural characteristics of physicians and practices

		COM #	COM %	COM CI	SANTH #	SANTH %	SANTH CI
Physicians	N	191			30		
Female physicians	Proportion	24	12.6	7.8-17.3	3	10.0	0.0-20.8
Years since graduation	Mean:		23.2 years			22.9 years	
Language *	German	126	66.0	59.2-72.7	30	100.0	100.0-100.0
	French	61	31.9	25.3-38.6	0		-.-
	Italian	4	2.1	0.0-4.1	0		-.-
Urbanisation	Inner city	66	34.6	27.8-41.4	16	53.3	35.3-71.3
	Agglomeration	78	40.8	33.8-47.9	10	33.3	16.3-50.3
	Segregated City	5	2.6	0.3-4.9	0		-.-
	Rural area	42	22.0	16.1-27.9	4	13.3	1.1-25.6
Practice Type	Single practice	133	69.6	63.1-76.2	24	80.0	65.6-94.4
	Group practice with separate billing	43	22.5	16.5-28.5	6	20.0	5.6-34.4
	Group practice with pooled billing	15	7.9	4.0-11.7	0		-.-
Practice Equipment	Laboratory *	183	95.8	92.9-98.7	25	83.3	69.9-96.8
	ECG *	186	97.4	95.1-99.7	25	83.3	69.9-96.8
	X-ray *	155	81.2	75.6-86.7	15	50.0	32.0-68.0
	Ultrasound	50	26.2	19.9-32.5	10	33.3	16.3-50.3
Fulltime work		163	85.8		29	96.7	
Total working hours/week	Mean:		53.7 hours			57.2 hours	
Working hours/week (direct patient-physician contact)	Mean:		40.1 hours			44.0 hours	
Consultations/week	Mean:		108.1 cons.			115.0 cons.	
Waiting lists *		4	2.1		7	23.3	
Extend of waiting lists	0 patients	185	98.4		23	76.7	
	1-5 patients	1	0.5		0	0.0	
	6-10 patients	0	0.0		1	3.3	
	<10patients	2	1.1		6	20.0	
Admission of new patients	Yes	184	96.34		27	90.0	
	No	6	3.1		3	10.0	
Waiting time to receive first appointments at physician	0-3 months	183	97.3		22	73.3	
	<3 months	7	3.7		8	26.6	
Referrals from other colleges *	Mean:		5.2%			10.1%	

* Indicate significant values (p<0.05) between COM and SANTH groups

15

Table 2: Self rated health status of patients

		COM #	%	CI	SANTH #	%	CI
Physicians (Clusters)							
Patients	*N*						
	Children, ≤16 years	185			103		
	Adult, > 16 years	3078			1024		
	All	**3263**			**1127**		
Proportion of female Patients	*Children, ≤16 years*	111	60.0	53.5-66.5	52	50.5	39.0-62.0
	Adult, > 16 years [a]	1734	56.3	53.1-59.6	694	67.8	62.3-73.3
	All [a]	**1845**	**56.5**	**53.4-59.7**	**746**	**66.2**	**61.3-71.0**
Patients' age	*Childre, ≤16 years* [a] *Mean*	10.9			8.8		
	Adult, > 16 years [a] *Mean*	52.0			51.4		
	All [a] ***Mean***	50.1			48.2		
Patients with higher education	*Proportion, age > 16*	603	19.9	17.7-22.2	222	21.9	16.3-27.5
General health [b]	*Proportion of less well and bad general health*	724	23.9	21.6-26.2	323	32.0	26.1-37.9
Duration of disease [b]	*Mean*	51.7			70.7		
	Median	6.0			24.0		
	First quartile	0.75			3.0		
	Third quartile	60.0			90.0		
Main health problems (reason of doctor visit) [b]	*Proportion of severe conditions*	565	21.1	18.9-23.2	279	29.1	23.7-34.4

[a] Significant difference (p<0.05) between COM and NT groups (bivariate analysis)
[b] Significant difference (p<0.05) to COM-group in a multivariate linear or logistic model (age and gender controlled).

