Summary

Chapter 1 introduces the theme of neck pain. Neck pain, in adjunction with low back pain, is the most common cause of disability worldwide. The prevalence is around 5% during one year globally. In general, neck pain is described as pain in the back of the neck spreading from the superior nuchal line and the spinous process of T1. However, this describes only the area where the patient perceives the pain. Neck pain usually has a multifactorial etiology and resolves within a few days in most cases.

However, the recurrence and prognostic factors of neck pain have not yet been clearly defined. There are factors that influence the onset and prognosis of neck pain. One of them is patient education. To improve the treatment outcome, current guidelines recommend a structured patient education in combination with exercises, and if the duration is less than three months, manipulation or mobilization can be considered.

Guidelines further recommend frequent reassessment of neck pain to monitor improvement or deterioration. The commonly used assessment tools for patients with neck pain are questionnaires. It is recommended that questionnaires used in the assessment of neck pain should have well confirmed psychometric properties. A novel and important assessment approach is the patient’s perspective of the cervical range of motion. This assessment approach provides patient feedback and information from the patient’s perspective, which may optimize the evaluation of patients with neck pain. Clinicians should obtain patient feedback and information from the patient’s perspective in order to improve and target the treatment accordingly.

In Chapter 2, the findings of a study, which analyzed the data of 545 patients followed for over a year, are presented. The goal was to assess the recurrence and prognostic factors of neck pain. Information about recurrence and prognostic factors is important for patients as well as practitioners to set realistic expectations about the chances of full recovery and to reduce patient anxiety and uncertainty. Only 11% of the patients were classified as having recurrent neck pain. A logistic regression analysis was conducted to identify the possible prognostic factors. The independent variables were age, pain medication use, sex, work status, duration of neck pain, previous episodes of neck pain, and trauma onset. The analysis revealed that previous episodes of neck pain and increasing age were associated with the recurrence of neck pain. Additionally, the recurrence rate was very low.
Chapter 3 presents the study protocol for a randomized clinical trial. Manipulations of the cervical spine have some risks for the patient being treated. Currently, the literature is equivocal, but the risk of treatment should be as limited as possible. Therefore, manipulation of the thoracic spine is a welcome alternative for patients with neck pain, and it has already been shown to be effective. The goal was to compare the short- and long-term effects of manual and mechanically assisted manipulations of the thoracic spine, in combination with a standardized exercise program in patients with neck pain. The aim was to include 54 patients with acute or chronic neck pain, without any serious pathology. Three treatment sessions were planned with a 4-day interval. Patients received either manually- or mechanically-assisted manipulations directed to the thoracic spine. The primary outcome measure was the Visual Analogue Pain Scale score. The secondary outcome measures were the German version of the Neck Disability Index (NDI-G), European Quality of Life 5 Dimensions 5 Levels, and Patient’s Global Impression of Change Scale score. Both interventions were expected to improve neck pain. This treatment approach does not carry the same risks as those associated with manipulations directed to the cervical spine.

Chapter 4 describes the outcomes of a pilot study adhering to the framework as described in chapter 3. The study included 10 patients aged over 18 years, who were able to speak and read German or English, had acute or chronic neck pain, and had not undergone manual therapy for the thoracic spine previously. Five patients received manual manipulations and five received electromechanical manipulations. Both groups showed an improvement in pain scores with no difference between the groups. There was no significant change in the secondary outcome. The electromechanical manipulation group showed a clinically relevant reduction in the NDI. Both manual and electromechanical manipulations were well tolerated, and this finding indicates that both approaches could be successful treatments for neck pain in combination with exercise. Therefore, thoracic manipulations appear to be beneficial for neck pain, while electromechanical manipulations appear to be able to reduce neck disability. The results of this study should be verified in a larger study.

In Chapter 5, the findings of a validation and reliability study conducted for the NDI-G are presented. The NDI is a well-known and widely used questionnaire and has never been translated into German and tested according to established guidelines previously. Patients with acute and chronic neck pain and healthy participants completed the questionnaire twice, within three days. The total score of the NDI showed high reliability and high Cronbach’s alpha. Furthermore, the minimal detectable change and the Bland–Altman plot were presented. The Kruskal–Wallis test showed significant differences in the
total scores between acute neck pain patients and healthy participants. Factor analysis revealed a two-factor structure. The NDI-G is a valid and reliable assessment tool, and its psychometric properties are comparable with those of the original version. Thus, it can be recommended for use in German-speaking countries.

