FINAL ASSIGNMENT

The role of exercise therapy and pain education for chronic neck pain after whiplash

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Class: Movement, function and pain
Semester: 7th semester
Assignment: Final assignment
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Program: Physiotherapy
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Submission date: 03/18-2023
Length of assignment: 11.733 including spaces

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List of abbreviations

WAD: Whiplash Associated Disorders

RCT: Randomized Controlled Trial

CBT: Cognitive Behavioral Therapy

1. Introduction to the elective course movement, function and pain

The elective course delivered an overview about current topics for the treatment of chronic pain like the role of pain education, exercise therapy, different manual therapy approaches and motor control. Two treatment sessions with patients who suffered from chronic pain offered students the opportunity to transfer the treatment approaches directly into practice. Reflective based learning was used to challenge the students about how and why they chose interventions for the individual patient. A critical discussion about current research according to the special condition of the patients supported evidence-based practice. The students could test their particular treatment approaches in workshops with feedback of the class before applying it to the patients. The complex history of my patient with chronic neck pain for a period of 9 years after a whiplash formed the interest to follow up my reflection process with a specific research question in this final assignment. After describing the current challenges of treating chronic whiplash associated disorders (WAD), there will be a critical reflection about the role of exercise therapy and pain education in primary care.

2. Challenges for the treatment of whiplash associated disorders

In the following, challenges for the treatment of chronic WAD will be described in the context of physiotherapy. The symptoms after WAD are often presented to physiotherapists and remain difficult to manage (1). Thus, there is evidence that 50 % of the patients will report neck pain 1 year after the accident (2). Central sensitization plays an important role for the persistence of pain (3). Dysfunctional endogenous analgesic control may lead to different responses during or after exercise therapy, such as hyperalgesia. The prescription of exercise therapy should be carefully considered as it can directly influence outcomes of an intervention (4). Pain responses after or during therapy could result in kinesiophobia. An additional pain education with a behavioral approach counteracts these maladaptive coping strategies (5). The recommendation for chronic WAD as a bio-psycho-social phenomena is a treatment in broader, multidisciplinary programs (3, 6, 7). Unfortunately, these multimodal pain management programs are rare and cost intensive ((8). Physiotherapy is still a preferred treatment option for this complex disorder (1). The aim of this paper is therefore to discuss the role of exercise therapy and pain education for the treatment of chronic WAD in the context of primary care.

To specify the research question, the focus will be on the exercise prescription in the presence of nociplastic pain and the efficacy of additional pain education with a behavioral component. The current evidence will be used for the reflection of two treatment sessions with a patient who still complains about neck pain 9 years after a whiplash.

3. The role of exercise therapy and pain education for chronic neck pain after whiplash

The role of exercise therapy and pain education will be discussed in the context of the current evidence, the quality assurance of physiotherapy care and the impact for clinical practice. The quality assurance of physiotherapy care can be assessed by using routinely collected data on patients with WAD. It can be noted that physiotherapy care has improved substantially over a period of 16 years (1). This could be evaluated due to definitions of quality indicators in healthcare using the Donabedian's model (1, 9). Applying these quality indicators for the clinical reasoning process of chronic WAD results in the main factors “explaining underlying pain mechanisms”, “improving active coping” and “increasing physical loadability” (10). Current guidelines in Germany support these factors as a recommendation for the combination of exercise therapy and cognitive behavioral therapy (CBT) (6). While there is no current guideline available in Denmark, international guidelines support the focus on a multimodal treatment approaches (7).

The treatment of a 28 years old male with chronic pain since 9 years after a whiplash demanded a more detailed insight in recommendations for patients with chronic WAD. In the first session, the patient's bio-psycho-social factors were analyzed. He experienced neck pain in longer static sitting positions during exams periods of his study program in medicine. The patient showed maladaptive beliefs about the correlation of rounded sitting and pain. Furthermore, he described a lack of motivation to change his inactive behavior, although general strength training improved his symptoms. His goal was to reduce his pain by his own and to change his inactive behavior. We decided to use a combination of pain education with behavioral components and exercise therapy to support his goal.

For planning our second treatment session, we conducted a search strategy in Pedro to identify high quality clinical trials which described and compared treatment options for chronic WAD. The detailed search strategy is shown in appendix 2.