Table 3: Diagnostic procedures

		COM			SANTH		
		#	%	CI	#	%	CI
General diagnostic procedures							
	Anamnesis	2688	86.9	83.3-90.4	725	70.5	49.4-91.5
	Physical visit	2430	78.5	75.3-81.8	582	56.6	36.4-76.7
	X-ray/ ultrasound	188	6.1	4.9-7.3	48	4.7	2.3-7.1
	Laboratory test/ ECG	741	23.9	21.5-26.4	168	16.3	10.1-22.5
	Others	29	0.9	0.5-1.4	39	3.8	1.8-5.8
Specific diagnostic procedures							
	COM	2876	92.9		552	53.6	
	COM+ NT				39	3.8	
	COM and other CAM (without NT)	1	0.03		38	3.7	
	NT				128	12.4	
	NT + Others				2	0.2	
	Others	6	0.2		59	5.73	
	None	211	6.8		211	20.5	
Main health problems *	*Proportion of severe conditions:*	280	10.1	8.5-11.7	204	21.3	16.3-26.4
Duration of disease *	*Mean*	23.2			47.8		
	Median	1.25			12.0		
	First quartile	0.25			1.25		
	Third quartile	18.0			60		
Morbidity	***ICD-10 chapter***						
	Main diagnosis						
	ICD-10 M	496	16.0	14.3-17.8	293	28.5	21.2-35.7
	Diseases of the musculoskeletal system and connective tissue						
	ICD-10 I	488	15.8	14.1-17.4	89	8.6	5.6-11.7
	Diseases of the circulatory system						
	ICD-10 J	331	10.7	9.4-12.0	77	7.5	4.3-10.7
	Diseases of the respiratory system						
	ICD-10 R	124	4.0	3.2-4.9	63	6.1	4.3-7.9
	Symptoms and signs, not elsewhere classified						
	ICD-10 G	78	2.5	2.0-3.1	63	6.1	3.4-8.8
	Diseases of the nervous system						
	ICD-10 K	189	6.1	5.1-7.1	60	5.8	4.2-7.5
	Diseases of digestive system						
Co-morbidities	*None*	1288	41.6	37.4-45.9	360	35.0	25.8-44.2
	1	954	30.8	28.7-32.9	342	33.2	29.4-37.1
	>1	852	27.5	24.0-31.1	327	31.8	21.4-42.2

* Significant difference ($p < 0.05$) to COM-group in a multivariate linear or logistic model.

Table 4: Therapeutic procedures

		COM			SANTH		
		#	%	CI	#	%	CI
Specific therapeutic procedures	COM	2693	87.0		335	32.6	
	COM+ NT				62	6.0	
	COM and other CAM (without NT)	1	0.03		38	3.7	
	NT				291	28.3	
	NT + Others				53	5.1	
	Others	60	1.94		205	19.92	
	None	322	10.4		61	5.6	
Type of therapy	Medication	1668	53.9	50.6-57.3	310	30.1	19.7-40.5
	Non-medication therapies	536	17.3	15.2-19.4	410	39.8	30.5-49.2
	Medication and non-medication therapies	566	18.3	15.1-21.5	213	20.7	13.6-27.8
	None	324	10.5	8.4-12.5	93	9.3	4.4-14.3
Non-medication therapies according to frequencies	Counseling	264	27.6		70	15.0	
	Minor surgical procedures	203	21.2		38	8.12	
	Diet	116	12.1		33	7.0	
	Electrotherapy	3	0.3		146	31.2	
	Physiotherapy	123	12.9		26	5.6	
	Recommendation for physical activity	100	10.5		24	5.1	
	Psychotherapy	81	8.5		31	6.6	
	Manipulative methods	40	4.2		56	12.0	
	Other CAM	0	0		28	6.0	
	External application	10	1.0		11	2.35	
Referrals according to frequencies *(Therapeutic & diagnostic)*	**Total proportion of Referrals (inkl. dentist)**	**410**	**13.2**		**112**	**10.8**	
	Radiology	50	1.61		14	1.35	
	Orthopedic surgery	38	1.22		7	0.7	
	Surgery	31	1.00		12	1.2	
	Cardiology	33	1.06		7	0.7	
	Gastroenterology	33	1.06		7	0.7	
	Psychiatry & Psychotherapy	29	0.93		2	0.2	
	Neurology	26	0.84		2	0.2	
	Dentist	1	0.0		22	2.1	
	Total proportion of Referrals (exclus. dentist)	**409**	**13.1**		**90**	**8.7**	
Work incapacity	*Proportion, age >16 and age ≤65*	319	14.2	12.1-16.2	49	6.1	2.6-9.6
Duration of consultation	Mean	16.8 minutes			19.6 minutes		
	Median	15.0 minutes			15.0 minutes		
	First quartile	10 minutes			10 minutes		
	Second quartile	20 minutes			2 minutes		

* Significant difference (p<0.05) to COM-group in a multivariate linear or logistic model