Chapter 6 presents the findings of a validation study that was conducted for the Örebro Musculoskeletal Pain Screening Questionnaire (OMPSQ). This questionnaire was primarily validated in patients with low back pain, and no long-form is available in German. Moreover, this questionnaire was not tested in patients with chronic neck pain. The questionnaire was translated into German, followed by assessment for discriminant validity between patients and healthy adults. Additionally, convergent validity was assessed by using Pearson’s correlation coefficient between the OMPSQ-G, NDI-G, and VAS. Factor analysis, floor and ceiling effects, internal consistency, and test-retest and relative reliability were assessed. Fifty patients with chronic neck pain and 24 healthy adults participated. The Mann–Whitney U test showed significant differences in OMPSQ scores between both groups at baseline and at the second time point. There were no floor and ceiling effects. Cronbach’s alpha was 0.94, and thus, OMPSQ-G showed high reliability. The Bland–Altman plot indicated no systematic error. OMPSQ-G showed good validity and reliability in patients with neck pain. Thus, OMPSQ-G can be used in patients with chronic neck pain.

Chapter 7 presents the findings of a validation study for a newly developed assessment tool. The patient’s perspective of the cervical range of motion is considered. The cervical range of motion is commonly assessed during the first appointment of patients with neck pain. The measurement is often limited by the approach used by the clinician. However, integrating patient perceptual feedback can optimize and personalize treatment. This aspect appears to be lacking in previous studies and has therefore been developed. The aim was to develop and validate a questionnaire (S-ROM-Neck) for evaluating cervical range of motion from the patient’s perspective. The assessment tool was developed and optimized during pretest sessions. The reliability and construct validity of the questionnaire were tested. Fifty participants aged over 18 years, with neck pain for over 90 days were enrolled. Only patients who were able to speak, read, and write German fluently were included. The exclusion criterion was the presence of any condition that could limit manual therapy to the cervical spine. Participants completed S-ROM-Neck twice within seven days, along with the VAS for pain intensity and NDI-G. Relative reliability, internal consistency, and absolute reliability were analyzed. Bland–Altman plots were generated. Construct validity was established by correlating the total score of S-ROM-Neck with the scores of
VAS and NDI-G based on pre-set hypotheses. S-ROM-Neck demonstrated moderate reliability. There were medium negative correlations between VAS and S-ROM-Neck and between NDI-G and S-ROM-Neck. The tool provides patient feedback and information on the patient’s perspective, which may optimize the assessment of patients with neck pain.

Chapter 8 presents the association between objective and subjective cervical range of motion among patients with neck pain, and the awareness of impairments has been assessed. The goal was achieved using a mixed-methods approach.

In chapter 7, the new S-ROM-Neck has been described. This tool provides information on personal feelings with regard to the range of motion. However, it does not provide information on whether the patient experiences impairments because of possible reduction in the range of motion.

It is important to know what the patient expects from the treatment and whether the patient feels impaired. Expectations can have profound effects on treatment outcomes and patient satisfaction. A cervical range of motion instrument (CROM), the NDI, and the S-ROM-Neck were used. Ten patients participated in semi-structured interviews. Correlations were analyzed using Spearman’s rank order correlations \( r_s \). The Mann–Whitney \( U \) test evaluated differences between the patient and assessor. Qualitative data were analyzed by content analysis. Thirty participants were included. Qualitative analysis revealed that patients had general restrictions in daily life and with specific movements, but they adjusted their behavior to avoid impairment. There was a significant correlation between patient and therapist ratings for cervical spine mobility. Although patients experienced restriction while moving and were impaired with regard to specific activities, they adjusted their lifestyle to accommodate their limitations.

In Chapter 9, important and new information with regard to patients experiencing neck pain has been presented. Age and a previous episode of neck pain may influence the recurrence of neck pain. Furthermore, manually and/or electromechanically applied manipulations are successful treatment options for patients with neck pain, with regard to pain and disability. Optimally, they should be combined with exercise. All questionnaires presented in this thesis were found to be valid and reliable for use in chronic neck pain-specific treatment, and they were translated into German and evaluated by current standards for the first time. Additionally, there is now a tool that can capture the patient’s perspective on the range of motion, and this can aid in the evaluation of patients with neck pain.
pain. Furthermore, it is important to mention that the patient’s perspective on cervical spine range of motion and perceptual disability are important aspects for appropriately addressing the patient's needs.