In contrast to the previously described recommendation of national and international guidelines, a Randomized Controlled Trial (RCT) for our article discussion found no additional effect of CBT when added to a neck-specific exercise program (5). Due to the strong maladaptive beliefs and the wish to change his behavior, we decided to add pain education with a focus on CBT despite this RCT with no additional effect. We used open questions to support the patient's reflection about his understanding of pain and his willingness to change his behavior. Additionally, we used neck-specific exercises with a focus to improve neck muscle endurance as it was described very detailed in the RCT and showed clinical significant improvement for pain, kinesiophobia and patient satisfaction in comparison to the description of physical activity (5). The workshops with Steffan, Samuel and Brian challenged my clinical reasoning about the reasons behind my particular treatment decisions, meaning my choice of intervention, repetition, dose etc. In the following, there will be a reflection about the exercise prescription and the amount of pain education we used while presenting the evidence of systematic reviews. The search strategy in PubMed is presented in appendix 2.

The clinical reasoning for using neck-specific exercises was to improve neck muscle endurance. The use of specific exercises in contrast to just giving the advice for staying active was supported by the previously described RCT (5). In contrast to this specific approach, it could be argued to include also exercises for non-painful areas in the presence of nociplastic pain to prevent exercise-induced hyperalgesia (4). We supported the patient to continue his general strength training program in the gym. The theoretical framework and evidence for this decision motivates me and gives me more self-assurance in my decision-making. There is evidence for the suggestion of 15–20 repetitions, 2 to 3 times a week, for at least 6 weeks, with mild to moderate tolerance meaning 40 to 60 % of 1 Repetition maximum according to strength training for chronic WAD under the presence of nociplastic pain (4). In the RCT, they used 3 x 5 repetitions with 5 seconds hold for isometric exercises (5). This is in line with our description with the goal of improving neck muscle endurance and reducing pain. Our exercise description was detailed for the repetitions and intensity during a day, but not for the week or the long-term outcome. We used one dynamic exercise in a sitting position with 2 x 15 repetitions to facilitate the adherence during a study period (fig.1 – appendix 1) and one isometric exercise for the anterior flexors (fig. 2 – appendix 1) with 3 x 5 repetitions with 5 seconds hold.

In general, I can support our exercise descriptions. There were many implicit thinking processes which could be confirmed afterwards while reading the current evidence. We could use more detailed explanations about the reasons behind our exercises. This may support the adherence for the patient and our self-assurance.

We used pain education and tried to integrate CBT, although the RCT of our article discussion showed no additional effect (5). The reasons behind this decision were the maladaptive beliefs and the willingness for a behavioral change. Furthermore, the current guidelines supported this multimodal treatment (6, 7). A systematic review emphasizes the importance of a multimodal program including pain education because it leads to changes in the pain behavior and enhance physical activity (11). Education can be defined as CBT if the focus is on cognitive and psychological aspects associated with pain such as knowledge, beliefs, fear, stress or relaxation and can lead to improved self-efficacy (12). After a training program, physiotherapist are able to deliver this intervention effectively (13). In my clinical reflection after the treatment session, I had the feeling that we chose the right topics for delivering a CBT focused education, but we missed validating his reasons for his behavior. My training program in motivational interviewing showed me that it could be more effective to validate his thoughts first and to follow his thinking process before acting as a mirror for the reflective process of the patient by his own (14). Nevertheless, we asked him to summarize his learning outcome for the session, and he showed big reflective steps and change talk: “My biggest learning outcomes are, that I want to invest in myself more especially in stressful phases, because in long-term it will support my learning goals and prevent my symptoms.”

The final reflection about the additional effect of CBT for this individual patient can be evaluated by getting qualitative feedback from the patient about the treatment and the improvement of his symptoms in a few weeks.

4. Discussion

The aim of this assignment was to discuss the role of exercise therapy and pain education for the treatment of chronic WAD. For answering this research question, I used specific search strategies n PEDRO, PubMed and added clinical guidelines which is described more detailed in appendix 2. The key messages are shown in appendix 3.