Table 5: Outcome

		COM			NT		
		#	%	CI	#	%	CI
SF 36							
Physical health score	Mean		...47.9			...46.7	
Mental health score*	Mean		...47.8			...49.2	
Disease severity (main health problem)							
	Not any	388	28.4		78	13.9	
	Rather low	389	28.5		191	34.0	
	Middle-rate	405	29.7		191	34.0	
	Rather intense	130	9.5		73	13.0	
	Very intense	38	2.8		23	4.1	
	Unbearable	14	1.0		5	1.0	
Treatment causality of symptom amelioration							
	Very sure	415	43.0		212	48.7	
	Sure	381	39.4		183	42.1	
	Not sure	111	11.5		25	5.7	
	Don't know	59	6.1		15	3.4	
Adverse side effects	Yes	197	15.0	12.7-17.3	66	11.9	8.8-14.9
Treatment effects in general							
	Positive effect	222	17.5		211	38.7	
	Negative effect	87	6.9		28	5.2	
	No effect	957	75.6		304	56.0	
Fulfillment of treatment expectations	Proportion of "complete fulfillment"	425	32.5	29.2-35.7	174	31.5	28.0-34.9
Treatment satisfaction*	Proportion of "very satisfied"	571	43.3	40.5-46.2	267	48.1	44.2-52.0

* Significant difference (p<0.05) to COM-group in a multivariate linear or logistic model

Table 6 Outcomes

Patient satisfaction EUROPEP

Nr	Questions / items	% of best answer					
	Relation and communication	**4756**	**64.1**	**61-67.0**	**2125**	**66.4**	**59-73.9**
1.	Making you feel you had time during consultation?	830	61.5	58-65.3	342	62.1	52-72.1
2.	Interest in your personal situation?	802	60.0	57-63.2	362	65.9	58-73.4
3.	Making it easy for you to tell him or her about your problem?	598	62.7	59-66.8	349	65.8	59-73.2
4.	Involving you in decisions about your medical care?	707	58.3	55-62.1	308	58.4	50-67.3
5.	Listening to you?	910	67.2	64-70.2	377	68.5	60-76.8
6.	Keeping your records and data confidential?	909	75.2	72-78.1	387	78.8	72-85.3
	Medical care	**2613**	**45.6**	**43-47.8**	**1066**	**47.7**	**43-52.5**
7.	Quick relief of your symptoms?	319	27.6	25-30.3	136	27.9	23-33.1
8.	Helping you to feel well so that you can perform your normal daily activities?	475	41.3	38-44.1	202	41.7	37-46.2
9.	Thoroughness? *	729	56.6	53-60.1	363	67.5	63-72.3
10.	Physical examination of you?	630	52.7	50-55.6	233	53.2	43-63.4
11.	Offering you services for preventing diseases (screening, health checks, immunizations, ...)	460	49.1	46-52.6	132	46.0	40-51.9
	Information and support	**2625**	**55.6**	**53-58.1**	**1118**	**59.6**	**53-65.7**
12.	Explaining the purpose of tests and treatments?	737	59.9	57-63.1	329	65.7	59-72.3
13.	Telling you what you wanted to know about your symptoms and/or illness?	774	60.1	57-63.2	341	64.2	57-71.3
14.	Helping you deal with emotional problems related to your health status?	538	49.6	47-52.8	235	54.1	48-60.4
15.	Helping you understand of following his or her advice?	576	51.4	48-54.4	213	51.8	45-58.5
	Continuity and cooperation	**1049**	**54.4**	**51-57.5**	**383**	**59.0**	**52-66.5**
16.	Knowing what s/he had done or told you during earlier contacts?	612	53.4	50-56.8	252	57.8	50-65.4
17.	Preparing you for what to expect from specialist or hospital care?	437	55.7	52-59.7	131	61.5	53-70.5
	Facilities availability and accessibility	**3838**	**50.4**	**48-52.7**	**1465**	**49.7**	**45-54.4**
18.	The helpfulness of the staff (other than the doctor)?	892	66.5	63-70.2	387	70.5	65-76.3
19.	Getting an appointment to suit you?	16	1.2	1-1.8	7	1.3	0-2.4
20.	Getting through to the practice on telephone?	983	72.4	69-75.6	353	66.0	60-71.9
21.	Being able to speak to the general practitioner on the telephone?	599	58.3	55-62.0	189	55.1	47-63.4
22.	Waiting time in the waiting room?	514	38.2	33-43.6	230	42.4	33-52.2
23.	Providing quick services for urgent health problems?	834	71.5	68-74.7	299	71.0	65-77.3

*Significant difference (p<0.05) to COM-group in a multivariate linear or logistic model