Summarizing the evidence and the reflection progress, the combination of exercise therapy with a focus on neck muscle endurance and pain education with a behavioral focus play an important role for improving pain and function in patients with chronic WAD (1, 6, 7). Nevertheless, there is a need for further research to support these findings and their underlying mechanisms (11, 12). There is evidence for similar mediators of exercise therapy and CBT like improved self-efficacy as a potential factor for positive effects on pain and disability in chronic musculoskeletal pain conditions like WAD. The focus on the main responsible mediators for the treatment effects should be focused in future research (12). Furthermore, the effect sizes in improving outcomes through exercise therapy and pain educations still seem to be small. For example, the improvement in neck muscle endurance in the previous described RCT was still lower after 6 months compared with those reported in healthy individuals, meaning that this population group may require a longer period to maximize improvements (5). This underlines the relevance of my research question about the description of exercise and CBT for this special condition in primary care. The findings could help the physiotherapist in the clinical practice to understand the mechanism of action and to enhance self-assurance in clinical reasoning and decision-making.

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Reference standard: APA

6. Appendices

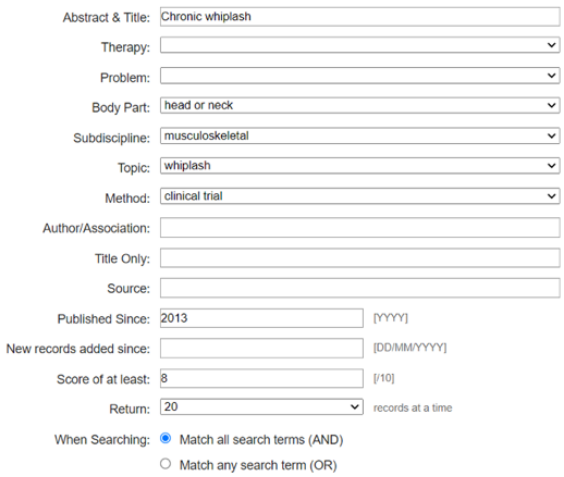
6.1 Appendix 1 – Dynamic and isometric exercises for the patient

Figure 1 dynamic exercise "upright row" 2 x 15 repetitions

Figure 2 static exercise 3 x 5 repetitions with 5 sec hold (5)

6.2 Appendix 2 – Dosis-guide

1. Describe your topic (subject description/brainstorming on possible keywords)
Title: The role of exercise therapy and pain education for chronich neck pain after whiplash **Question**: Which role have exercise therapy and pain education for chonic neck pain after whiplash in the context of physiotherapy? **Brainstorming and to specify the research question:** Which exercise prescription are recommended and why? (global or neck specific exercises? Intensity? Specific prescriptions for chronic/nociplastic pain?) Which additional effect has pain education with a behavioural component? (Transfer into primary care in the context of physiotherapy?)

2: Databases (choices and arguments)		
Database name:	**Arguments for choice of database**	**Date and results**
1: Pedro	**Exact search strategy:**  Abstract & Title: Chronic whiplash Therapy: Problem: Body Part: head or neck Subdiscipline: musculoskeletal Topic: whiplash Method: clinical trial Author/Association: Title Only: Source: Published Since: 2013 [YYYY] New records added since: [DD/MM/YYYY] Score of at least: 8 [/10] Return: 20 records at a time When Searching: Match all search terms (AND) Match any search term (OR) **Arguments:** To identify high quality (8/10 or higher) clinical trials for a comparison of treatment descriptions (exercise therapy AND/OR CBT) for chronic WAD in physiotherapy ➔ Pedro has an own topic filter for whiplash ➔ I can choose high quality articles ○ 8/10 or higher because in physiotherapy it´s often not possible to have blinded therapists for example. This is why 8/10 seems to have a very high quality of internal validity. This is important for evaluating the role of exercise therapy and CBT, although the external validity may be limited. ➔ Focus on chronic whiplash and only on articles from the last 10 years because I wanted to include current evidence for effective treatment programs	**11 results** (10-03-2023) **Excluded: 10** **Reasons for exclusion:** - other interventions in focus - no description of the intervention, therefore difficult to integrate specific implications for our patient **Included: 1 RCT** (5) **Reasons for inclusion:** - high internal validity (PEDRO 8/10) - Follow-up - detailed exercise + CBT description + images of the exercise program **Limitations of the RCT:** - external validity for our patient was low because the exercises were not easy to integrate in his daily life

2: Pubmed	**Exact search strategy:** ("chronic whiplash" OR ("chronic neck pain" OR "persistent neck pain" AND Whiplash")) AND ("exercise therapy" OR "pain education" OR " cognitive behavioral therapy") **Article Type:** Systematic review or Meta-analysis **Arguments:** To identify structured reviews about the treatment of chronic WAD in databases including more than 35 million citations for biomedical literature ➔ no limits according to the publication date but only systematic reviews and Meta-analysis included to get a broader view of the evidence and to compare the results with our RCT from the article discussion	**15 results** (10-03-2023) **Excluded: 11** **Reasons for exclusion:** - No focus on chronic neck pain / chronic WAD **Included: 4** **Reasons for inclusion:** - Focus on chronic / nociplastic pain - Focus on pain education AND/OR exercise therapy **Limitations with the help of CASP and GRADE:** - pain education content is heterogen in most of the studies; comparison is difficult (11) - there are gaps about the underlying mechanism of CBT and exercise therapy; effective mediators should be focused in future research (12, 3) - larger sample sizes are needed to compare the effectiveness of exercise parameters (4)

3: AWMF	To find current german Guidelines	**1 result** (10-03-2023) (6)
4: Sundhed-styrelsen	To find current danish guidelines	**0 results** (10-03-2023)
5: PEDRO	To find current international guidelines	**1 result** (10-03-2023) (7)

3. Block indexing (selected search terms/search techniques for each block)					
Database name:	**Block 1 Population**	**Block 2 Intervention**	**Block 3 Intervention combination**	**Block 4 Outcome**	**…**
1: Pubmed	**search techniques:** ”chronic whiplash” OR (”chronic neck pain” OR ”persistent neck pain” AND Whiplash”)	**search techniques:** "exercise therapy" OR "pain education" OR " cognitive behavioral therapy"	**search techniques:** ”exercise therapy” AND (”pain education” OR ”cognitive behavioral therapy”)	**search techniques:** (”pain” OR ”function” OR ”disability”)	

4. Search results for each individual block (number of hits) Only inlcuded systematic review and meta-analysis					
Database name:	**Block 1 Population**	**Block 2 Intervention**	**Block 3 Intervention combination**	**Block 4 Outcome**	**…**
1: Pubmed	36	6.293	96	55.209	

4. Search results of various block combinations (number of hits)				
Database name:	**Block 1 AND Block 2**	**Block 1 AND Block 2 AND Block 3**	**Block 1 AND Block 3**	**Block 1 AND Block 2 AND Block 4**
1:	15 results	Same results	Same results	Same resuls

6.3 Appendix 3 – Key messages

Key messages
Problem: - 50 % of the patients will report neck pain 1 year after whiplash and recommended multimodal pain management programs are rare. - Addressing chronic WAD in primary care is demanded. **Quality of physiotherapy care:** - Physiotherapy care for WAD has improved substantially over a period of 16 years. - Important quality indicators for treating chronic WAD are “explaining underlying pain mechanisms”, “improving active coping” and “increasing physical loadability”. **Recommendations:** - Exercise therapy and pain education with a behavioral focus are recommended for chronic WAD in national and international guidelines. - In the presence of nociplastic pain, the prescription of exercise should focus on muscle endurance and integrate non-painful body parts besides neck-specific exercises to prevent hyperalgesia. - Physiotherapists are able to deliver CBT after a training program and could address the multidimensional factors of chronic WAD in primary care. **Strengths:** - This assignment had a specific focus on exercise therapy and pain education with structured search strategies. - The reference to my own individual patient enabled the discussion about the transfer into daily practice. **Limitations:** - The underlying mechanism for the effectiveness of exercise therapy and pain education are still unclear. - There were only two treatment sessions with my patient. The long-term effects of neck-specific exercise and the additional benefit of CBT can not be evaluated at this time. **Own critical reflection:** There were many implicit thinking processes about the choice of treatment ideas. It was very helpful for my self-confidence to read about evidence for or against my clinical reasoning. It's a challenge to find high quality research (internal validity) and a good transfer to an individual patient (external validity) at the same time. On the one hand, a deeper reflection was difficult due to the limitation of length in this assignment. On the other hand, I knew from other chronic pain conditions that pain education alone may not be sufficient to improve outcomes and the combination of treatment approaches was the best fit to transfer the results to our patient. This was the reason for my broader search strategy including exercise therapy and CBT.

7. Declaration of Authorship

I hereby declare that I am the sole author of this term paper and that I did not use any other aids or resources than the ones stated. Those parts of the paper that were taken from other works, either as quote or paraphrase, are marked by respective statements of sources. This is also the case for drawings, sketches, illustrations and other similar works. Furthermore, I declare that this term paper has not been handed in for a different academic assessment by me or another person.